INTERNATIONAL TELECOMMUNICATION UNION

Radio Regulations

Edition of 1998

2 *Appendices*

Geneva 1998

Note by the Secretariat

This revision of the Radio Regulations, complementing the Constitution and the Convention of the International Telecommunication Union, incorporates the decisions of the World Radiocommunication Conferences of 1995 (WRC-95) and of 1997 (WRC-97). The provisions of these Regulations apply provisionally as from 1 January 1999, unless otherwise specified (see also Article **S59** of this edition).

In preparing the Radio Regulations, edition of 1998, the Secretariat made editorial changes, where appropriate, to reflect:

– the ITU structural changes (world administrative radio conference to world radiocommunication conference, CCIR to ITU-R, IFRB to the Radiocommunication Bureau, Administrative Council to Council, etc.);

– the replacement of ex-CCIR Reports by ITU-R Recommendations;

– the renumbering of Radio Regulation provisions resulting from the simplification of the Radio Regulations.

The term "Member(s)" has been replaced by the term "Member State(s)[‡]" to correspond with the terminology employed currently within the ITU. The symbol "[‡]" indicates that this replacement was made by the Secretariat.

In addition, the term "the Bureau" has been used to refer to the Radiocommunication Bureau.

The following references to texts of these Radio Regulations appear in bold type:

– Articles, e.g. Article **S52**;

– Provision numbers, e.g. No. **S5.344**;

– Article table numbers, e.g. Table **S22-2**;

– Appendices, e.g. Appendix **S30A**;

– Resolutions, e.g. Resolution **46 (Rev.WRC-97)**;

– Recommendations, e.g. Recommendation **515 (Rev.WRC-97)**.

References to provision numbers which are not preceded by the letter "S" (usually after an oblique stroke in the case of double references) refer to provisions of the Radio Regulations, edition of 1990, revised in 1994.

As Articles **S5**, **S21** and **S22** applied provisionally as from 1 January 1997, they were published previously in Volume 4 of the Radio Regulations, Geneva, 1996. Where provisions in these Articles were modified by the World Radiocommunication Conference (Geneva, 1997), this has been indicated by the addition of "(WRC-97)" at the end of the text of the provision. Similarly, those provisions in these Articles which were abrogated by WRC-97 are shown by the addition of "(SUP - WRC-97)" following the provision number.

Abbreviations have generally been used for the names of world administrative radio conferences and world radiocommunication conferences. These abbreviations are shown on the next page.

Abbreviation	Conference
WARC Mar	World Administrative Radio Conference to Deal with Matters Relating to the Maritime Mobile Service (Geneva, 1967)
WARC-71	World Administrative Radio Conference for Space Telecommunications (Geneva, 1971)
WMARC-74	World Maritime Administrative Radio Conference (Geneva, 1974)
WARC SAT-77	World Broadcasting-Satellite Administrative Radio Conference (Geneva, 1977)
WARC-Aer2	World Administrative Radio Conference on the Aeronautical Mobile (R) Service (Geneva, 1978)
WARC-79	World Administrative Radio Conference (Geneva, 1979)
WARC Mob-83	World Administrative Radio Conference for the Mobile Services (Geneva, 1983)
WARC HFBC-84	World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1984)
WARC Orb-85	World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilising It (First Session – Geneva, 1985)
WARC HFBC-87	World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1987)
WARC Mob-87	World Administrative Radio Conference for the Mobile Services (Geneva, 1987)
WARC Orb-88	World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilising It (Second Session – Geneva, 1988)
WARC-92	World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992)
WRC-95	World Radiocommunication Conference (Geneva, 1995)
WRC-97	World Radiocommunication Conference (Geneva, 1997)
WRC-99	World Radiocommunication Conference, 1999[1]
WRC-01	World Radiocommunication Conference, 2001[2]

[1] This conference will be held in the year 2000.

[2] The date of this conference has not been finalised.

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APPENDIX S1

Classification of emissions and necessary bandwidths

(See Article **S2**)

§ 1 1) Emissions shall be designated according to their necessary bandwidth and their classification as explained in this Appendix.

2) Formulae and examples of emissions designated in accordance with this Appendix are given in Recommendation ITU-R SM.1138. Further examples may be provided in other ITU-R Recommendations. These examples may also be published in the Preface to the International Frequency List.

Section I – Necessary bandwidth

§ 2 1) The necessary bandwidth, as defined in No. **S1.152** and determined in accordance with the formulae and examples, shall be expressed by three numerals and one letter. The letter occupies the position of the decimal point and represents the unit of bandwidth. The first character shall be neither zero nor K, M or G.

2) Necessary bandwidths[1]:

between 0.001 and 999 Hz shall be expressed in Hz (letter H);

between 1.00 and 999 kHz shall be expressed in kHz (letter K);

between 1.00 and 999 MHz shall be expressed in MHz (letter M);

between 1.00 and 999 GHz shall be expressed in GHz (letter G).

3) For the full designation of an emission, the necessary bandwidth, indicated in four characters, shall be added just before the classification symbols. When used, the necessary bandwidth shall be determined by one of the following methods:

3.1) use of the formulae and examples of necessary bandwidths and designation of corresponding emissions given in Recommendation ITU-R SM.1138;

3.2) computation, in accordance with other ITU-R Recommendations;

3.3) measurement, in cases not covered by § 3.1) or 3.2) above.

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[1] Examples:

0.002	Hz	=	H002		6	kHz	=	6K00		1.25	MHz = 1M25
0.1	Hz	=	H100		12.5	kHz	=	12K5		2	MHz = 2M00
25.3	Hz	=	25H3		180.4	kHz	=	180K		10	MHz = 10M0
400	Hz	=	400H		180.5	kHz	=	181K		202	MHz = 202M
2.4	kHz	=	2K40		180.7	kHz	=	181K		5.65	GHz = 5G65

Section II – Classification

§ 3. The class of emission is a set of characteristics conforming to § 4 below.

§ 4 Emissions shall be classified and symbolized according to their basic characteristics as given in Sub-Section IIA and any optional additional characteristics as provided for in Sub-Section IIB.

§ 5 The basic characteristics (see Sub-Section IIA) are:

1) first symbol – type of modulation of the main carrier;

2) second symbol – nature of signal(s) modulating the main carrier;

3) third symbol – type of information to be transmitted.

Modulation used only for short periods and for incidental purposes (such as, in many cases, for identification or calling) may be ignored provided that the necessary bandwidth as indicated is not thereby increased.

Sub-Section IIA – Basic characteristics

§ 6 1) First symbol – type of modulation of the main carrier

1.1)	Emission of an unmodulated carrier	N
1.2)	Emission in which the main carrier is amplitude-modulated (including cases where sub-carriers are angle-modulated)	
1.2.1)	Double-sideband	A
1.2.2)	Single-sideband, full carrier	H
1.2.3)	Single-sideband, reduced or variable level carrier	R
1.2.4)	Single-sideband, suppressed carrier	J
1.2.5)	Independent sidebands	B
1.2.6)	Vestigial sideband	C
1.3)	Emission in which the main carrier is angle-modulated	
1.3.1)	Frequency modulation	F
1.3.2)	Phase modulation	G
1.4)	Emission in which the main carrier is amplitude- and angle-modulated either simultaneously or in a pre-established sequence	D
1.5)	Emission of pulses[2]	
1.5.1)	Sequence of unmodulated pulses	P

[2] Emissions where the main carrier is directly modulated by a signal which has been coded into quantized form (e.g. pulse code modulation) should be designated under § 1.2) or 1.3).

1.5.2) A sequence of pulses

1.5.2.1)	modulated in amplitude	K
1.5.2.2)	modulated in width/duration	L
1.5.2.3)	modulated in position/phase	M
1.5.2.4)	in which the carrier is angle-modulated during the angle-period of the pulse	Q
1.5.2.5)	which is a combination of the foregoing or is produced by other means	V

1.6)	Cases not covered above, in which an emission consists of the main carrier modulated, either simultaneously or in a pre-established sequence, in a combination of two or more of the following modes: amplitude, angle, pulse	W
1.7)	Cases not otherwise covered	X

2) Second symbol – nature of signal(s) modulating the main carrier

2.1)	No modulating signal	0
2.2)	A single channel containing quantized or digital information without the use of a modulating sub-carrier[3]	1
2.3)	A single channel containing quantized or digital information with the use of a modulating sub-carrier[3]	2
2.4)	A single channel containing analogue information	3
2.5)	Two or more channels containing quantized or digital information	7
2.6)	Two or more channels containing analogue information	8
2.7)	Composite system with one or more channels containing quantized or digital information, together with one or more channels containing analogue information	9
2.8)	Cases not otherwise covered	X

3) Third symbol – type of information to be transmitted[4]

3.1)	No information transmitted	N
3.2)	Telegraphy – for aural reception	A
3.3)	Telegraphy – for automatic reception	B
3.4)	Facsimile	C
3.5)	Data transmission, telemetry, telecommand	D

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[3] This excludes time-division multiplex.

[4] In this context the word “information” does not include information of a constant, unvarying nature such as is provided by standard frequency emissions, continuous wave and pulse radars, etc.

3.6)	Telephony (including sound broadcasting)	E
3.7)	Television (video)	F
3.8)	Combination of the above	W
3.9)	Cases not otherwise covered	X

Sub-Section IIB – Optional characteristics for the classification of emissions

§ 7 Two optional characteristics should be added for a more complete description of an emission. These are:

Fourth symbol – Details of signal(s)

Fifth symbol – Nature of multiplexing

Where the fourth or fifth symbol is used it shall be as indicated below.

Where the fourth or the fifth symbol is not used this should be indicated by a dash where each symbol would otherwise appear.

1) *Fourth symbol* – Details of signal(s)

1.1)	Two-condition code with elements of differing numbers and/or durations	A
1.2)	Two-condition code with elements of the same number and duration without error-correction	B
1.3)	Two-condition code with elements of the same number and duration with error-correction	C
1.4)	Four-condition code in which each condition represents a signal element (or one or more bits)	D
1.5)	Multi-condition code in which each condition represents a signal element (of one or more bits)	E
1.6)	Multi-condition code in which each condition or combination of conditions represents a character	F
1.7)	Sound of broadcasting quality (monophonic)	G
1.8)	Sound of broadcasting quality (stereophonic or quadraphonic)	H
1.9)	Sound of commercial quality (excluding categories given in § 1.10) and 1.11))	J
1.10)	Sound of commercial quality with the use of frequency inversion or band-splitting	K
1.11)	Sound of commercial quality with separate frequency-modulated signals to control the level of demodulated signal	L

1.12)	Monochrome	M
1.13)	Colour	N
1.14)	Combination of the above	W
1.15)	Cases not otherwise covered	X

2) *Fifth symbol* – Nature of multiplexing

2.1)	None	N
2.2)	Code-division multiplex[5]	C
2.3)	Frequency-division multiplex	F
2.4)	Time-division multiplex	T
2.5)	Combination of frequency-division multiplex and time-division multiplex	W
2.6)	Other types of multiplexing	X

5 This includes bandwidth expansion techniques.

APPENDIX S2

Table of transmitter frequency tolerances

(See Article **S3**)

1 Frequency tolerance is defined in Article **S1** and is expressed in parts in 10^6, unless otherwise indicated.

2 The power shown for the various categories of stations is the peak envelope power for single-sideband transmitters and the mean power for all other transmitters, unless otherwise indicated. The term "power of a radio transmitter" is defined in Article **S1**.

3 For technical and operational reasons, certain categories of stations may need more stringent tolerances than those shown in the table.

Frequency bands (lower limit exclusive, upper limit inclusive) and categories of stations	**Tolerances applicable to transmitters**
Band: **9 kHz to 535 kHz**	
1 *Fixed stations:*	
– 9 kHz to 50 kHz	100
– 50 kHz to 535 kHz	50
2 *Land stations:*	
a) Coast stations	100 [1, 2]
b) Aeronautical stations	100
3 *Mobile stations:*	
a) Ship stations	200 [3, 4]
b) Ship's emergency transmitters	500 [5]
c) Survival craft stations	500
d) Aircraft stations	100
4 *Radiodetermination stations*	100
5 *Broadcasting stations*	10 Hz
Band: **535 kHz to 1 606.5 kHz (1 605 kHz in Region 2)**	
Broadcasting stations	10 Hz [6]
Band: **1 606.5 kHz (1 605 kHz in Region 2) to 4 000 kHz**	
1 *Fixed stations:*	
– power 200 W or less	100 [7, 8]
– power above 200 W	50 [7, 8]
2 *Land stations:*	
– power 200 W or less	100 [1, 2, 7, 9, 10]
– power above 200 W	50 [1, 2, 7, 9, 10]

Frequency bands (lower limit exclusive, upper limit inclusive) and categories of stations	Tolerances applicable to transmitters
Band: **1 606.5 kHz (1 605 kHz in Region 2) to 4 000 kHz** *(cont.)*	
3 *Mobile stations:*	
a) Ship stations	40 Hz [3, 4, 12]
b) Survival craft stations	100
c) Emergency position-indicating radiobeacons	100
d) Aircraft stations	100 [10]
e) Land mobile stations	50 [13]
4 *Radiodetermination stations:*	
– power 200 W or less	20 [14]
– power above 200 W	10 [14]
5 *Broadcasting stations*	10 Hz [15]
Band: **4 MHz to 29.7 MHz**	
1 *Fixed stations:*	
a) Single-sideband and independent-sideband emissions:	
– power 500 W or less	50 Hz
– power above 500 W	20 Hz
b) Class F1B emissions	10 Hz
c) Other classes of emission:	
– power 500 W or less	20
– power above 500 W	10
2 *Land stations:*	
a) Coast stations	20 Hz [1, 2, 16]
b) Aeronautical stations:	
– power 500 W or less	100 [10]
– power above 500 W	50 [10]
c) Base stations	20 [7]
3 *Mobile stations:*	
a) Ship stations:	
1) Class A1A emissions	10
2) Emissions other than Class A1A	50 Hz [3, 4, 19]
b) Survival craft stations	50
c) Aircraft stations	100 [10]
d) Land mobile stations	40 [20]
4 *Broadcasting stations*	10 Hz [15, 21]
5 *Space stations*	20
6 *Earth stations*	20

Frequency bands (lower limit exclusive, upper limit inclusive) and categories of stations	Tolerances applicable to transmitters
Band: **29.7 MHz to 100 MHz**	
1 *Fixed stations:*	
– power 50 W or less	30
– power above 50 W	20
2 *Land stations*	20
3 *Mobile stations*	20 [22]
4 *Radiodetermination stations*	50
5 *Broadcasting stations (other than television)*	2 000 Hz [23]
6 *Broadcasting stations (television sound and vision)*	500 Hz [24, 25]
7 *Space stations*	20
8 *Earth stations*	20
Band: **100 MHz to 470 MHz**	
1 *Fixed stations:*	
– power 50 W or less	20 [26]
– power above 50 W	10
2 *Land stations:*	
a) Coast stations	10
b) Aeronautical stations	20 [28]
c) Base stations:	
– in the band 100-235 MHz	15 [29]
– in the band 235-401 MHz	7 [29]
– in the band 401-470 MHz	5 [29]
3 *Mobile stations:*	
a) Ship stations and survival craft stations:	
– in the band 156-174 MHz	10
– outside the band 156-174 MHz	50 [31]
b) Aircraft stations	30 [28]
c) Land mobile stations:	
– in the band 100-235 MHz	15 [29]
– in the band 235-401 MHz	7 [29, 32]
– in the band 401-470 MHz	5 [29, 32]
4 *Radiodetermination stations*	50 [33]
5 *Broadcasting stations (other than television)*	2 000 Hz [23]
6 *Broadcasting stations (television sound and vision)*	500 Hz [24, 25]
7 *Space stations*	20
8 *Earth stations*	20

Frequency bands (lower limit exclusive, upper limit inclusive) and categories of stations	Tolerances applicable to transmitters
Band: **470 MHz to 2 450 MHz**	
1 *Fixed stations:*	
– power 100 W or less	100
– power above 100 W	50
2 *Land stations*	20 [36]
3 *Mobile stations*	20 [36]
4 *Radiodetermination stations*	500 [33]
5 *Broadcasting stations (other than television)*	100
6 *Broadcasting stations (television sound and vision)* in the band 470 MHz to 960 MHz	500 Hz [24, 25]
7 *Space stations*	20
8 *Earth stations*	20
Band: **2 450 MHz to 10 500 MHz**	
1 *Fixed stations:*	
– power 100 W or less	200
– power above 100 W	50
2 *Land stations*	100
3 *Mobile stations*	100
4 *Radiodetermination stations*	1 250 [33]
5 *Space stations*	50
6 *Earth stations*	50
Band: **10.5 GHz to 40 GHz**	
1 *Fixed station*	300
2 *Radiodetermination stations*	5 000 [33]
3 *Broadcasting stations*	100
4 *Space stations*	100
5 *Earth stations*	100

Notes in the table of transmitter frequency tolerances

1 For coast station transmitters used for direct-printing telegraphy or for data transmission, the tolerance is:

– 5 Hz for narrow-band phase-shift keying;

– 15 Hz for frequency-shift keying for transmitters in use or installed before 2 January 1992;

– 10 Hz for frequency-shift keying for transmitters installed after 1 January 1992.

2 For coast station transmitters used for digital selective calling, the tolerance is 10 Hz. This tolerance applies to transmitters installed after 1 January 1992 and to all transmitters after the date of full implementation of the GMDSS (see Resolution **331 (Rev.WRC-97)**).

3 For ship station transmitters used for direct-printing telegraphy or for data transmission, the tolerance is:

– 5 Hz for narrow-band phase-shift keying;

– 40 Hz for frequency-shift keying for transmitters in use or installed before 2 January 1992;

– 10 Hz for frequency-shift keying for transmitters installed after 1 January 1992.

4 For ship station transmitters used for digital selective calling, the tolerance is 10 Hz. This tolerance applies to transmitters installed after 1 January 1992 and to all transmitters after the date of full implementation of the GMDSS (see Resolution **331 (Rev.WRC-97)**).

5 If the emergency transmitter is used as the reserve transmitter for the main transmitter, the tolerance for ship station transmitters applies.

6 In countries covered by the North American Regional Broadcasting Agreement (NARBA) the tolerance of 20 Hz may continue to be applied.

7 For single-sideband radiotelephone transmitters except at coast stations, the tolerance is:

– 50 Hz in the bands 1 606.5 (1 605 Region 2)-4 000 kHz and 4-29.7 MHz, for peak envelope powers of 200 W or less and 500 W or less, respectively;

– 20 Hz in the bands 1 606.5 (1 605 Region 2)-4 000 kHz and 4-29.7 MHz, for peak envelope powers above 200 W and 500 W, respectively.

8 For radiotelegraphy transmitters with frequency-shift keying the tolerance is 10 Hz.

9 For coast station single-sideband radiotelephone transmitters the tolerance is 20 Hz.

10 For single-sideband transmitters operating in the frequency bands 1 606.5 (1 605 Region 2)-4 000 kHz and 4-29.7 MHz which are allocated exclusively to the aeronautical mobile (R) service, the tolerance on the carrier (reference) frequency is:

a) for all aeronautical stations, 10 Hz;

b) for all aircraft stations operating on international services, 20 Hz;

c) for aircraft stations operating exclusively on national services, 50 Hz*.

11 Not used.

12 For A1A emissions the tolerance is 50×10^{-6}.

13 For transmitters used for single-sideband radiotelephony or for frequency-shift keying radiotelegraphy the tolerance is 40 Hz.

14 For radiobeacon transmitters in the band 1 606.5 (1 605 Region 2)-1 800 kHz the tolerance is 50×10^{-6}.

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* NOTE – In order to achieve maximum intelligibility, it is suggested that administrations encourage the reduction of this tolerance to 20 Hz.

[15] For A3E emissions with carrier power of 10 kW or less the tolerance is 20×10^{-6}, 15×10^{-6} and 10×10^{-6} in the bands 1 606.5 (1 605 Region 2)-4 000 kHz, 4-5.95 MHz and 5.95-29.7 MHz respectively.

[16] For A1A emissions the tolerance is 10×10^{-6}.

[17] Not used.

[18] Not used.

[19] For ship station transmitters in the band 26 175-27 500 kHz, on board small craft, with a carrier power not exceeding 5 W in or near coastal waters and utilizing A3E or F3E and G3E emissions, the frequency tolerance is 40×10^{-6}.

[20] The tolerance is 50 Hz for single-sideband radiotelephone transmitters, except for those transmitters operating in the band 26 175-27 500 kHz, and not exceeding a peak envelope power of 15 W, for which the basic tolerance of 40×10^{-6} applies.

[21] It is suggested that administrations avoid carrier frequency differences of a few hertz, which cause degradations similar to periodic fading. This could be avoided if the frequency tolerance were 0.1 Hz, a tolerance which would be suitable for single-sideband emissions*.

[22] For non-vehicular mounted portable equipment with a transmitter mean power not exceeding 5 W, the tolerance is 40×10^{-6}.

[23] For transmitters of a mean power of 50 W or less operating at frequencies below 108 MHz a tolerance of 3 000 Hz applies.

[24] In the case of television stations of:

– 50 W (vision peak envelope power) or less in the band 29.7-100 MHz;

– 100 W (vision peak envelope power) or less in the band 100-960 MHz;

and which receive their input from other television stations or which serve small isolated communities, it may not, for operational reasons, be possible to maintain this tolerance. For such stations, the tolerance is 2 000 Hz.

For stations of 1 W (vision peak envelope power) or less, this tolerance may be relaxed further to:

– 5 kHz in the band 100-470 MHz;

– 10 kHz in the band 470-960 MHz.

[25] For transmitters for system M (NTSC) the tolerance is 1 000 Hz. However, for low power transmitters using this system Note 24 applies.

[26] For multi-hop radio-relay systems employing direct frequency conversion the tolerance is 30×10^{-6}.

[27] Not used.

[28] For a channel spacing of 50 kHz the tolerance is 50×10^{-6}.

[29] These tolerances apply to channel spacings equal to or greater than 20 kHz.

[30] Not used.

[31] For transmitters used by on-board communication stations a tolerance of 5×10^{-6} shall apply.

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* NOTE – The single-sideband system adopted for the bands exclusively allocated to HF broadcasting does not require a frequency tolerance less than 10 Hz. The above-mentioned degradation occurs when the ratio of wanted-to-interfering signal is well below the required protection ratio. This remark is equally valid for both double- and single-sideband emissions.

[32] For non-vehicular mounted portable equipment with a transmitter mean power not exceeding 5 W the tolerance is 15×10^{-6}.

[33] Where specific frequencies are not assigned to radar stations, the bandwidth occupied by the emissions of such stations shall be maintained wholly within the band allocated to the service and the indicated tolerance does not apply.

[34] Not used.

[35] Not used.

[36] In applying this tolerance administrations should be guided by the latest relevant ITU-R Recommendations.

APPENDIX S3

Table of maximum permitted spurious emission power levels

(See Article **S3**)

1 The following sections indicate the maximum permitted levels of spurious emissions, in terms of power as indicated in the tables, of any spurious component supplied by a transmitter to the antenna transmission line. Section I is applicable until 1 January 2012 to transmitters installed on or before 1 January 2003; Section II is applicable to transmitters installed after 1 January 2003 and to all transmitters after 1 January 2012. This Appendix does not cover out-of-band emissions. Out-of-band emissions are dealt with in No. **S4.5**.

2 Spurious emission from any part of the installation, other than the antenna and its transmission line, shall not have an effect greater than would occur if this antenna system were supplied with the maximum permitted power at that spurious emission frequency.

3 These levels shall not, however, apply to emergency position-indicating radiobeacon (EPIRB) stations, emergency locator transmitters, ships' emergency transmitters, lifeboat transmitters, survival craft stations or maritime transmitters when used in emergency situations.

4 For technical or operational reasons, more stringent levels than those specified may be applied to protect specific services in certain frequency bands. The levels applied to protect these services, such as safety and passive services, shall be those agreed upon by the appropriate world radiocommunication conference. More stringent levels may also be fixed by specific agreement between the administrations concerned. Additionally, special consideration of transmitter spurious emissions may be required for the protection of safety services, radio astronomy and space services using passive sensors. Information on the levels of interference detrimental to radio astronomy, Earth exploration satellites and meteorological passive sensing is given in the most recent version of Recommendation ITU-R SM.329.

5 Spurious emission limits for combined radiocommunication and information technology equipment are those for the radiocommunication transmitters.

Section I – Spurious emission limits for transmitters installed on or before 1 January 2003 (valid until 1 January 2012)

6 The measurement methods for radar systems should be guided by Recommendation ITU-R M.1177. For those radar systems for which acceptable methods of measurement do not exist, the lowest practicable power of spurious emission should be achieved.

TABLE I

Attenuation values and absolute mean power levels used to calculate maximum permitted spurious emission power levels for use with radio equipment

Frequency band containing the assignment (lower limit exclusive, upper limit inclusive)	**For any spurious component, the attenuation (mean power within the necessary bandwidth relative to the mean power of the spurious component concerned) shall be at least that specified below and the absolute mean power levels given shall not be exceeded**[1]
9 kHz to 30 MHz	40 dB 50 mW [2, 3, 4]
30 MHz to 235 MHz – mean power above 25 W – mean power 25 W or less	 60 dB 1 mW [5] 40 dB 25 μW
235 MHz to 960 MHz – mean power above 25 W – mean power 25 W or less	 60 dB 20 mW [6, 7] 40 dB 25 μW [6, 7]
960 MHz to 17.7 GHz – mean power above 10 W – mean power 10 W or less	 50 dB 100 mW [6, 7, 8, 9] 100 μW [6, 7, 8, 9]
Above 17.7 GHz	The lowest possible values achievable shall be employed (see Recommendation **66 (Rev.WRC-97**)).

1 When checking compliance with the provisions of the Table, it shall be verified that the bandwidth of the measuring equipment is sufficiently wide to accept all significant components of the spurious emission concerned.

2 For mobile transmitters which operate below 30 MHz, any spurious component shall have an attenuation of at least 40 dB without exceeding the value of 200 mW, but every effort should be made to comply with the level of 50 mW wherever practicable.

3 For transmitters of a mean power exceeding 50 kW which can operate on two or more frequencies covering a frequency range approaching an octave or more, while a reduction below 50 mW is not mandatory, a minimum attenuation of 60 dB shall be provided.

4 For hand-portable equipment of mean power less than 5 W, the attenuation shall be 30 dB, but every practicable effort should be made to attain 40 dB attenuation.

5 Administrations may adopt a level of 10 mW provided that harmful interference is not caused.

TABLE I (*end*)

[6] Where several transmitters feed a common antenna or closely spaced antennas on neighbouring frequencies, every practicable effort should be made to comply with the levels specified.

[7] Since these levels may not provide adequate protection for receiving stations in the radio astronomy and space services, more stringent levels might be considered in each individual case in the light of the geographical position of the stations concerned.

[8] These levels are not applicable to systems using digital modulation techniques, but may be used as a guide. Values for these systems may be provided by the relevant ITU-R Recommendations, when available (see Recommendation **66 (Rev.WRC-97)**).

[9] These levels are not applicable to stations in the space services, but the levels of their spurious emissions should be reduced to the lowest possible values compatible with the technical and economic constraints to which the equipment is subject. Values for these systems may be provided by the relevant ITU-R Recommendations, when available (see Recommendation **66 Rev.WRC-97)**).

Section II – Spurious emission limits for transmitters installed after 1 January 2003 and for all transmitters after 1 January 2012

Application of these limits

7 The frequency range of the measurement of spurious emissions is from 9 kHz to 110 GHz or the second harmonic if higher.

8 Guidance regarding the methods of measuring spurious emissions is given in the most recent version of Recommendation ITU-R SM.329. The e.i.r.p. method specified in that Recommendation should be used when it is not possible to measure the power supplied to the antenna transmission line. Additionally, the e.i.r.p. method may need some modification for special cases, e.g. beam-forming radars.

9 Guidance regarding the methods of measuring spurious emissions from radar systems is given in the most recent version of Recommendation ITU-R M.1177. The reference bandwidths required for proper measurement of radar spurious emissions should be calculated for each particular radar system. Thus, for the three general types of radar pulse modulation utilized for radionavigation, radiolocation, acquisition, tracking and other radiodetermination functions, the reference bandwidth values should be:

– for fixed-frequency, non-pulse-coded radar, one divided by the radar pulse length, in seconds (e.g. if the radar pulse length is 1 μs, then the reference bandwidth is 1/1 μs = 1 MHz);

– for fixed-frequency, phase coded pulsed radar, one divided by the phase chip length, in seconds (e.g. if the phase coded chip is 2 μs long, then the reference bandwidth is 1/2 μs = 500 kHz);

– for frequency modulated (FM) or chirped radar, the square root of the quantity obtained by dividing the radar bandwidth in MHz by the pulse length, in seconds (e.g. if the FM is from 1 250 MHz to 1 280 MHz or 30 MHz during the pulse of 10 μs, then the reference bandwidth is (30 MHz/10 μs)$^{1/2}$ = 1.73 MHz).

For those radar systems for which acceptable methods of measurement do not exist, the lowest practicable power of spurious emission should be achieved.

10 The spurious emission levels are specified in the following reference bandwidths:

– 1 kHz between 9 kHz and 150 kHz

– 10 kHz between 150 kHz and 30 MHz

– 100 kHz between 30 MHz and 1 GHz

– 1 MHz above 1 GHz.

As a special case, the reference bandwidth of all space service spurious emissions should be 4 kHz.

11 For the purpose of setting limits, all emissions, including harmonic emissions, intermodulation products, frequency conversion products and parasitic emissions, which fall at frequencies separated from the centre frequency of the emission by ±250%, or more, of the necessary bandwidth of the emission will generally be considered as spurious emissions. However, this frequency separation may be dependent on the type of modulation used, the maximum bit rate in the case of digital modulation, the type of transmitter and frequency coordination factors. For example, in the case of digital (including digital broadcasting) modulation systems, broadband systems, pulsed modulation systems and narrow-band high power transmitters, the frequency separation may need to differ from the ±250% factor. For multichannel or multicarrier transmitters/transponders, where several carriers may be transmitted simultaneously from a final output amplifier or an active antenna, the centre frequency of the emission is taken to be the centre of the −3 dB bandwidth of the transmitter or transponder and the necessary bandwidth is taken to be the transmitter or transponder bandwidth.

12 Examples of applying 43 + 10 log (*P*) to calculate attenuation requirements

Where specified in relation to mean power, spurious emissions are to be at least *x* dB below the total mean power *P*, i.e. −*x* dBc. The power *P* (W) is to be measured in a bandwidth wide enough to include the total mean power. The spurious emissions are to be measured in the

reference bandwidths given in the Recommendation. The measurement of the spurious emission power is independent of the value of necessary bandwidth. Because the absolute emission power limit, derived from 43 + 10 log (*P*), can become too stringent for high-power transmitters, alternative relative powers are also provided in Table II.

Example 1

A land mobile transmitter, with any value of necessary bandwidth, must meet a spurious emission attenuation of 43 + 10 log (*P*), or 70 dBc, whichever is less stringent. To measure spurious emissions in the frequency range between 30 MHz and 1 GHz, Recommendation ITU-R SM.329-7 *recommends* 4.1 indicates the use of a reference bandwidth of 100 kHz. For other frequency ranges, the measurement must use the appropriate reference bandwidths given in *recommends* 4.1.

With a measured total mean power of 10 W:

– Attenuation relative to total mean power = 43 + 10 log (10) = 53 dBc.

– The 53 dBc value is less stringent than the 70 dBc, so the 53 dBc value is used.

– Therefore: Spurious emissions must not exceed 53 dBc in a 100 kHz bandwidth, or converting to an absolute level, spurious emissions must not exceed 10 dBW – 53 dBc = −43 dBW in a 100 kHz reference bandwidth.

With a measured total mean power of 1 000 W:

– Attenuation relative to total mean power = 43 + 10 log (1 000) = 73 dBc.

– The 73 dBc value is more stringent than the 70 dBc limit, so the 70 dBc value is used.

– Therefore: Spurious emissions must not exceed 70 dBc in a 100 kHz bandwidth, or converting to an absolute level, spurious emissions must not exceed 30 dBW – 70 dBc = −40 dBW in a 100 kHz reference bandwidth.

Example 2

A space service transmitter with any value of necessary bandwidth must meet a spurious emission attenuation of 43 + 10 log (*P*), or 60 dBc, whichever is less stringent. To measure spurious emissions at any frequency, Note 10 to Table II indicates using a reference bandwidth of 4 kHz.

With a measured total mean power of 20 W:

– Attenuation relative to total mean power = 43 + 10 log (20) = 56 dBc.

– The 56 dBc value is less stringent than the 60 dBc limit, so the 56 dBc value is used.

– Therefore: Spurious emissions must not exceed 56 dBc in a 4 kHz reference bandwidth, or converting to an absolute level, spurious emissions must not exceed 13 dBW – 56 dBc = –43 dBW in a 4 kHz reference bandwidth.

TABLE II

Attenuation values used to calculate maximum permitted spurious emission power levels for use with radio equipment

Service category in accordance with Article S1, or equipment type [15]	**Attenuation (dB) below the power supplied to the antenna transmission line**
All services except those services quoted below:	43 + 10 log (*P*), or 70 dBc, whichever is less stringent
Space services (earth stations) [10, 14]	43 + 10 log (*P*), or 60 dBc, whichever is less stringent
Space services (space stations) [10, 14]	43 + 10 log (*P*), or 60 dBc, whichever is less stringent
Radiodetermination	43 + 10 log (*PEP*), or 60 dB, whichever is less stringent
Broadcast television [11]	46 + 10 log (*P*), or 60 dBc, whichever is less stringent, without exceeding the absolute mean power level of 1 mW for VHF stations or 12 mW for UHF stations. However, greater attenuation may be necessary on a case by case basis.
Broadcast FM	46 + 10 log (*P*), or 70 dBc, whichever is less stringent; the absolute mean power level of 1 mW should not be exceeded
Broadcasting at MF/HF	50 dBc; the absolute mean power level of 50 mW should not be exceeded
SSB from mobile stations [12]	43 dB below *PEP*
Amateur services operating below 30 MHz (including with SSB) [12]	43 + 10 log (*PEP*), or 50 dB, whichever is less stringent
Services operating below 30 MHz, except space, radiodetermination, broadcast, those using SSB from mobile stations, and amateur [12]	43 + 10 log (*X*), or 60 dBc, whichever is less stringent, where $X = PEP$ for SSB modulation, and $X = P$ for other modulation

TABLE II (*end*)

Service category in accordance with Article S1, or equipment type[15]	**Attenuation (dB) below the power supplied to the antenna transmission line**
Low-power device radio equipment[13]	56 + 10 log (*P*), or 40 dBc, whichever is less stringent
Emergency position-indicating radio beacon Emergency locator transmitter Personal location beacon Search and rescue transponder Ship emergency, lifeboat and survival craft transmitters Land, aeronautical or maritime transmitters when used in emergency	No limit

P: mean power in watts supplied to the antenna transmission line, in accordance with No. **S1.158**. When burst transmission is used, the mean power *P* and the mean power of any spurious emissions are measured using power averaging over the burst duration.

PEP: peak envelope power in watts supplied to the antenna transmission line, in accordance with No. **S1.157**.

dBc: decibels relative to the unmodulated carrier power of the emission. In the cases which do not have a carrier, for example in some digital modulation schemes where the carrier is not accessible for measurement, the reference level equivalent to dBc is decibels relative to the mean power *P*.

[10] Spurious emission limits for all space services are stated in a 4 kHz reference bandwidth.

[11] For analogue television transmissions, the mean power level is defined with a specified video signal modulation. This video signal has to be chosen in such a way that the maximum mean power level (e.g. at the video signal blanking level for negatively modulated television systems) is supplied to the antenna transmission line.

[12] All classes of emission using SSB are included in the category “SSB”.

[13] Low-power radio devices having a maximum output power of less than 100 mW and intended for short-range communication or control purposes; such equipment is in general exempt from individual licensing.

[14] These values are “design objectives”. This note will not be applicable after WRC-99.

[15] In some cases of digital modulation (including digital broadcasting), broadband systems, pulsed modulation and narrow-band high-power transmitters for all categories of services, there may be difficulties in meeting limits close to ± 250% of the necessary bandwidth.

APPENDIX S4

Consolidated list and tables of characteristics for use in the application of the procedures of Chapter SIII

1 The substance of this Appendix is separated into two parts: one concerning data and their use for terrestrial radiocommunication services and another concerning data and their use for space radiocommunication services.

2 Both parts contain a list of characteristics and a table indicating the use of each of the characteristics in specific circumstances.

Annex 1A: List of characteristics of stations in the terrestrial services

Annex 1B: Table of characteristics to be submitted for stations in the terrestrial services

Annex 2A: Characteristics of satellite networks or earth or radio astronomy stations

Annex 2B: Table of characteristics to be submitted for space and radio astronomy services.

ANNEX 1A

List of characteristics of stations in the terrestrial services[1]

ITEM B – Notifying administration

Country symbol of the notifying administration.

ITEM SYNC – Synchronized network

Symbol followed by the identification number of the network, if the station concerned by the assignment pertains to a synchronized network.

ITEM 1A – Assigned frequency

The assigned frequency as defined in Article **S1**.

ITEM 1B – Reference frequency

The reference frequency as defined in Article **S1**.

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[1] The Radiocommunication Bureau shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Appendix and related decisions of future conferences. Additional information on the items listed in this Annex together with an explanation of the symbols is to be found in the Preface to the International Frequency List.

ITEM 1C – Preferred band (MHz)

For notifications under No. **S7.6** and for HF broadcasting stations in their exclusive bands.

ITEM 1D – Vision Carrier Frequency

The vision carrier frequency of a television broadcasting assignment.

ITEM 1E – Frequency offset

The carrier frequency offset expressed as a multiple of 1/12 of the line frequency of the television system concerned, expressed by a number and a symbol (P or M).

ITEM 1G – Alternative frequency

For HF broadcasting stations in their exclusive bands.

ITEM 1H – Other frequencies used

For HF broadcasting stations in their exclusive bands.

ITEM 1X – Channel number proposed or allotted channel

For HF coast radiotelephone stations.

ITEM 1Y – Channel number of the alternative proposed channel

For HF coast radiotelephone stations.

ITEM 1Z – Channel number of channel to be replaced

For HF coast radiotelephone stations.

ITEM 2C – Date of bringing into use

The date (actual or foreseen, as appropriate) of bringing the frequency assignment (new or modified) into use.

ITEM 3A – Call sign or identification

The call sign or other identification used in accordance with Article **S19**.

ITEM 4A – Name of the transmitting station

The name of the locality by which the transmitting station is known or in which it is situated.

ITEM 4B – Country or geographical area

The country or geographical area in which the station is located.

ITEM 4C – Geographical coordinates

The geographical coordinates (longitude and latitude in degrees and minutes) of the transmitter site. In some cases, seconds are also indicated.

ITEM 4D – Radius of the circular area

The nominal radius (km) of the circular area in which the mobile transmitting stations are operating.

ITEM 4E – Country symbol or standard defined area

A country symbol or a standard defined area described by the symbols contained in standard references.

ITEM 4F – B1 character (transmitter coverage area identifier)

For a coast station assignment in the international NAVTEX system.

ITEM 4G – Ground conductivity

For assignments to stations of the broadcasting service covered by the LF/MF Broadcasting Agreement (Regions 1 and 3) (Geneva, 1975).

ITEM 5A – Name of the receiving station

The name of the locality by which the receiving station is known or in which it is situated.

ITEM 5B – Country or geographical area

The country or geographical area in which the receiving station is located.

ITEM 5C – Geographical coordinates

The geographical coordinates (longitude and latitude in degrees and minutes) of the site of the receiving station.

ITEM 5D – Area of the receiving station(s)

The standard defined area of reception of the transmitting station.

ITEM 5E – Longitude and latitude of the centre of the circular receiving area

The geographical coordinates (in degrees and minutes).

ITEM 5F – Nominal radius of the circular receiving area

The radius (km) of the circular receiving area.

ITEM 5G – Maximum length of circuit

The maximum length of the circuit (in km) for receiving areas other than circular.

ITEM 6A – Class of station

The class of station described by a symbol.

ITEM 6B – Nature of service

The nature of service described by a symbol.

ITEM 7A – Class of emission, necessary bandwidth and description of transmission

The class of emission, necessary bandwidth and description of transmission, in accordance with Article **S2** and Appendix **S1**.

ITEM 7AA – Type of modulation

The choice of modulation is needed in order to specify if the requirement is to use DSB, SSB or any new broadcasting techniques recommended by ITU-R.

ITEM 7B – Class of operation of the assignment

The class of operation of the assignment.

ITEM 7C1 – Television system

Symbol corresponding to the television system.

ITEM 7C2 – Colour system

Symbol corresponding to the colour system.

ITEM 7D – Transmission system

Symbol corresponding to the transmission system for an assignment to a broadcasting station.

ITEM 7E – Frequency deviation

For any type of modulation, as applicable: the peak-to-peak frequency deviation (MHz).

ITEM 7F – Energy dispersal

For any type of modulation, as applicable: the sweep frequency (kHz) of the energy dispersal waveform.

ITEM 8 – Power (dBW)

Symbol X, Y or Z describing, as appropriate, the type of power corresponding to the class of emission.

ITEM 8A – Power delivered to the antenna (dBW)

The power delivered to the antenna transmission line expressed in dBW.

ITEM 8AB – Maximum power density (dB(W/Hz))

The maximum power density (dB(W/Hz)) for each carrier type averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz, supplied to the antenna transmission line.

ITEM 8B – Radiated power (dBW)

The radiated power expressed in dBW in one of the forms described in Nos. **S1.161** to **S1.163**. In the case of systems where automatic power control is applied, indicate the range of power control, expressed in dB relative to the transmitted power indicated above.

ITEM 8BH – Effective radiated power (dBW) – horizontal

The effective radiated power of the horizontal polarization component (for VHF sound broadcasting (BC) and VHF/UHF television broadcasting (BT) assignments).

ITEM 8BV – Effective radiated power (dBW) – vertical

The effective radiated power of the vertical polarization component (for VHF sound broadcasting (BC) and VHF/UHF television broadcasting (BT) assignments).

ITEM 8D – Vision/sound power ratio

Vision/sound carrier power ratio for VHF/UHF television broadcasting (BT) assignments.

ITEM 9 – Directivity of the antenna

Directional (D) or non-directional (ND) antenna.

ITEM 9A – Azimuth of maximum radiation

For a directional transmitting antenna, the azimuth of maximum radiation of the transmitting antenna in degrees (clockwise) from True North, or the symbol “ND” for a non-directional antenna.

ITEM 9AA – Central azimuth of augmentation

The central azimuth of the augmentation (centre of the span) in degrees for an assignment to a broadcasting station.

ITEM 9AB – Azimuthal sector for rotating antenna

Two azimuths in degrees (clockwise from True North) defining the sector in which the antenna rotates.

ITEM 9B – Elevation angle of maximum directivity

The angle of maximum directivity in degrees with one decimal position.

ITEM 9C – Angular width of radiation main lobe (beamwidth)

The total angle measured horizontally in a plane containing the direction of maximum radiation, in degrees, within which the power radiated in any direction does not fall more than 3 dB below the power radiated in the direction of maximum radiation.

ITEM 9CA – Total span of augmentation

The total span of the augmentation in degrees for an assignment to a broadcasting station.

ITEM 9D – Polarization

Information on polarization.

ITEM 9E – Height of antenna

Information on height above ground level, in metres.

ITEM 9EA – Altitude of site above sea level

Information on the altitude of the site above mean sea level, in metres (for VHF sound broadcasting (BC) and VHF/UHF television broadcasting (BT) assignments, and for all terrestrial stations in the frequency bands above 1 GHz that are shared between space radiocommunication and terrestrial radiocommunication services).

ITEM 9EB – Maximum effective antenna height

The maximum effective height of the antenna, in metres (for VHF sound broadcasting (BC) and VHF/UHF television broadcasting (BT) assignments).

ITEM 9EC – Effective antenna height at different azimuths

The effective height of the antenna at different azimuths, in metres, for every 10° interval (for VHF sound broadcasting (BC) and VHF/UHF television broadcasting (BT) assignments).

ITEM 9F – Electrical height or maximum height of the antenna

The electrical height of the antenna in degrees or metres.

ITEM 9G – Maximum antenna gain (isotropic, relative to a short vertical antenna or relative to a half-wave dipole, as appropriate)

The maximum gain of the antenna in the direction of maximum radiation (see No. **S1.160**).

ITEM 9GH – Antenna gain for different azimuths in the horizontal plane

The antenna gain in the horizontal plane for different azimuths (dB).

ITEM 9GV – Antenna gain for different azimuths in the vertical plane

The antenna gain in the vertical plane for different azimuths (dB).

ITEM 9H – Azimuths defining the sectors of limited radiation in degrees (clockwise) from True North

The azimuth or azimuthal sectors of limited radiation, in degrees (clockwise) from True North.

ITEM 9I – Maximum agreed radiation in the sectors

The maximum agreed radiation in the sector, in dB relative to a cymomotive force (c.m.f.) of 300 V or an effective monopole radiated power (e.m.r.p.) of 1 kW, determined from the nominal power of the transmitter and the theoretical gain of the antenna without allowing for miscellaneous losses.

ITEM 9IA – Radiation at central azimuth of augmentation

The value of the radiation at the central azimuth of the augmentation, expressed in mV/m at 1 km.

ITEM 9J – Reference antenna

The measured radiation pattern of the antenna, the reference radiation pattern or the symbols in standard references to be used for coordination.

ITEM 9K – Receiving system noise temperature

The lowest total receiving system noise temperature, in Kelvin.

ITEM 9N – Attenuation in a sector (dB)

The value in dB of the attenuation in a defined sector.

ITEM 9NA – Augmentation number

The serial numbers of the augmentations as described in items 9IA, 9AA and 9CA.

ITEM 9NH – Attenuation (dB) in the horizontal plane at different azimuths

The value of attenuation in dB with respect to maximum e.r.p. in the horizontal plane at different azimuths.

ITEM 9NV – Attenuation (dB) in the vertical plane at different azimuths

The value of attenuation in dB with respect to maximum e.r.p. in the vertical plane at different azimuths.

ITEM 9O – Type of pattern

The type of antenna radiation pattern, represented by a symbol.

ITEM 9P – Special quadrature factor

The value of the special quadrature factor, in mV/m at 1 km (to replace the normal expanded quadrature factor when special precautions are taken to ensure pattern stability).

ITEM 9Q – Type of antenna

Simple vertical antenna or directional antenna.

ITEM 9R – Slew angle

The slew angle represents the difference between the azimuth of maximum radiation and the direction of unslewed radiation.

ITEM 9T1 – Tower number

The serial number of each of the towers whose characteristics are described in items 9T2 to 9T8.

ITEM 9T2 – Tower field ratio

The ratio of the tower field to the field of the reference tower.

ITEM 9T3 – Phase difference of the field

The positive or negative difference in the tower field with respect to the field of the reference tower, in degrees.

ITEM 9T4 – Electrical tower spacing

The electrical spacing of the tower from the reference point, in degrees.

ITEM 9T5 – Angular tower orientation

The angular orientation of the tower from the reference point, in degrees (clockwise) from True North.

ITEM 9T6 – Reference point indicator

The reference point.

ITEM 9T7 – Electrical height of tower

The electrical height of the tower, in degrees.

ITEM 9T8 – Tower structure

Symbol corresponding to the tower structure.

ITEMS 9T9A to 9T9D – Description of top-loaded or sectionalized tower

Description of top-loaded or sectionalized towers, in degrees.

ITEM 10A – Maximum hours (UTC) of operation of the circuit to each locality or area

The maximum hours of operation, expressed in hours and minutes (UTC) or by symbols.

ITEM 10B – Regular hours (UTC) of operation of the frequency assignment

The regular hours of operation (in hours and minutes from ... to ...) of the frequency assignment, in UTC.

ITEM 10CA – Start date

Used in the case that the requirement starts after the start of the schedule.

ITEM 10CB – Stop date

Used in the case that the requirement stops before the end of the schedule.

ITEM 10CC – Days of operation

Used when the station does not transmit every day of the week.

ITEM 10D – Estimated peak hours of traffic

For HF coast radiotelephone stations.

ITEM 10E – Estimated daily volume of traffic

For HF coast radiotelephone stations.

ITEM 10F – Duration of transmissions

For coast stations in the International NAVTEX system, the duration of transmission in hours and minutes.

ITEM 11 – Coordination with other administrations

Country or geographical area with which coordination is to be effected and the provision (No. of the Radio Regulations, regional agreement, or other arrangement) requiring such coordination.

ITEM 12A – Operating administration or agency

The symbol for the operating agency.

ITEM 12B – Postal and telegraphic addresses of the administration responsible for the station

Symbol for the address of the administration responsible for the station and to which communication should be sent on urgent matters regarding interference, quality of emissions and questions referring to the technical operation of the circuit (see Article **S15**).

ANNEX 1B

Table of characteristics to be submitted for stations in the terrestrial services

Notice type	AP1/A1					AP1/B		AP1/C	AP1/A2	AP1/A4		AP1/A5	AP1/A6	AP1/A7	AP2	AP5	AP1/A1	Notice type
Item No.	**AL, NL LR, OE**	**FC, FP FA, BC FB**	**FD, FG**	**FX**	**SM**	**AM, ML MA, MO**	**MS, OD SA**	**All, except BC**	**BC**	**BC**	**BT**	**BC**	**BT**	**BC**	**BC**	**FC**	**FC (Art. S11)**	**Item No.**
B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	B
SYNC									X					X				SYNC
1A	X	X	X	X	X	X	X	X	X	X	X[5]	X	X[5]	X	X		X	1A
1B	+	+	+	+	+	+	+	+			X[5]				+			1B
1C				+											X	+		1C
1D											X		X					1D
1E											X		X					1E
1G															O			1G
1H															X			1H
1X																X		1X
1Y																O		1Y
1Z																+		1Z
2C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	+	X	X	2C
3A	X	X	X	X	X				X	O	O	O	O		X		X	3A
4A	X	X	X	X	X				X	X	X	X	X	X	X	+	X	4A
4B	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	4B
4C	X	X	X	X	X	*[1]	*[1]	*[1]	X	X	X	X	X	X	X	+	X	4C
4D						*[1]	*[1]	*[1]										4D
4E						*	*	*										4E
4F																	X	4F
4G									X									4G
5A				X		X	X											5A
5B				X		X	X											5B
5C				X		X	X										*	5C
5D		*[2]	*[2]												X	*[3]	*	5D
5E	X	*	*		X											*		5E
5F	X	*	*		X											*		5F
5G	+	+	+	+	+											+	+	5G

X Mandatory * One of the items + Required in specific cases O Optional

Table of characteristics to be submitted for stations in the terrestrial services *(cont.)*

Notice type	AP1/A1					AP1/B		AP1/C	AP1/A2	AP1/A4		AP1/A5	AP1/A6	AP1/A7	AP2	AP5	AP1/A1	Notice type
Item No.	**AL, NL LR, OE**	**FC, FP FA, BC FB**	**FD, FG**	**FX**	**SM**	**AM, ML MA, MO**	**MS, OD SA**	**All, except BC**	**BC**	**BC**	**BT**	**BC**	**BT**	**BC**	**BC**	**FC**	**FC (Art. S11)**	**Item No.**
6A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	6A
6B	+	+	X	X		X	X	+								X		6B
7A	X	X	X	X	X	X	X	X	X	X[5]	X[5]	X[5]	X[5]	X	X	X	X	7A
7AA															X			7AA
7B				X					X					X				7B
7C1											X		X					7C1
7C2											X		X					7C2
7D												X						7D
7E				+[7]														7E
7F				+[7]														7F
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	8
8A	*	*	X	*	X	*	*	*	X					X	X	X	*	8A
8AB				+[7]														8AB
8B	*	*		*		*	*	*		X	X	X	X				*	8B
8BH										X	X	X	X					8BH
8BV										X	X	X	X					8BV
8D											X		X					8D
9	X	X	X	X	X				X	X	X	X	X		X	X	X	9
9A	X	X	X	X	X				X	X	X	X	X		X	X	X	9A
9AA														X				9AA
9AB	+	+	+	+	+				+						+	+	+	9AB
9B				+											X			9B
9C	+	+	+	+	+											+		9C
9CA														X				9CA
9D				+						X	X	X	X					9D
9E	+	+	+	+	+				X	X	X	X	X					9E
9EA	+	+	+	+	+					X	X	X	X					9EA
9EB										X	X	X	X					9EB
9EC										X	X	X	X					9EC
9F														X				9F
9G	+	+	+	+	+			+							+	+		9G

X Mandatory * One of the items + Required in specific cases O Optional

Table of characteristics to be submitted for stations in the terrestrial services *(cont.)*

Notice type	AP1/A1					AP1/B		AP1/C	AP1/A2	AP1/A4		AP1/A5	AP1/A6	AP1/A7	AP2	AP5	AP1/A1	Notice type
Item No.	**AL, NL LR, OE**	**FC, FP FA, BC FB**	**FD, FG**	**FX**	**SM**	**AM, ML MA, MO**	**MS, OD SA**	**All, except BC**	**BC**	**BC**	**BT**	**BC**	**BT**	**BC**	**BC**	**FC**	**FC (Art. S11)**	**Item No.**
9GH									X									9GH
9GV									X									9GV
9H									X	X[5]	X[5]	X[5]		+		+		9H
9I									X					X				9I
9IA														X				9IA
9J				+, +[7]											X	+		9J
9K				+[7]														9K
9N												X[5]						9N
9NA														X				9NA
9NH										X[6]	X[6]	X[6]	X					9NH
9NV										X[6]	X[6]	X[6]	X					9NV
9O														X	X	X		9O
9P														X				9P
9Q									X					X				9Q
9R															X			9R
9T1														X				9T1
9T2														X				9T2
9T3														X				9T3
9T4														X				9T4
9T5														X				9T5
9T6														X				9T6
9T7														X				9T7
9T8														X				9T8
9T9A														+				9T9A
9T9B														X				9T9B
9T9C														+				9T9C
9T9D														+				9T9D

X Mandatory * One of the items + Required in specific cases O Optional

Table of characteristics to be submitted for stations in the terrestrial services *(end)*

Notice type	AP1/A1					AP1/B		AP1/C	AP1/A2	AP1/A4		AP1/A5	AP1/A6	AP1/A7	AP2	AP5	AP1/A1	Notice type
Item No.	**AL, NL LR, OE**	**FC, FP FA, BC FB**	**FD, FG**	**FX**	**SM**	**AM, ML MA, MO**	**MS, OD SA**	**All, except BC**	**BC**	**BC**	**BT**	**BC**	**BT**	**BC**	**BC**	**FC**	**FC (Art. S11)**	**Item No.**
10A				+														10A
10B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	10B
10CA															O			10CA
10CB															O			10CB
10CC															O			10CC
10D																X		10D
10E																X		10E
10F																	X	10F
11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	O	X	11
12A	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	12A
12B	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	12B

X Mandatory * One of the items + Required in specific cases O Optional

[1] (4C and 4D) or (4E).

[2] (5D) or (5E and 5F).

[3] (5D and 5F) or (5E and 5F).

[4] For low-power channels.

[5] May not be required with the new TerRaSys.

[6] To be used in the future TerRaSys.

[7] This information need only be furnished when such information has been used as a basis to effect coordination with another administration. This information may be optionally provided in a request for coordination under Nos. **S9.16**, **S9.18** and **S9.19**.

ANNEX 2A

Characteristics of satellite networks or earth or radio astronomy stations[2]

A General characteristics to be provided for the satellite network or the earth or radio astronomy station

A.1 Identity of the satellite network or the earth or radio astronomy station

a) Identity of a satellite network.

b) Country and ITU number (Regions 1 and 3); country and beam identification (Region 2).

c) Country and beam identification.

d) Country and identification of the allotment; for a network not derived from the Allotment Plan, the identity of the network.

e) Identity of an earth or radio astronomy station:

1) the type of earth station (specific or typical);

2) the name by which the station is known or the name of the locality in which it is situated;

3) for a specific earth station:

– the country or geographical area in which the station is located, using the symbols from the Preface to the International Frequency List;

– the geographical coordinates of each transmitting and receiving antenna site constituting the earth station (longitude and latitude in degrees and minutes as well as seconds with an accuracy of one-tenth of a minute; the seconds need only be furnished if the coordination area of the earth station overlaps the territory of another administration);

4) for a radio astronomy station:

– the country or geographical area in which the station is located, using the symbols from the Preface to the International Frequency List;

– the geographical coordinates of the station site (longitude and latitude in degrees and minutes).

f) Country symbol of the notifying administration. In the case of advance information, give the symbol of the administration or the symbols of the administrations in the group submitting the advance information on the satellite network.

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2 See footnote 1.

A.2 Date of bringing into use

a) The date (actual or foreseen, as appropriate) of bringing the frequency assignment (new or modified) into use. Whenever the assignment is changed in any of its basic characteristics (except in the case of a change in § A.1 *a)*, the date to be given shall be that of the latest change (actual or foreseen, as appropriate).

b) For the case of a space station onboard a geostationary (GSO) satellite, the period of validity of the frequency assignments (see Resolution **4 (Rev.Orb-88)**).

c) The date (actual or foreseen, as appropriate) on which reception of the frequency band begins or on which any of the basic characteristics are modified.

A.3 Operating administration or agency

Symbols for the operating administration or agency and for the address of the administration to which communication should be sent on urgent matters regarding interference, quality of emissions and questions referring to the technical operation of the network or station (see Article **S15**).

A.4 Orbital information

a) For the case of a space station onboard a GSO satellite:

1) the nominal geographical longitude on the geostationary-satellite orbit;

2) the planned longitudinal tolerance and inclination excursion.

In the case where a GSO space station is intended to communicate with an earth station:

3) the arc of visibility (the arc of the geostationary-satellite orbit over which the space station is visible at a minimum angle of elevation of 10° at the Earth’s surface from its associated earth stations or service areas);

4) the service arc (the arc of the geostationary-satellite orbit within which the space station could provide the required service to its associated earth stations or service areas);

5) in the event that the service arc is less than the arc of visibility, the reasons therefor.

b) For the case of space station(s) onboard non-GSO satellite(s):

1) the angle of inclination of the orbit;

2) the period;

3) the altitudes (km) of the apogee and perigee of the space station(s);

4) the number of satellites used.

In addition, if the stations operate in a frequency band subject to the provisions of No. **S9.11A**:

5) new data elements required to characterize properly the orbital statistics of non-GSO satellite systems:

N_p = number of orbital planes;

N_s = number of satellites in each orbital plane;

Ω_j = right ascension of the ascending node for the *j*-th orbital plane, measured counter-clockwise in the equatorial plane from the direction of the vernal equinox to the point where the satellite makes its South-to-North crossing of the equatorial plane ($0° \le \Omega_j < 360°$);

i_j = inclination angle for the *j*-th orbital plane with respect to the reference plane, which is taken to be the Earth's equatorial plane ($0° \le i_j < 180°$);

ω_i = initial phase angle of the *i*-th satellite in its orbital plane at reference time $t = 0$, measured from the point of the ascending node ($0° \le \omega_i < 360°$);

α = semi-major axis;

e = eccentricity ($0 \le e < 1$);

ω_p = argument of perigee, measured in the orbital plane, in the direction of motion, from the ascending node to the perigee ($0° \le \omega_p < 360°$).

c) For the case of an earth station, the identity of the associated space station(s) with which communication is to be established as well as, in the case of a geostationary space station, its orbital position.

A.5 Coordination

The country symbol of any administration with which coordination has been successfully effected, as well as the country symbol of any administration with which coordination has been sought but not completed.

A.6 Agreements

If appropriate, the country symbol of any administration or administration representing a group of administrations with which agreement has been reached, including where the agreement is to exceed the limits prescribed in these Regulations.

A.7 Earth station site characteristics

For a specific earth station:

a) The horizon elevation angle in degrees and, in the case of a station submitted in accordance with Appendix **S30A**, the antenna gain in the direction of the horizon for each azimuth around the earth station.

b) The planned minimum angle of elevation of the antenna in the direction of maximum radiation in degrees from the horizontal plane, having due regard to possible inclined-orbit operation of the associated space station.

c) The planned range of operating azimuthal angles for the direction of maximum radiation in degrees, clockwise from True North, having due regard to possible inclined-orbit operation of the associated space station.

d) The altitude (metres) of the antenna above mean sea level.

A.8 The rain climatic zone(s)

A.9 Minimum angle of elevation in the service area in the case of Regions 1 and 3

A.10 Earth station coordination area diagrams

The diagrams shall be drawn to an appropriate scale, indicating, for both transmission and reception, the location of the earth station and its associated coordination areas, or the coordination area related to the service area in which it is intended to operate the mobile earth station.

A.11 Regular hours of operation

A.12 Range of automatic gain control

Range of automatic gain control, expressed in dB.

A.13 As appropriate, reference to the Special Section of the Bureau's Weekly Circular

a) providing the advance publication information required in accordance with No. **S9.1**;

b) providing the coordination information required in accordance with No. **S9.7**;

c) providing the information required in accordance with No. **S9.21**;

d) providing the coordination information required in accordance with No. **S9.8**;

e) providing the coordination information required in accordance with No. **S9.9**;

f) providing the coordination information required in accordance with No. **S9.11**;

g) providing the coordination information required in accordance with No. **S9.11A**;

h) providing the information required in accordance with Article 6 of Appendix **S30B**.

B Characteristics to be provided for each satellite antenna beam or each earth or radio astronomy station antenna

B.1 The designation of the satellite antenna beam and, if appropriate, an indication as to whether it is a steerable or reconfigurable antenna beam. The designation shall be a character code, and the last character shall be an "R" for steerable or reconfigurable beams.

B.2 Transmission/reception indicator

B.3 Geostationary space station antenna characteristics

a) Where it is intended to communicate with an earth station via an antenna pointing in a fixed direction:

1) the maximum isotropic gain (dBi);

2) the antenna gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite onto a plane perpendicular to the axis from the centre of the Earth to the satellite. The space station antenna gain contours shall be drawn as isolines of the isotropic gain, at least for –2, –4, –6, –10 and –20 dB and at 10 dB intervals thereafter, as necessary, relative to the maximum antenna gain, when any of these contours is located either totally or partially anywhere within the limit of visibility of the Earth from the given geostationary satellite. Whenever possible, the gain contours of the space station antenna should also be provided in a numerical format.

b) Where a steerable beam (see No. **S1.191**) is used:

1) the maximum isotropic antenna gain (dBi), if the effective boresight area (see No. **S1.175**) is identical with the global or nearly global service area. The maximum antenna gain is applicable to all points on the Earth's visible surface;

2) the maximum antenna gain and the effective antenna gain contours (see No. **S1.176**), if the effective boresight area (see No. **S1.175**) is less than the global or nearly global service area. These contours shall be provided as defined in § B.3 *a)* 2) above.

c) The antenna gain contours of § B.3 *a)* 2) and B.3 *b)* 2) above shall include the effect of the planned longitudinal tolerance, inclination excursion and pointing accuracy of the antenna.

d) The pointing accuracy of the antenna.

e) The antenna radiation pattern, where the antenna radiation beam is directed towards another satellite.

f) The gain of the antenna in the direction of those parts of the geostationary-satellite orbit which are not obstructed by the Earth, in the case of operation in a band allocated in the Earth-to-space direction and in the space-to-Earth direction.

g) For the case of a space station submitted in accordance with Appendix **S30**, Appendix **S30A** or Appendix **S30B**:

1) maximum isotropic antenna gain (dBi);

2) shape of the beam (elliptical, circular, or other);

3) for circular beams:

– half-power beamwidth in degrees;

– co-polar and cross-polar radiation patterns;

– nominal intersection of the antenna beam axis with the Earth (boresight longitude and latitude);

4) for elliptical beams:

– co-polar and cross-polar radiation patterns;

– rotational accuracy in degrees;

– major axis orientation in degrees anticlockwise from the Equator;

– major axis (degrees) at the half-power beamwidth;

– minor axis (degrees) at the half-power beamwidth;

– nominal intersection of the antenna beam axis with the Earth (boresight longitude and latitude);

5) for beams of other than circular or elliptical shape:

– co-polar and cross-polar gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite on to a plane perpendicular to the line from the centre of the Earth to the satellite. The isotropic or absolute gain shall be indicated at each contour which corresponds to a decrease in gain of 2, 4, 6, 10 or 20 dB and thereafter at 10 dB intervals down to a value of 0 dB relative to an isotropic radiator. Whenever practicable, a numerical equation or table providing the necessary information to allow the gain contours to be plotted should be provided;

– beam aim point longitude and latitude;

– where a steerable beam (see No. **S1.191**) is used, the maximum antenna gain and the effective antenna gain contours (see No. **S1.176**); these contours shall be provided as defined above;

6) for an assignment in the bands 14.5-14.8 GHz or 17.7-18.1 GHz, the isotropic gain in the direction of those parts of the geostationary-satellite orbit which are not obstructed by the Earth. Use a diagram to show estimated isotropic gain relative to orbit longitude;

7) ΔG (difference between the maximum gain and the gain in the direction of the point in the service area at which the power-flux density is at a minimum) (for Regions 1 and 3 only).

B.4 Non-geostationary space station antenna characteristics

a) Isotropic gain of the antenna in the direction of maximum radiation (dBi) and the antenna radiation pattern.

b) In the case of a space station submitted in accordance with No. **S9.11A**:

- orientation of the satellite transmitting and receiving antenna beams and their radiation pattern;
- satellite antenna gain $G(\theta_e)$ as a function of elevation angle at a fixed point on the Earth;
- spreading loss (for a non-GSO satellite) as a function of elevation angle (to be determined by equations or provided in graphical format);
- maximum and average beam peak e.i.r.p./4 kHz and e.i.r.p./1 MHz for each beam;
- for the fixed-satellite service (space-to-Earth) in the band 6 700-7 075 MHz, calculated peak value of power flux-density produced within $\pm 5°$ inclination of the geostationary-satellite orbit.

B.5 Earth station antenna characteristics

a) The isotropic gain (dBi) of the antenna in the direction of maximum radiation (see No. **S1.160**).

b) Half-power beamwidth in degrees.

c) Either the measured radiation pattern of the antenna or the reference radiation pattern to be used for coordination.

B.6 Radio astronomy station antenna characteristics

The antenna type and dimensions, effective area and angular coverage (in azimuth and elevation).

C Characteristics to be provided for each group of frequency assignments for a satellite antenna beam or an earth or radio astronomy station antenna

C.1 Frequency range

The frequency range within which the carriers will be located for each Earth-to-space or space-to-Earth service area, or for each space-to-space relay.

C.2 Assigned frequency (frequencies)

a) The assigned frequency (frequencies), as defined in No. **S1.148**, in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive and in GHz above 10 500 MHz. Alternatively, in the case of a space station submitted in accordance with Appendix **S30**, the channel number.

If the basic characteristics are identical, with the exception of the assigned frequency, a list of frequency assignments may be provided.

b) The centre of the frequency band observed, in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive and in GHz above 10 500 MHz.

C.3 Assigned frequency band

a) The bandwidth of the assigned frequency band in kHz (see No. **S1.147**).

b) The bandwidth of the frequency band in kHz observed by the station.

C.4 Class of station(s) and nature of service

The class of station and nature of service performed, using the symbols shown in the Preface to the International Frequency List.

C.5 Receiving system noise temperature

a) In the case of a space station, the lowest total receiving system noise temperature, in kelvins, referred to the output of the receiving antenna of the space station.

b) In the case of an earth station, the lowest total receiving system noise temperature, in kelvins, referred to the output of the receiving antenna of the earth station under clear-sky conditions. This value shall be indicated for the nominal value of the angle of elevation when the associated transmitting station is onboard a geostationary satellite and, in other cases, for the minimum value of the angle of elevation.

c) In the case of a radio astronomy station, the overall receiving system noise temperature in kelvins, referred to the output of the receiving antenna.

C.6 Polarization

The type of polarization and, if appropriate, sense of polarization of the antenna. In the case of circular polarization, indicate the direction of polarization (see Nos. **S1.154** and **S1.155**). In the case of linear polarization, indicate the angle (degrees) measured counter-clockwise in a plane normal to the beam axis from the equatorial plane to the electric vector of the waves as seen from the satellite. In the case of a space station submitted in accordance with Appendix **S30** or **S30A**, this indication is to be in the direction of the boresight or the aim point or as defined in § B.3 *g)* 3), B.3 *g)* 4) and § B.3 *g)* 5), respectively.

C.7 Class of emission, necessary bandwidth and description of the transmission

In accordance with Article **S2** and Appendix **S1**:

a) the class of emission and the necessary bandwidth;

b) the carrier frequency or frequencies of the emission(s);

c) for each carrier the class of emission, necessary bandwidth and description of transmission;

d) for the carrier having the smallest bandwidth of the assignments in the system, the class of emission, necessary bandwidth and a description of the transmission.

C.8 Power characteristics of the transmission

a) The maximum value of the peak envelope power (dBW) and the maximum power density (dB(W/Hz))[3], averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz, supplied to the input of the antenna for each carrier type.

b) The total peak envelope power (dBW) and the maximum power density (dB(W/Hz))[3] supplied to the input of the antenna, averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz.

c) The minimum value of the peak envelope power (dBW) and the minimum power density (dB(W/Hz))[3], averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz, supplied to the input of the antenna for each carrier type.

d) The maximum total peak envelope power (dBW) supplied to the input of the antenna for each contiguous satellite bandwidth and this bandwidth. For a satellite transponder, this corresponds to the maximum saturated peak envelope power and the bandwidth of each transponder.

e) The required carrier-to-noise ratio (dB), considering clear-sky operation, for each carrier type.

f) Nominal equivalent isotropically radiated power(s) (e.i.r.p.) on the beam axis.

g) The maximum aggregate power (dBW) of all carriers (per transponder, if applicable) supplied to the input of the antenna and their aggregate bandwidth. If this corresponds to the bandwidth of a transponder, this shall be indicated.

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[3] The most recent version of Recommendation ITU-R SF.675 should be used to the extent applicable in calculating the maximum power density per Hz.

h) In the case of a space station submitted in accordance with Appendix **S30**:

– the power supplied to the antenna (dBW) (Regions 1 and 3);

– the power supplied to the antenna (dBW) and the maximum power density per Hz (dB(W/Hz)), averaged over the worst 5 MHz, 40 kHz and 4 kHz, supplied to the antenna (Region 2).

i) In the case of an earth station submitted in accordance with Appendix **S30A**:

– total transmitting power (dBW) in the assigned frequency band supplied to the input of the antenna;

– for the band 17.3-18.1 GHz, the maximum power density per Hz (dB(W/Hz)) supplied to the input of the antenna averaged over the worst 1 MHz band;

– for the band 14.5-14.8 GHz, the maximum power density per Hz (dB(W/Hz)) supplied to the input of the antenna averaged over the worst 4 kHz band;

– for the band 17.3-17.8 GHz, the maximum power density per Hz (dB(W/Hz)) supplied to the input of the antenna averaged over the total RF bandwidth (24 MHz for Region 2 or 27 MHz for Regions 1 and 3);

– range of power control, expressed in dB, above the transmitting power indicated above (if power control is used).

j) In the case of a space station or an earth station submitted in accordance with Appendix **S30B**:

– the maximum value of power density, in dB(W/Hz), averaged over the necessary bandwidth of the modulated carrier, supplied to the input of the antenna;

– the frequency below which signals whose peak-to-average ratio is less than 5 dB will be located;

– maximum carrier power density, in dB(W/Hz), averaged over the worst 4 kHz band, supplied to the antenna input.

C.9 Information on modulation characteristics

a) For each carrier, according to the nature of the signal modulating the carrier and the type of modulation:

1) in the case of a carrier frequency modulated by a frequency-division multichannel telephony baseband (FDM/FM) or by a signal that can be represented by a multi-channel telephony baseband: the lowest and highest frequencies of the baseband and the r.m.s. frequency deviation of the test tone as a function of baseband frequency;

2) in the case of a carrier frequency modulated by a television signal: the standard of the television signal (including, where appropriate, the standard used for colour), the frequency deviation for the reference frequency of the pre-emphasis characteristic and the pre-emphasis characteristic itself as well as, where applicable, the characteristics of the multiplexing of the video signal with the sound signal(s) or other signals;

3) in the case of a carrier phase-shift modulated by a digital signal: the bit rate and the number of phases;

4) in the case of an amplitude modulated carrier (including single sideband): as precisely as possible, the nature of the modulating signal and the kind of amplitude modulation used;

5) for all other types of modulation: such particulars as may be useful for an interference study;

6) for any type of modulation, as applicable: the characteristics of energy dispersal, such as the peak-to-peak frequency deviation (MHz) and the sweep frequency (kHz) of the energy dispersal waveform.

b) In the case of a space station submitted in accordance with Appendix **S30** or the case of a space station submitted in accordance with Appendix **S30A**:

1) type of modulation;

2) pre-emphasis characteristics;

3) TV standard;

4) sound-broadcasting characteristics;

5) frequency deviation;

6) composition of the baseband;

7) type of multiplexing of the video and sound signals;

8) energy dispersal characteristics.

c) In the case of a non-geostationary space station submitted in accordance with No. **S9.11A**, the type of modulation and multiple access, and spectrum mask.

C.10 Type and identity of the associated station(s)

The associated station may be another space station, a typical earth station of the network or a specific earth station.

a) For an associated space station, its identity.

b) For a specific associated earth station, the identity of the earth station and the geographical coordinates of the antenna site.

c) For an associated earth station (whether specific or typical):

1) the class of station and nature of service performed, using the symbols shown in the Preface to the International Frequency List;

2) the isotropic gain (dBi) of the antenna in the direction of maximum radiation (see No. **S1.160**);

3) the beamwidth in degrees between the half power points (describe in detail if not symmetrical);

4) either the measured radiation pattern of the antenna or the reference radiation pattern;

5) the lowest total receiving system noise temperature, in kelvins, referred to the output of the receiving antenna of the earth station under clear-sky conditions, when the associated station is a receiving earth station;

6) the antenna diameter (metres).

C.11 Service area

a) The service area or areas of the satellite beam on the Earth, when the associated transmitting or receiving stations are earth stations.

b) In the case of a space station submitted in accordance with Appendix **S30A**:

– where the feeder-link earth station is in Region 2, the geographical coordinates of the feeder-link station in the frequency band 17.7-17.8 GHz, including the rain climatic zone;

– in all other cases, the feeder-link service area identified by a set of a maximum of ten feeder-link test points, including the rain climatic zone for each test point, and by a service area contour on the surface of the Earth.

c) In the case of a space station submitted in accordance with Appendix **S30** or Appendix **S30B**, the service area identified by a set of a maximum of ten test points and by a service area contour on the surface of the Earth.

d) In the case of a non-geostationary space station submitted in accordance with No. **S9.11A**, appropriate information required to calculate the affected region due to the mobile-satellite service space stations (as defined in Recommendation ITU-R M.1187).

C.12 Required protection ratio

The minimum acceptable aggregate carrier-to-interference ratio, if less than 26 dB. The carrier-to-interference ratio is to be expressed in terms of the power averaged over the necessary bandwidth of the modulated wanted and interfering signals, assuming both the desired carrier and interfering signals have equivalent bandwidths and modulation types.

C.13 Class of observations

The class of observations to be taken on the frequency band shown in § C.3 *b)*. Class A observations are those in which the sensitivity of the equipment is not a primary factor. Class B observations are those of such a nature that they can be made only with advanced low-noise receivers using the best techniques.

C.14 Type of reception

Type of reception (individual or community) in the case of a space station in Regions 1 and 3 submitted in accordance with Appendix **S30**.

D Overall link characteristics

To be provided only when simple frequency-changing transponders are used on the space station onboard a geostationary satellite.

D.1 Connection between Earth-to-space and space-to-Earth frequencies in the network

The connection between uplink and downlink frequency assignments in each transponder for each intended combination of receiving and transmitting beams.

D.2 Transmission gains and associated equivalent satellite link noise temperatures

For each entry under § D.1:

a) The lowest equivalent satellite link noise temperature and the associated transmission gain. These values shall be indicated for the nominal value of the angle of elevation. The transmission gain is evaluated from the output of the receiving antenna of the space station to the output of the receiving antenna of the earth station.

b) The values of transmission gain and associated equivalent satellite link noise temperature that correspond to the highest ratio of transmission gain to equivalent satellite link noise temperature.

ANNEX 2B

Table of characteristics to be submitted for space and radio astronomy services

A – General characteristics of the satellite network or the earth station

Items in Appendix	Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network subject to coordination under Section II of Article S9	Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article S9	Notification or coordination of a geostationary-satellite network (including Appendix S30B)	Notification or coordination of a non-geostationary-satellite network	Notification or coordination of an earth station	Notice for space stations in the broadcasting-satellite service under Appendix S30 *	Notice for feeder-link stations under Appendix S30A *	Notice for stations in the fixed-satellite service under Appendix S30B	Items in Appendix	Radio astronomy
A.1.a	X	X	X	X	X		X	X	X	A.1.a	
A.1.b							X			A.1.b	
A.1.c								X		A.1.c	
A.1.d									X	A.1.d	
A.1.e.1						X				A.1.e.1	
A.1.e.2						X				A.1.e.2	X
A.1.e.3						X				A.1.e.3	
A.1.e.4										A.1.e.4	X
A.1.f	X	X	X	X	X	X	X	X	X	A.1.f	X
A.2.a	X	X	X	X	X	X	X	X	X	A.2.a	
A.2.b	X			X						A.2.b	
A.2.c										A.2.c	X
A.3			X	X	X	X	X	X		A.3	X
A.4.a.1	X			X			X	X	X	A.4.a.1	
A.4.a.2				X			X	X		A.4.a.2	
A.4.a.3				X						A.4.a.3	
A.4.a.4				X						A.4.a.4	
A.4.a.5				X						A.4.a.5	
A.4.b.1		X	X		X					A.4.b.1	
A.4.b.2		X	X		X					A.4.b.2	
A.4.b.3		X	X		X					A.4.b.3	
A.4.b.4		X	X		X					A.4.b.4	
A.4.b.5					X					A.4.b.5	
A.4.c						X				A.4.c	
A.5				X	X	X	X	X	X	A.5	
A.6				X	X	X	X	X	X	A.6	
A.7.a						X		X		A.7.a	
A.7.b						X		X		A.7.b	
A.7.c						X				A.7.c	
A.7.d						X		X		A.7.d	
A.8							X			A.8	

X Mandatory information O Optional information C This information need only be furnished when it has been used as a basis to effect coordination with another administration

* The application of this column is suspended pending the decision of WRC-99.

A – General characteristics of the satellite network or the earth station *(end)*

Items in Appendix	Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network subject to coordination under Section II of Article S9	Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article S9	Notification or coordination of a geostationary-satellite network (including Appendix S30B)	Notification or coordination of a non-geostationary-satellite network	Notification or coordination of an earth station	Notice for space stations in the broadcasting-satellite service under Appendix S30 *	Notice for feeder-link stations under Appendix S30A *	Notice for stations in the fixed-satellite service under Appendix S30B	Items in Appendix	Radio astronomy
A.9							X			A.9	
A.10						X				A.10	
A.11							X	X		A.11	
A.12								X		A.12	
A.13				X	X	X				A.13	

B – Characteristics to be provided for each satellite antenna beam and for each earth station antenna

Items in Appendix	Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network subject to coordination under Section II of Article S9	Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article S9	Notification or coordination of a geostationary-satellite network (including Appendix S30B)	Notification or coordination of a non-geostationary-satellite network	Notification or coordination of an earth station	Notice for space stations in the broadcasting-satellite service under Appendix S30 *	Notice for feeder-link stations under Appendix S30A *	Notice for stations in the fixed-satellite service under Appendix S30B	Items in Appendix	Radio astronomy
B.1			X	X	X	X	X	X	X	B.1	
B.2			X	X	X	X			X	B.2	
B.3.a				X						B.3.a	
B.3.b.1				X						B.3.b.1	
B.3.b.2				X						B.3.b.2	
B.3.c				C						B.3.c	
B.3.d				X			X	X	X	B.3.d	
B.3.e				X						B.3.e	
B.3.f				X				X		B.3.f	
B.3.g.1							X	X	X	B.3.g.1	
B.3.g.2							X	X	X	B.3.g.2	
B.3.g.3							X	X	X[9]	B.3.g.3	
B.3.g.4							X	X	X[9]	B.3.g.4	
B.3.g.5							X	X	X[9]	B.3.g.5	
B.3.g.6								X		B.3.g.6	
B.3.g.7							X			B.3.g.7	
B.4.a			X		X					B.4.a	
B.4.b			X		X					B.4.b	
B.5.a						X				B.5.a	
B.5.b						X				B.5.b	
B.5.c						X				B.5.c	
B.6										B.6	X

X Mandatory information O Optional information C This information need only be furnished when it has been used as a basis to effect coordination with another administration

[9] Only information on co-polar antenna characteristics is required.

* The application of this column is suspended pending the decision of WRC-99.

C – Characteristics to be provided for each group of frequency assignments for a satellite antenna beam or an earth station antenna

Items in Appendix	Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network subject to coordination under Section II of Article S9	Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article S9	Notification or coordination of a geostationary-satellite network (including Appendix S30B)	Notification or coordination of a non-geostationary-satellite network	Notification or coordination of an earth station	Notice for space stations in the broadcasting-satellite service under Appendix S30 *	Notice for feeder-link stations under Appendix S30A *	Notice for stations in the fixed-satellite service under Appendix S30B	Items in Appendix	Radio astronomy
C.1	X	X	X						X	C.1	
C.2.a				X	X	X	X	X		C.2.a	
C.2.b										C.2.b	X
C.3.a				X	X	X		X		C.3.a	
C.3.b										C.3.b	X
C.4	X	X	X	X	X	X	X	X		C.4	X
C.5.a			X	X	X			X	X	C.5.a	
C.5.b						X				C.5.b	
C.5.c										C.5.c	X
C.6			X	X	X	X	X	X		C.6	
C.7.a			O	X	X	X	X	X		C.7.a	
C.7.b			O	C	C	C				C.7.b	
C.7.c			O	C	C	C				C.7.c	
C.7.d			O	C	C	C				C.7.d	
C.8.a			X[1, 7]	X[7]	X[7]	C[8]				C.8.a	
C.8.b			X[1, 7]	X[7]	X[7]	X				C.8.b	
C.8.c			O	X[6]	X[6]	X[6]				C.8.c	
C.8.d				X[2]	X[2]					C.8.d	
C.8.e			O	X[6]	X[6]	X[6]				C.8.e	
C.8.f			X[3]							C.8.f	
C.8.g				C[4]	C[4]	C[4, 5]				C.8.g	
C.8.h							X			C.8.h	
C.8.i								X		C.8.i	
C.8.j									X	C.8.j	

X Mandatory information O Optional information C This information need only be furnished when it has been used as a basis to effect coordination with another administration

[1] Only the value of maximum power density is mandatory.

[2] For transmission from the space station only.

[3] For space-to-space relay only.

[4] For transmission from the earth station only.

[5] Not required for coordination under Nos. **S9.15**, **S9.17** or **S9.17A**.

[6] Required, if applicable, for the type of transmission. If not applicable, a reason why it is not applicable is required.

[7] One or the other of C.8.a or C.8.b is mandatory, but not both.

[8] Only the value of total peak envelope power is required for coordination under Nos. **S9.15**, **S9.17** or **S9.17A**.

* The application of this column is suspended pending the decision of WRC-99.

C – Characteristics to be provided for each group of frequency assignments for a satellite antenna beam or an earth station antenna *(end)*

Items in Appendix	Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network subject to coordination under Section II of Article S9	Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article S9	Notification or coordination of a geostationary-satellite network (including Appendix S30B)	Notification or coordination of a non-geostationary-satellite network	Notification or coordination of an earth station	Notice for space stations in the broadcasting-satellite service under Appendix S30 *	Notice for feeder-link stations under Appendix S30A *	Notice for stations in the fixed-satellite service under Appendix S30B	Items in Appendix	Radio astronomy
C.9.a			O	C	C					C.9.a	
C.9.b							X	X		C.9.b	
C.9.c			X		X					C.9.c	
C.10.a			X	X	X					C.10.a	
C.10.b			X	X	X			X		C.10.b	
C.10.c.1			X	X	X			X	X	C.10.c.1	
C.10.c.2			X	X	X			X	X	C.10.c.2	
C.10.c.3			O	X	X			X	X	C.10.c.3	
C.10.c.4			X	X	X			X	X	C.10.c.4	
C.10.c.5			X	X	X				X	C.10.c.5	
C.10.c.6								X		C.10.c.6	
C.11.a	X[10]	X[10]	X	X	X					C.11.a	
C.11.b								X		C.11.b	
C.11.c							X		X	C.11.c	
C.11.d					X					C.11.d	
C.12									X	C.12	
C.13										C.13	X
C.14							X			C.14	

X Mandatory information O Optional information C This information need only be furnished when it has been used as a basis to effect coordination with another administration

[10] Only the list of country or geographic designators or a narrative description of the service area shall be supplied.

D – Overall link characteristics

Items in Appendix	Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network subject to coordination under Section II of Article S9	Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article S9	Notification or coordination of a geostationary-satellite network (including Appendix S30B)	Notification or coordination of a non-geostationary-satellite network	Notification or coordination of an earth station	Notice for space stations in the broadcasting-satellite service under Appendix S30 *	Notice for feeder-link stations under Appendix S30A *	Notice for stations in the fixed-satellite service under Appendix S30B	Items in Appendix	Radio astronomy
D.1				X						D.1	
D.2.a				X						D.2.a	
D.2.b				X						D.2.b	

X Mandatory information O Optional information C This information need only be furnished when it has been used as a basis to effect coordination with another administration

* The application of this column is suspended pending the decision of WRC-99.

APPENDIX S5

Identification of administrations with which coordination is to be effected or agreement sought under the provisions of Article S9

1 For the purpose of effecting coordination under Article **S9**, except in the case under No. **S9.21**, and for identifying the administrations with which coordination is to be effected, the frequency assignments to be taken into account are those in the same frequency band as the planned assignment, pertaining to the same service or to another service to which the band is allocated with equal rights or a higher category[1] of allocation, which might affect or be affected, as appropriate, and which are:

a) in conformity with No. **S11.31**[2]; and

b) either recorded in the Master International Frequency Register (Master Register) with a favourable finding with respect to No. **S11.32**; or

c) recorded in the Master Register with an unfavourable finding with respect to No. **S11.32** and a favourable finding with respect to No. **S11.32A** or No. **S11.33**, as appropriate; or

d) coordinated under the provisions of Article **S9**; or

e) included in the coordination procedure with effect from the date of receipt[3] by the Bureau, in accordance with No. **S9.34**, of those characteristics specified in Appendix **S4** as mandatory or required, or from the date of dispatch, in accordance with No. **S9.29**, of the appropriate information listed in Appendix **S4**; or

f) where appropriate, in conformity with a world or regional allotment or assignment plan and the associated provisions;

g) for terrestrial radiocommunication stations or earth stations operating in the opposite direction of transmission[4] and, in addition, operating in accordance with these Regulations, or to be so operated prior to the date of bringing the earth station assignment into service, or within the next three years from the date of dispatch of coordination data under No. **S9.29**, whichever is the longer, or from the date of the publication referred to in No. **S9.38**, as appropriate.

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[1] The coordination between an earth station and terrestrial stations under Nos. **S9.15**, **S9.16**, **S9.17**, **S9.18** and **S9.19**, or between earth stations operating in opposite directions of transmission under **S9.17A**, applies only to assignments in bands allocated with equal rights.

[2] For the purpose of effecting coordination, an assignment for which the process of obtaining agreement under No. **S9.21** has been initiated is considered to be in conformity with No. **S11.31** with respect to No. **S9.21**.

[3] See No. **S9.1** concerning the date to be considered as the date of receipt by the Bureau of the information relating to the coordination of a satellite network or the notification of a frequency assignment.

[4] The associated space network characteristics must have been communicated to the Bureau under No. **S9.2B**.

2 For the application of No. **S9.21**, the agreement of an administration may be required with respect to the frequency assignments in the same frequency band as the planned assignment, pertaining to the same service or to another service to which the band is allocated with equal rights or a higher category of allocation, which may affect or be affected, as appropriate, and:

a) in cases involving a station in a space radiocommunication service with respect to any other station or involving a terrestrial radiocommunication station with respect to an earth station:

i) which are in conformity with No. **S11.31**, and comply with the relevant conditions listed in § 1 *b)* to 1 *g)*; or

ii) for which the procedure under No. **S9.21** has been initiated, with effect from the date of receipt by the Bureau, in accordance with No. **S9.34**, of the basic characteristics specified in Appendix **S4**;

or

b) for terrestrial radiocommunication stations operating in accordance with these Regulations, or to be so operated prior to the date of bringing the other terrestrial station assignment into service, or within the next three months, whichever is the longer.

3 For each of the frequency assignments to a station of a terrestrial or space radiocommunication service referred to in § 1 and 2 above, the level of interference shall be determined using the method referred to in Table S5-1 which is appropriate to the particular case.

4 The assignment is considered to affect or be affected, as appropriate, and coordination must be sought under the procedure of Article **S9**, if:

a) the threshold levels given in Table S5-1 are exceeded; and

b) the condition specified in Table S5-1 is applicable.

5 Threshold values to determine whether coordination under No. **S9.11A** is required are given in Table S5-2.

6 No coordination is required:

a) when the use of a new frequency assignment will not cause or suffer, as appropriate, in respect of any service of another administration, an increase in the level of interference above the threshold calculated in accordance with the method referred to in Tables S5-1 and S5-2; or

b) when the characteristics of a new or a modified frequency assignment or a new earth station are within the limits of those of a frequency assignment which has previously been coordinated; or

c) to change the characteristics of an existing assignment in such a way as not to increase the interference to or from, as appropriate, the assignments of other administrations; or

d) for assignments to stations comprising a satellite network in relation to assignments of other satellite networks:

i) for a new frequency assignment to a receiving station, when the notifying administration states that it accepts the interference resulting from the frequency assignments referred to in No. **S9.27**; or

ii) between earth stations using frequency assignments in the same direction (either Earth-to-space or space-to-Earth); or

e) for assignments to earth stations in relation to terrestrial stations or earth stations operating in the opposite direction of transmission, when an administration proposes:

i) to bring into use an earth station the coordination area of which does not include any of the territory of any other country;

ii) to operate a mobile earth station. However, if the coordination area associated with the operation of such a mobile earth station includes any of the territory of another country, the operation of such a station shall be subject to agreement on coordination between the administrations concerned. This agreement shall apply to the characteristics of the mobile earth station(s), or to the characteristics of a typical mobile earth station, and shall apply to a specified service area. Unless otherwise stipulated in the agreement, it shall apply to any mobile earth stations in the specified service area provided that interference caused by them shall not be greater than that caused by a typical earth station for which the technical characteristics appear in the notice and have been or are being submitted in accordance with Section I of Article **S11**; or

iii) to bring into use a new frequency assignment to a receiving earth station and the notifying administration states that it accepts the interference resulting from existing and future terrestrial station assignments or assignments to earth stations operating in the opposite direction of transmission. In such case, administrations responsible for the terrestrial stations or earth stations operating in the opposite direction of transmission are not required to apply the provisions of No. **S9.18** or No. **S9.17A** of Article **S9** respectively:

f) to bring into use an assignment to a terrestrial station or an earth station operating in the opposite direction of transmission which is located, in relation to an earth station, outside the coordination area of that earth station; or

g) to bring into use an assignment to a terrestrial station or an earth station operating in the opposite direction of transmission within the coordination area of an earth station, provided that the proposed assignment to a terrestrial station or an earth station operating in the opposite direction of transmission is outside any part of a frequency band coordinated for reception by that earth station.

TABLE S5-1

Technical conditions for coordination
(see Article **S9**)

Reference of Article S9	**Case**	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Calculation method**	**Remarks**
No. **S9.7** GSO/GSO	A station in a satellite network using the geostationary-satellite orbit (GSO), in any space radio-communication service, in a frequency band and in a Region where this service is not subject to a Plan, in respect of any other satellite network using that orbit, in any space radiocommunication service in a frequency band and in a Region where this service is not subject to a Plan, with the exception of the coordination between earth stations operating in the opposite direction of transmission	Any frequency band allocated to a space service, where this service is not subject to a Plan	Value of $\Delta T/T$ exceeds 6%	Appendix **S8**	
No. **S9.8** GSO/GSO	A transmitting space station in the fixed-satellite service (FSS) using the GSO in a frequency band shared with the broadcasting-satellite service (BSS) on an equal primary basis, in respect of space stations in the latter service which are subject to the Plans in Appendix **S30**	11.7-12.2 GHz (Region 2) 12.2-12.7 GHz (Region 3) 12.5-12.7 GHz (Region 1)	i) There is an overlap in the necessary bandwidths of the FSS and BSS space stations; and ii) the power flux-density (pfd) of the FSS space station exceeds the value given in Annex 4 of Appendix **S30** on the territory of another administration located in another Region	Check by using the assigned frequencies and bandwidths;	See also Article 7 of Appendix **S30**. Application of this provision with respect to Articles 6 and 7 of Appendices **S30** and **S30A** is suspended pending the decision of WRC-99 on the revision of these two Appendices.

TABLE S5-1 (*continued*)

Reference of Article S9	**Case**	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Calculation method**	**Remarks**
No. **S9.9** GSO/GSO	A station of the FSS in a frequency band shared on an equal primary basis with the feeder links of the BSS, which are subject to the Plans in Appendix **S30A**	17.7-18.1 GHz (Region 1) 17.7-18.1 GHz (Region 3) 17.7-17.8 GHz (Region 2)	i) Value of $\Delta T_s/T_s$ exceeds 4% (see Section I of Annex 4 of Appendix **S30A**); and ii) geocentric inter-satellite angular separation is less than 3° or greater than 150°	i) Case II of Appendix **S8** ii) Annex 1 of Appendix **S8**	The threshold/conditions do not apply when the geocentric angular separation, between an FSS transmitting space station and a receiving space station in the feeder-link plan, exceeds 150° of arc and the free-space pfd of the FSS transmitting space station does not exceed a value of –137 dB(W/m^2/MHz) on the surface of the Earth at the equatorial limb. Application of this provision with respect to Articles 6 and 7 of Appendices **S30** and **S30A** is suspended pending the decision of WRC-99 on the revision of these two Appendices.

TABLE S5-1 (*continued*)

Reference of Article S9	**Case**	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Calculation method**	**Remarks**
No. **S9.11** GSO/terrestrial	A space station in the BSS in any band shared on an equal primary basis with terrestrial services and where the BSS is not subject to a Plan, in respect of terrestrial services	620-790 MHz 1 452-1 492 MHz 2 310-2 360 MHz 2 520-2 655 MHz 2 655-2 670 MHz 12.5-12.75 GHz (Region 3) 17.7-17.8 GHz (Region 2) 21.4-22 GHz (Region 1 and 3) 40.5-42.5 GHz 84-86 GHz	Condition: bandwidths overlap	Check by using the assigned frequencies and bandwidths	
No. **S9.12** 1) Non-GSO/ non-GSO	A station in a satellite network using a non-geostationary-satellite orbit in the frequency bands for which a footnote refers to **S9.11A** in respect of any other satellite network using a non-geostationary-satellite orbit, with the exception of coordination between earth stations operating in the opposite direction of transmission	See Table S5-2	Condition: bandwidths overlap	Check by using the assigned frequencies and bandwidths	
No. **S9.12** 2) Non-GSO/ GSO	A station in a satellite network using a non-geostationary-satellite orbit in the frequency bands for which a footnote refers to **S9.11A** in respect of any other satellite network using the geostationary-satellite orbit, with the exception of coordination between earth stations operating in the opposite direction of transmission	See Table S5-2	Condition: bandwidths overlap	Check by using the assigned frequencies and bandwidths	

TABLE S5-1 (*continued*)

Reference of Article S9	**Case**	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Calculation method**	**Remarks**
No. **S9.13** GSO/non-GSO	A station in a satellite network using the GSO in the frequency bands for which a footnote refers to No. **S9.11A** in respect of any other satellite network using a non-GSO, with the exception of coordination between earth stations operating in the opposite direction of transmission	See Table S5-2	Condition: bandwidths overlap	Check by using the assigned frequencies and bandwidths	
No. **S9.14** Non-GSO/ terrestrial, GSO/terrestrial	For a space station in a satellite network in the frequency bands for which a footnote refers to No. **S9.11A** in respect of stations of terrestrial services where threshold(s) is (are) exceeded	See Table S5-2	See § 1 of Annex 1 of this Appendix	See § 1 of Annex 1 of this Appendix	
No. **S9.15** Non-GSO/ terrestrial	A specific earth station or a typical earth station in respect of terrestrial stations in frequency bands for which a footnote refers to No. **S9.11A** allocated with equal rights to space and terrestrial services, where the coordination area of the earth station includes the territory of another country	See Table S5-2	The coordination area of the earth station covers the territory of another administration	See § 2 of Annex 1 of this Appendix	

TABLE S5-1 (*continued*)

Reference of Article S9	**Case**	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Calculation method**	**Remarks**
No. **S9.16** Terrestrial/ non-GSO	A transmitting station in a terrestrial service within the coordination area of an earth station in a non-GSO network in frequency bands for which a footnote refers to No. **S9.11A**	See Table S5-2	Transmitting terrestrial station is situated within the coordination area of a receiving earth station	See § 2 of Annex 1 of this Appendix	The coordination area of the affected earth station has already been determined using the calculation method of No. **S9.15**
No. **S9.17** GSO, non-GSO/ terrestrial	A specific earth station or a typical mobile earth station in frequency bands above 1 GHz allocated with equal rights to space and terrestrial services in respect of terrestrial stations, where the coordination area of the earth station includes the territory of another country, with the exception of the coordination under No. **S9.15**	Any frequency band allocated to a space service, except those mentioned in the Plans in Appendix **S30A**	The coordination area of the earth station covers the territory of another administration	Appendix **S7** (for earth stations in the radiodetermination-satellite service (RDSS) in the bands: 1 610-1 626.5 MHz, 2 483.5-2 500 MHz and 2 500-2 516.5 MHz, see Remarks column) 1) The coordination area of aircraft earth stations is determined by increasing the service area by 1 000 km with respect to the aeronautical mobile service (terrestrial) or 500 km with respect to terrestrial services other than the aeronautical mobile service	NOTE – For RDSS earth stations, a uniform coordination distance of 400 km corresponding to an airborne earth station shall be used. In cases where the earth stations are all ground-based, a coordination distance of 100 km shall be used

TABLE S5-1 (*continued*)

Reference of Article S9	Case	Frequency bands (and Region) of the service for which coordination is sought	Threshold/condition	Calculation method	Remarks
No. **S9.17** GSO, non-GSO/ terrestrial (*cont.*)				2) For receiving earth stations in the meteo-rological-satellite service in frequency bands shared with the meteorological aids service, the coordina-tion distance is consi-dered to be the visibility distance as a function of the earth station horizon elevation angle for a radiosonde at an altitude of 20 km above mean sea level, assuming 4/3 Earth radius	Application of this provision with respect to Articles 6 and 7 of Appendices **S30** and **S30A** is suspended pending the decision of WRC-99 on the revision of these two Appendices

TABLE S5-1 (*continued*)

Reference of Article S9	**Case**	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Calculation method**	**Remarks**
No. **S9.17A** GSO, non-GSO/ GSO, non-GSO	A specific earth station in respect of other earth stations operating in the opposite direction of transmission in frequency bands allocated with equal rights to space radiocommunication services in both directions of transmission, where the coordination area of the earth station includes the territory of another country or the earth station is located within the coordination area of a coordinated earth station, with the exception of the frequency bands subject to the Plans in Appendix **S30A**	Any frequency band allocated to a space service	The coordination area of the earth station covers the territory of another administration or the earth station is located within the coordination area of an earth station	i) For bands in Table S5-2, see § 2 of Annex 1 of this Appendix ii) See Recommendations ITU-R IS.847, ITU-R IS.848 and ITU-R IS.849	
No. **S9.18** Terrestrial/ GSO, non-GSO	Any transmitting station of a terrestrial service in the bands referred to in No. **S9.17** within the coordination area of an earth station, in respect of this earth station, with the exception of the coordination under Nos. **S9.16** and **S9.19**	Any frequency band allocated to a space service.	Transmitting terrestrial station is situated within the coordination area of a receiving earth station	See Remarks column	The coordination area of the affected earth station has already been determined using the calculation method of No. **S9.17**

TABLE S5-1 (*continued*)

Reference of Article S9	**Case**	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Calculation method**	**Remarks**
No. **S9.19** Terrestrial/ GSO	A transmitting station in a terrestrial service in a frequency band shared on an equal primary basis with the BSS, except where the service is subject to the Plans in Appendix **S30**	Bands listed in No. **S9.11**	i) Necessary bandwidths overlap; and ii) the pfd of the terrestrial station at the edge of the BSS service area exceeds the permissible level	Check by using the assigned frequencies and bandwidths	
No. **S9.21** Terrestrial, GSO, non-GSO/ terrestrial, GSO, non-GSO	A station of a service for which the requirement to obtain the agreement of other administrations is included in a footnote to the Table of Frequency Allocations, referring to No. **S9.21**	Band(s) indicated in the relevant footnote	Condition: Incompatibility established by the use of Appendices **S7**, **S8**, technical annexes of Appendices **S30**, **S30A** and **S30B**, pdf values specified in some of the footnotes, other technical provisions of the Radio Regulations or ITU-R Recommendations as appropriate	Methods specified in, or adapted from, Appendices **S7**, **S8**, **S30**, **S30A**, **S30B**, other technical provisions of the Radio Regulations or ITU-R Recommendations	

TABLE S5-1A

Applicability of No. S9.11A for space services

NOTE – Annex 1 contains the relevant coordination thresholds for sharing between the mobile-satellite service (MSS) (space-to-Earth) and terrestrial services as well as the relevant coordination areas for mobile earth stations operating below 3 GHz. It also contains the relevant coordination thresholds for sharing between non-GSO MSS feeder links (space-to-Earth) and terrestrial services as well as the relevant coordination areas for earth stations providing feeder links for non-GSO satellites operating in the MSS and for non-GSO FSS earth stations.

Frequency band	**RR foot-note/Res.**	**Space services [1] in the footnote to which No. S9.11A applies**		**Other space services [1] to which No. S9.11A applies equally**	**Date of provisional application of allocation if later than 22.11.1997**
137-137.025 MHz 137.175-137.825 MHz	**S5.208**	MSS	↓	SPACE OPERATION METEOROLOGICAL-SATELLITE SPACE RESEARCH	
137.025-137.175 MHz 137.825-138 MHz	**S5.208**	mss	↓	---	
148-149.9 MHz	**S5.219**	MSS	↑	---	
149.9-150.05 MHz	**S5.220**	MSS	↑	--- (See **S5.220**)	Limited to LMSS until 1.1.2015
312-315 MHz	**S5.255**	mss	↑	---	
387-390 MHz	**S5.255**	mss	↓	---	
399.9-400.05 MHz	**S5.220**	MSS	↑	--- (See **S5.220**)	Limited to LMSS until 1.1.2015
400.15-401 MHz	**S5.264**	MSS	↓	METEOROLOGICAL-SATELLITE SPACE RESEARCH	
454-455 MHz	**S5.286A**	MSS (**S5.286D**, **S5.286E**)	↑	---	1.1.1999
455-456 MHz	**S5.286A**	MSS (R2, **S5.286E**)	↑	---	1.1.1999
459-460 MHz	**S5.286A**	MSS (R2, **S5.286E**)	↑	---	1.1.1999
1 492-1 525 MHz	**S5.348**	MSS (R2, except USA)	↓	---	
1 525-1 530 MHz	**S5.354**	MSS	↓	SPACE OPERATION	1.1.1999 (LMSS, AMSS in R1)
1 530-1 533 MHz	**S5.354**	MSS	↓	SPACE OPERATION	1.1.1999 (AMSS)
1 533-1 535 MHz	**S5.354**	MSS	↓	SPACE OPERATION	1.1.1999 (LMSS, AMSS)
1 535-1 544 MHz	**S5.354**	MSS	↓	---	1.1.1999 (LMSS, AMSS)
1 544-1 545 MHz	**S5.354**	MSS	↓	---	
1 545-1 555 MHz	**S5.354**	MSS	↓	---	1.1.1999 (LMSS, MMSS)
1 555-1 559 MHz	**S5.354**	MSS	↓	---	1.1.1999 (AMSS, MMSS)
1 610-1 626.5 MHz	**S5.364**	MSS, RDSS (R2, **S5.369**)	↑	---	
1 610-1 626.5 MHz	**S5.364**	rdss (R1, R3,VEN)	↑	---	

TABLE S5-1A (*cont.*)

Frequency band	RR foot-note/Res.	Space services [1] in the footnote to which No. S9.11A applies		Other space services [1] to which No. S9.11A applies equally	Date of provisional application of allocation if later than 22.11.1997
1 613.8-1 626.5 MHz	**S5.365**	mss	↓	---	
1 626.5-1 631.5 MHz	**S5.354**	MSS	↑	---	(LMSS, AMSS in R1)
1 631.5-1 634.5 MHz	**S5.354**	MSS	↑	---	1.1.1999 (AMSS)
1 634.5-1 645.5 MHz	**S5.354**	MSS	↑	---	1.1.1999 (LMSS, AMSS)
1 645.5-1 646.5 MHz	**S5.354**	MSS	↑	---	
1 646.5-1 656.5 MHz	**S5.354**	MSS	↑	---	1.1.1999 (LMSS, MMSS)
1 656.5-1 660 MHz	**S5.354**	MSS	↑	---	1.1.1999 (AMSS, MMSS)
1 660-1 660.5 MHz	**S5.354**	MSS	↑	---	1.1.1999 (AMSS, MMSS)
1 675-1 700 MHz	**S5.377**	MSS (R2)	↑	--- (see **S5.377**)	
1 700-1 710 MHz	**S5.377**	MSS (R2)	↑	SPACE RESEARCH (**S5.384**)	
1 980-2 010 MHz	**S5.389A**	MSS	↑	---	1.1.2000 (1980-1990 MHz: 2005 in R2)
2 010-2 025 MHz	**S5.389C**	MSS (R2)	↑	---	1.1.2002 (1.1.2000 in CAN, USA)
2 160-2 170 MHz	**S5.389C**	MSS (R2)	↓	SPACE RESEARCH **S5.392A** (RUS)	1.1.2002 (1.1.2000 in CAN, USA)
2 170-2 200 MHz	**S5.389A**	MSS	↓	SPACE RESEARCH **S5.392A** (RUS)	1.1.2000
2 483.5-2 500 MHz	**S5.402**	MSS RDSS (R2, **S5.400**)	↓	---	
2 483.5-2 500 MHz	**S5.402**	rdss (R1, R3)	↓	---	
2 500-2 520 MHz	**S5.414** **S5.403**	MSS	↓	FSS (R2, R3), RDSS (**S5.404**)	1.1.2005 (until 2005: Article **14**: MSS (–AMSS)) 1.1.2000 (AMSS in J)
2 520 -2 535 MHz	**S5.403**	MSS (–AMSS)	↓	BSS, FSS (R2, R3)	1.1.2000 (AMSS in J)
2 655-2 670 MHz	**S5.420**	MSS (–AMSS)	↑	BSS, FSS (R2, R3)	
2 670-2 690 MHz	**S5.419** **S5.420**	MSS	↑	FSS (R2, R3)	1.1.2005 (until 2005: Article **14**: MSS (–AMSS)) 1.1.2000 (AMSS in J)
5 091-5 150 MHz	**S5.444A**	FSS (limited to non-GSO MSS feeder link)	↑	AMSS (**S5.367**)	
5 150-5 250 MHz	**S5.447A** **S5.447C**	FSS (limited to non-GSO MSS feeder link)	↑	RDSS (**S5.447C**)	
5 150-5 216 MHz	**S5.447B**	FSS (limited to non-GSO MSS feeder link)	↓	RDSS (**S5.447C**)	
6 700-7 075 MHz	**S5.458B**	FSS (limited to non-GSO MSS feeder link)	↓	Non-GSO FSS	

TABLE S5-1A (*end*)

Frequency band	RR foot-note/Res.	Space services [1] in the footnote to which No. S9.11A applies		Other space services [1] to which No. S9.11A applies equally	Date of provisional application of allocation if later than 22.11.1997
10.7-11.7 GHz	**S5.441** **S5.484A**	Non-GSO FSS [2]	↓	---	see Res. **130** [3]
11.7-12.2 GHz (R2) 12.2-12.75 GHz (R3) 12.5-12.75 GHz (R1)	**S5.484A**	Non-GSO FSS [2]	↓	---	see Res. **130** and Res. **538** [3], as appropriate
11.7-12.5 GHz (R1) 11.7-12.2 GHz (R3) 12.2-12.7 GHz (R2)	**S5.487A**	Non-GSO FSS [2]	↓	---	see Res. **538**
12.5-12.75 GHz	Res. **130**	Non-GSO FSS [2]	↑	---	see Res. **130**
12.75-13.25 GHz	**S5.441**	Non-GSO FSS [2]	↑	---	see Res. **130**
13.75-14.5 GHz	**S5.484A**	Non-GSO FSS [2]	↑	---	see Res. **130**
15.43-15.63 GHz	**S5.511A**	FSS (limited to non-GSO MSS feeder link)	↓	---	
15.63-15.65 GHz	**S5.511D**	Non-GSO FSS	↓	FSS ↑	
17.3-18.1 GHz (R1,R3)	**S5.516**	Non-GSO FSS [2]	↑	BSS	see Res. **538**
17.8-18.1 GHz (R2)	**S5.516**	Non-GSO FSS [2]	↑	---	see Res. **538**
17.8-18.6 GHz	**S5.484A**	Non-GSO FSS [2]	↓	---	see Res. **130**, for 17.8-18.1 GHz, see also Res. **538**
18.8-19.3 GHz	**S5.523A**	Non-GSO FSS	↓	GSO FSS	
19.3-19.6 GHz	**S5.523B**	FSS (non-GSO MSS feeder link)	↑	---	
19.3-19.7 GHz	**S5.523D**	FSS (GSO and non-GSO MSS feeder link)	↓	---	
19.7-20.2 GHz	**S5.484A**	Non-GSO FSS [2]	↓	---	see Res. **130**
27.5-28.6 GHz	**S5.484A**	Non-GSO FSS [2]	↑	---	see Res. **130**
28.6-29.1 GHz	**S5.523A**	Non-GSO FSS	↑	GSO FSS	
29.1-29.5 GHz	**S5.535A**	FSS (GSO and non-GSO MSS feeder link)	↑		
29.5-30 GHz	**S5.484A**	Non-GSO FSS [2]	↑	---	see Res. **130**

[1] NOTE: AMSS: AERONAUTICAL MOBILE-SATELLITE SERVICE
BSS: BROADCASTING-SATELLITE SERVICE
FSS: FIXED-SATELLITE SERVICE
LMSS: LAND MOBILE-SATELLITE SERVICE
MMSS: MARITIME MOBILE-SATELLITE SERVICE
MSS: MOBILE-SATELLITE SERVICE
RDSS: RADIODETERMINATION-SATELLITE SERVICE
(small letters show secondary allocations.)

R1: Region 1
R2: Region 2
R3: Region 3
↓ space-to-Earth
↑ Earth-to-space

[2] Coordination of non-GSO FSS systems only with respect to other non-GSO FSS systems.

[3] For information: Non-GSO FSS systems operated in accordance with Resolutions **130 (WRC-97)** and **538 (WRC-97)** shall also apply the provisions of Nos. **S9.17** and **S9.17A**, as appropriate.

ANNEX 1

1 Coordination thresholds for sharing between MSS (space-to-Earth) and terrestrial services in the same frequency bands and between non-GSO MSS feeder links (space-to-Earth) and terrestrial services in the same frequency bands

1.1 Below 1 GHz*

1.1.1 In the bands 137-138 MHz and 400.15-401 MHz, coordination of a space station of the MSS (space-to-Earth) with respect to terrestrial services (except aeronautical mobile (OR) service networks operated by the administrations listed in Nos. **S5.204** and **S5.206** as of 1 November 1996) is required only if the pfd produced by this space station exceeds –125 dB (W/m^2/4 kHz) at the Earth's surface.

1.1.2 In the band 137-138 MHz, coordination of a space station of the MSS (space-to-Earth) with respect to the aeronautical mobile (OR) service is required only if the pfd produced by this space station at the Earth's surface exceeds:

– –125 dB (W/m^2/4 kHz) for networks for which complete Appendix **3** coordination information has been received by the Bureau prior to 1 November 1996;

– –140 dB (W/m^2/4 kHz) for networks for which complete Appendix **S4**/**3** coordination information has been received by the Bureau after 1 November 1996 for the administrations referred to in § 1.1.1 above.

1.1.3 In the band 137-138 MHz, coordination is also required for a space station on a replacement satellite of a MSS network for which complete Appendix **3** coordination information has been received by the Bureau prior to 1 November 1996 and the pfd exceeds –125 dB(W/m^2/4 kHz) at the Earth's surface for the administrations referred to in § 1.1.1 above.

1.2 Between 1 and 3 GHz

1.2.1 Objectives

Generally, pfd thresholds were used to determine the need for coordination between space stations of the MSS (space-to-Earth) and terrestrial services. However, to facilitate sharing between digital fixed service stations and non-GSO MSS space stations, the concept of fractional degradation in performance (FDP) was adopted. This concept involves new methods described in this Annex.

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* These provisions apply only to the MSS.

As a consequence of this new concept, the need for coordination between space stations of the MSS (space-to-Earth) and terrestrial services is determined using two methods:

– simple method: FDP (simple definition of the MSS system and characteristics of reference FS stations are used in inputs) or power flux-density trigger value;

– more detailed method: system specific methodology (SSM) (specific characteristics of the MSS system and characteristics of reference fixed service stations are used in inputs) as described, for example, in Annex 1 to Recommendation ITU-R IS.1143.

If one of the two methods gives a result that does not exceed the criteria relevant to each method, there is no need for coordination.

If only one method is available in an administration, the result of this method must be taken into account.

1.2.2 General considerations

1.2.2.1 Method for calculating the value of FDP

The FDP is used in cases of sharing between digital fixed service stations with non-GSO MSS stations (space-to-Earth).

To calculate the value of the FDP, the following parameters are needed:

– technical characteristics of digital fixed service station;

– technical characteristics of non-GSO MSS constellation.

The FDP is calculated:

– by simulating the proposed MSS constellation using the information given in A.4 of Annex 2A to Appendix **S4**;

– by positioning the fixed service station at a certain latitude (each station is assumed to operate at an elevation angle of 0°);

– by calculating for each pointing azimuth (*Az*) varying between 0° and 360°:

  – at each instant in time of the simulation, the aggregate interference from all visible space stations received at the fixed service station;

  – the FDP_{Az} for the azimuth *Az*, using the following formula:

$$FDP_{Az} = \sum_{I_i = min}^{max} \frac{I_i \, f_i}{N_T}$$

– by the following formula:

$$FDP = \max(FDP_{Az})$$

(The formula for *FDP* applies to the 1-3 GHz frequency range only. A different formula may apply at frequencies above 3 GHz.)

where:

I_i = interference noise power level (W)

f_i = the fractional period of time during which the interference power equals I_i

N_T = station receiving system noise power level = kTB (W)

k = Boltzmann's constant = 1.38×10^{-23} (J/K)

T = FS station receiving system effective noise temperature (T should be calculated by the following formula:

$$10 \log T = NF + 10 \log T_0$$

where NF (dB) is the receiver noise figure given in Annex 1 and T_0 should be assumed as 290 K)

B = reference bandwidth = 1 MHz.

NOTE – For the purpose of *FDP* calculation according to this Annex, it should be assumed that all space stations in the same MSS constellation operate on the same frequencies.

1.2.2.2 Characteristics of reference systems in the fixed service

The following parameters represent the set of reference parameters of the fixed service.

1.2.2.2.1 Characteristics of reference digital point-to-point systems

Three different digital systems are described in the following table:

– 64 kbit/s capacity used, for example, for outside plant (individual subscriber connection);

– 2 Mbit/s capacity used, for example, for business subscriber connections for the local part of the inside plant;

– 45 Mbit/s capacity used, for example, for trunk networks.

Capacity	64 kbit/s	2 Mbit/s	45 Mbit/s
Modulation	4-PSK	8-PSK	64-QAM
Antenna gain (dB)	33	33	33
Transmit power (dBW)	7	7	1
Feeder/multiplexer loss (dB)	2	2	2
e.i.r.p. (dBW)	38	38	32
Receiver IF bandwidth (MHz)	0.032	0.7	10
Receiver noise figure (dB)	4	4.5	4
Receiver input level for a BER of 10^{-3} (dBW)	–137	–120	–106

Antenna pattern:

$$G(\varphi) = G_{max} - 2.5 \times 10^{-3} \left(\frac{D\varphi}{\lambda} \right)^2 \quad \text{for} \quad 0 < \varphi < \varphi_m$$

$$G(\varphi) = 39 - 5 \log (D/\lambda) - 2.5 \log \varphi \quad \text{for} \quad \varphi_m \leq \varphi < 48°$$

$$G(\varphi) = -3 - 5 \log (D/\lambda) \quad \text{for} \quad 48° \leq \varphi \leq 180°$$

where:

$G(\varphi)$: gain relative to an isotropic antenna (dBi)

φ: off-axis angle (degrees)

D: antenna diameter

λ: wavelength expressed in the same unit as D

G_1: gain of the first side-lobe = $2 + 15 \log (D/\lambda)$

(D/λ may be estimated from $20 \log (D/\lambda) \approx G_{max} - 7.7$)

G_{max}: main lobe antenna gain (dBi)

$$\varphi_m = 20 (\lambda/D) \times \sqrt{(G_{max} - G_1)}$$

It should be noted that the above antenna radiation pattern corresponds to the average side-lobe pattern and it is recognized that individual side-lobes may exceed it by up to 3 dB.

1.2.2.2.2 Characteristics of reference analogue point-to-point systems

Reference circuit	12 hops with 50 km distance between stations
Antenna gain (dBi)	33
e.i.r.p. (dBW)	36
Feeder/multiplexer loss (dB)	3
Receiver noise figure (referred to input of receiver) (dB)	8
Maximum short- and long-term interference in the reference circuit: – baseband interfering signal power level not to be exceeded for more than 20% of the time – baseband interfering signal power level not to be exceeded for more than 0.01% of the time	 240 pW0p 50 000 pW0p

Antenna pattern: use antenna pattern of § 1.2.2.2.1.

1.2.2.2.3 Characteristics of reference point-to-multipoint systems

NOTE – In application of the standard computation program, the use of the point-to-multipoint reference fixed service system parameters for the 2 170-2 200 MHz band is not required.

Parameter	**Central station**	**Outstation**
Antenna type	Omni/sectoral	Dish/horn
Antenna gain (dBi)	10/13	20 (analogue) 27 (digital)
e.i.r.p. (max) (dBW): – analogue – digital	 12 24	 21 34
Noise figure (dB)	3.5	3.5
Feeder/multiplexer loss (dB)	2	2
IF bandwidth (MHz)	3.5	3.5

Antenna pattern:

For the outstation antenna pattern, the reference pattern described in § 1.2.2.2.1 is to be used.

The reference radiation pattern for omnidirectional or sectoral antennas is the following:

$$G(\theta) = G_0 - 12\,(\theta/\varphi_3)^2 \qquad \text{for} \quad 0 \le \theta < \varphi_3$$

$$G(\theta) = G_0 - 12 - 10 \log (\theta/\varphi_3) \qquad \text{for} \quad \varphi_3 \le \theta < 90°$$

where:

G_0: maximum gain in the horizontal plane (dBi)

θ: radiation angle above the horizontal plane (degrees)

φ_3 (degrees) is given by:

$$\varphi_3 = \frac{1}{\alpha^2 - 0.818}$$

where:

$$\alpha = \frac{10^{0.1G_0} + 172.4}{191}$$

1.2.3 Determination of the need for coordination between MSS space stations (space-to-Earth) and terrestrial stations

1.2.3.1 Method for the determination of the need for coordination between MSS space stations (space-to-Earth) and other terrestrial services sharing the same frequency band in the 1 to 3 GHz range

Coordination of assignments for transmitting space stations of the MSS with respect to terrestrial services is not required if the pfd produced at the Earth's surface or the FDP of a station in the fixed service does not exceed the threshold values shown in the following table.

TABLE S5-2

Frequency band (MHz)	**Terrestrial service to be protected**	**Coordination threshold values**				
		GSO space stations		**Non-GSO space stations**		
		pfd (per space station) calculation factors (NOTE 2)		**pfd (per space station) calculation factors (NOTE 2)**		**% FDP (in 1 MHz) (NOTE 1)**
		P	***r* dB/ degrees**	***P***	***r* dB/ degrees**	
1 492-1 525	Analogue FS telephony (NOTE 5)	−146 dB(W/m^2) in 4 kHz and −128 dB(W/m^2) in 1 MHz	0.5	−146 dB(W/m^2) in 4 kHz and −128 dB(W/m^2) in 1 MHz	0.5	
	All other cases (NOTE 4)	−128 dB(W/m^2) in 1 MHz	0.5	−128 dB(W/m^2) in 1 MHz	0.5	25

TABLE S5-2 (*continued*)

Frequency band (MHz)	Terrestrial service to be protected	Coordination threshold values				
		GSO space stations		Non-GSO space stations		
		pfd (per space station) calculation factors (NOTE 2)		pfd (per space station) calculation factors (NOTE 2)		% FDP (in 1 MHz) (NOTE 1)
		P	***r* dB/ degrees**	***P***	***r* dB/ degrees**	
1 525-1 530	Analogue FS telephony (NOTE 5)	−146 dB(W/m^2) in 4 kHz and −128 dB(W/m^2) in 1 MHz	0.5	−146 dB(W/m^2) in 4 kHz and −128 dB(W/m^2) in 1 MHz	0.5	
	All other cases	−128 dB(W/m^2) in 1 MHz	0.5	−128 dB(W/m^2) in 1 MHz	0.5	25
2 160-2 200 (NOTE 3)	Analogue FS telephony (NOTE 5)	−146 dB(W/m^2) in 4 kHz and −128 dB(W/m^2) in 1 MHz	0.5	−141 dB(W/m^2) in 4 kHz and −123 dB (W/m^2) in 1 MHz (NOTE 6)	0.5	
	All other cases	−128 dB(W/m^2) in 1 MHz	0.5	−123 dB(W/m^2) in 1 MHz (NOTE 6)	0.5	25
2 483.5-2 500	All cases	−146 dB(W/m^2) in 4 kHz and −128 dB(W/m^2) in 1 MHz	0.5	−144 dB(W/m^2) in 4 kHz and −126 dB(W/m^2) in 1 MHz (NOTE 7)	0.65	
2 500-2 520	Analogue FS telephony (NOTE 5)	−146 dB(W/m^2) in 4 kHz and −128 dB(W/m^2) in 1 MHz	0.5	−146 dB(W/m^2) in 4 kHz and −128 dB(W/m^2) in 1 MHz	0.5	
	All other cases	−128 dB(W/m^2) in 1 MHz	0.5	−128 dB (W/m^2) in 1 MHz	0.5	25
2 520-2 535	Analogue FS telephony (NOTE 5)	−154 dB(W/m^2) in 4 kHz and −136 dB(W/m^2) in 1 MHz	0.75	−146 dB(W/m^2) in 4 kHz and −128 dB(W/m^2) in 1 MHz	0.5	
	All other cases	−136 dB(W/m^2) in 1 MHz	0.75	−128 dB(W/m^2) in 1 MHz	0.5	25

NOTE 1 – The calculation of FDP is contained in § 1.2.2.1, using the reference FS parameters contained in § 1.2.2.2.1 and 1.2.2.2.3. The use of FDP threshold is limited to the case of digital FS systems.

NOTE 2 – The following formula should be used for deriving the coordination threshold in terms of pfd:

P for $0° \le \delta \le 5°$

$P + r\,(\delta - 5)$ for $5° < \delta \le 25°$

$P + 20\,r$ for $25° < \delta \le 90°$

where δ is the angle of arrival (degrees).

The threshold values are obtained under assumed free-space propagation conditions.

TABLE S5-2 *(end)*

NOTE 3 – The coordination thresholds in the band 2 160-2 270 MHz (Region 2) and 2 170-2 200 MHz (all Regions) to protect other terrestrial services do not apply to International Mobile Telecommunications-2000 (IMT-2000) systems, as the satellite and the terrestrial components are not intended to operate in the same area or on common frequencies within these bands.

NOTE 4 – Exceptions for the band 1 492-1 525 MHz are as follows:
4.1 For the land mobile service on the territory of Japan (No. **S5.348A**): –150 dB(W/m^2) in 4 kHz at all angles of arrival is applicable to all satellite space-to-Earth emissions.
4.2 For the aeronautical mobile service for telemetry (No. **S5.343**), the requirement for coordination is determined by frequency overlap (No. **S5.348**).

NOTE 5 – In all cases involving sharing with analogue systems for telephony in the FS, further coordination is only required when the pfd values are greater than or equal to the coordination threshold values in both reference bandwidths.

NOTE 6 – The pfd values specified for the band 2 160-2 200 MHz provide full protection for analogue radio-relay systems using the sharing criteria established by Recommendation ITU-R SF.357, for operation with a non GSO MSS system employing narrow-band time division multiple access/frequency division multiple access techniques.

NOTE 7 – The pfd values specified for the band 2 483.5-2 500 MHz provide full protection for analogue radio-relay systems using the sharing criteria established by Recommendation ITU-R SF.357, for operation with multiple non GSO MSS systems employing code division multiple access techniques. The pfd values specified will not provide full protection for existing digital fixed systems in all cases. However, these pfd values are considered to provide adequate protection for digital fixed systems designed to operate in this band, where high-power industrial, scientific and medical equipment and possible low-power applications are expected to produce a relatively high interference environment.

1.2.3.2 A system specific methodology (SSM) to be used in determining the need for detailed coordination of non-GSO MSS (space-to-Earth) systems with fixed service systems

The purpose of the SSM is to allow a detailed assessment of the need to coordinate frequency assignments to non-GSO MSS space stations (space-to-Earth) with frequency assignments to receiving stations in an fixed service network of a potentially affected administration. The SSM takes into account specific characteristics of the non-GSO MSS system and reference fixed service characteristics.

Those administrations planning to establish the need for coordination between non-GSO MSS networks and fixed service systems are encouraged to use Recommendation ITU-R IS.1143. While urgent additional development work is being undertaken in the ITU-R to facilitate the use of the methodology described in Recommendation ITU-R IS.1143, administrations may be able to effect coordination by applying this SSM.

1.3 Above 3 GHz

In the band 15.45-15.65 GHz, when an administration proposes to use a non-GSO space station whose emissions exceed –146 dB (W/m^2/MHz) for all angles of arrival, it shall coordinate with affected administrations.

2 Hard limits

2.1 Sharing between feeder links of the non-GSO MSS (space-to-Earth) and terrestrial services in the same frequency bands

The pfd at the Earth's surface produced by space stations of the FSS operating in the space-to-Earth direction in the band 5 150-5 216 MHz shall in no case exceed −164 dB(W/m^2) in any 4 kHz band for all angles of arrival.

Emissions from a non-GSO space station shall not exceed the following limits at the Earth's surface:

Frequency bands	**Service**	**Limit in dB(W/m^2) for angle of arrival above the horizontal plane**			**Reference bandwidth**
		0°-5°	**5°-25°**	**25°-90°**	
6 700-6 825 MHz	Fixed-satellite (space-to-Earth)	−137	−137 + 0.5(δ – 5)	−127	1 MHz
6 825-7 075 MHz	Fixed-satellite (space-to-Earth)	−154 and −134	−154 + 0.5(δ – 5) and −134 + 0.5(δ – 5)	−144 and −124	4 kHz 1 MHz

Emissions from a non-GSO space station shall not exceed the pfd limits at the Earth's surface of −146 dB(W/m^2/MHz) in the bands 15.4-15.45 GHz and 15.65-15.7 GHz, and −111 dB(W/m^2/MHz) in the band 15.45-15.65 GHz for all angles of arrival. These limits relate to the pfd which would be obtained under assumed free-space propagation conditions.

pfd limits between 17.7 GHz and 27.5 GHz:

The pfd at the Earth's surface produced by emissions from a space station, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the following values:

−115 dB(W/m^2) in any 1 MHz band for angles of arrival between 0° and 5° above the horizontal plane;

−115 + 0.5(δ – 5) dB(W/m^2) in any 1 MHz band for angles of arrival δ between 5° and 25° above the horizontal plane;

−105 dB(W/m^2) in any 1 MHz band for angles of arrival between 25° and 90° above the horizontal plane.

These limits relate to the pfd which would be obtained under assumed free-space propagation conditions.

In the band 19.3-19.7 GHz for non-GSO systems, these values shall apply subject to review by the ITU-R and the results of this review should be considered by WRC-97.

2.2 pfd limits produced by non-GSO MSS feeder links with respect to the GSO orbit

In the frequency band 6 700-7 075 MHz, the maximum aggregate pfd produced at the GSO and including ±5° of inclination around the GSO orbit by a non-GSO system in the FSS shall not exceed −168 dB(W/m^2) in any 4 kHz band.

2.3 pfd limits produced by non-GSO FSS in the 20-30 GHz band

The pfd at the Earth's surface produced by emissions from a space station shall not exceed the following values:

−115 dB(W/m^2) in any 1 MHz band for angles of arrival between 0° and 5° above the horizontal plane;

$-115 + 0.5(\delta - 5)$ dB(W/m^2) in any 1 MHz band for angles of arrival δ between 5° and 25° above the horizontal plane;

−105 dB(W/m^2) in any 1 MHz band for angles of arrival between 25° and 90° above the horizontal plane.

These limits relate to the pfd which could be obtained under assumed free-space propagation conditions.

In the band 18.9-19.3 GHz for non-GSO satellite systems, these values shall apply subject to review by the ITU-R and the results of this review should be considered by WRC-97.

2.4 Power limits for terrestrial stations

In the band 19.3-19.6 GHz, the maximum e.i.r.p. of a station in the FS or mobile service shall not exceed 55 dBW and the power delivered to the antenna shall not exceed +10 dBW.

2.5 Power limits for earth stations

In the band 19.3-19.6 GHz, the e.i.r.p. transmitted in any direction towards the horizon by a feeder-link earth station of the MSS shall not exceed the following limits:

$+64$ dBW in any 1 MHz band for $\theta \leq 0°$

$+64 + 3\,\theta$ dBW in any 1 MHz band for $0° \leq \theta < 5°$,

where θ is the angle of elevation of the horizon viewed from the centre of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

These limits may be exceeded by not more than 10 dB. However, when the resulting coordination area extends into the territory of another country, such increase shall be subject to agreement by the administration of that country.

3 Coordination areas for mobile earth stations operating below 3 GHz and earth stations providing feeder links for non-GSO satellites operating in the MSS and for non-GSO FSS earth stations

3.1 Objectives

In order to apply the provisions of Sections III and IV, § 3.1 and 4.1 of the Annex 1 to Resolution **46 (Rev.WRC-97)**, this Section specifies the coordination area (see No. **S1.171**) for mobile earth stations as well as earth stations providing feeder links for non-GSO networks. In both cases, the coordination contour (see No. **S1.172**) associated with the coordination area is drawn to scale on an appropriate map in order to depict the coordination area and the extent to which it overlaps the territory of administrations that may be affected. Tables 1-3 specify coordination distances (see No. **S1.173**) for certain frequency sharing situations and frequency bands in which the provisions of Resolution **46 (Rev.WRC-97)** are applied. Table 4 applies to non-GSO FSS earth stations.

The coordination area of a mobile earth station is determined as the service area in which it is intended to operate typical earth stations, extended in all directions by the coordination distance. Tables 1 and 2 specify coordination distances for mobile earth stations operating below 1 GHz and in the 1-3 GHz frequency range, respectively. In the case of feeder-link earth stations, the coordination contour is determined as the end points of coordination distances measured from the earth station location. Coordination distances for feeder-link earth stations operating below 1 GHz are specified in Table 1. Coordination distances for feeder-link earth stations operating

above 5 GHz are specified in Table 3 with respect to stations in terrestrial services and, where applicable, earth stations of other satellite networks operating in the opposite direction of transmission. Coordination distances for non-GSO FSS earth stations are specified in Table 4.

3.2 General considerations

Two types of coordination distances are specified in Tables 1-4:

– predetermined distances;

– distances that are to be calculated on a case-by-case basis, taking into account specific parameters of the earth station for which the coordination area is being determined.

Neither of these distances indicate required separation distances.

It must be emphasized that the presence or installation of another station within the coordination area of an earth station would not necessarily preclude the satisfactory operation of either the earth station or the other station, since coordination distances are based on the most unfavourable case assumptions as regards interference.

The different coordination distances may be reviewed at a future conference conforming to the relevant Resolution.

TABLE 1

Earth stations operating at frequencies below 1 GHz

Frequency sharing situation		**Coordination distance (in sharing situations involving services allocated with equal rights) (km)**
Frequency band and earth station for which coordination area is determined	**Other service or station**	
148-149.9 MHz ground-based (mobile)	Ground-based stations	As determined using Equation (1) and Fig. 1 of Recommendation ITU-R M.1185 In this case, the coordination distance is calculated by the administration of the terrestrial station using the parameters of its terrestrial stations and the most up-to-date relevant parameters published by the Bureau for the earth station.
149.9-150.05 MHz ground-based (mobile) 399.9-400.05 MHz ground-based (mobile)	Radionavigation-satellite service	The coordination distance is calculated by the administration of the MSS earth station using the parameters of its earth stations and the most up-to-date relevant parameters published by the Bureau for the radionavigation-satellite service earth station
400.15-401 MHz ground-based	Meteorological aids (radiosonde)	580

TABLE 1 (*end*)

Frequency sharing situation		**Coordination distance (in sharing situations involving services allocated with equal rights) (km)**
Frequency band and earth station for which coordination area is determined	**Other service or station**	
All bands below 1 GHz ground-based	Mobile (aircraft)	500
All bands below 1 GHz aircraft (mobile)	Ground-based stations	500
400.15-401 MHz aircraft (mobile)	Meteorological aids (radiosonde)	1 080
All bands below 1 GHz aircraft (mobile)	Mobile (aircraft)	1 000
454-456 MHz 459-460 MHz ground-based	Ground-based stations	500

TABLE 2

Earth stations operating at frequencies in the 1-3 GHz range

Frequency sharing situation		**Coordination distance (in sharing situations involving services allocated with equal rights) (km)**
Frequency band and earth station for which coordination area is determined	**Other service or station (station in terrestrial service or earth station)**	
Ground-based mobile (NOTE 1) (GSO network)	Ground-based stations in terrestrial services	Determined using Recommendation ITU-R IS.847 with the parameters specified therein for terrestrial stations and all applicable equations and figures
Ground-based mobile (NOTE 1) (non-GSO network)	Ground-based stations in terrestrial services	The methodology of Recommendation ITU-R IS.849 is applied in conjunction with Recommendation ITU-R IS.847 (see above)
1 675-1 700 MHz ground-based mobile	Meteorological aids (radiosonde)	580
All bands 1-3 GHz ground-based mobile	Terrestrial mobile (aircraft)	500
All bands aircraft (mobile)	Ground-based stations in terrestrial services	500
1 675-1 700 MHz aircraft (mobile)	Meteorological aids (radiosonde)	1 080
All bands aircraft (mobile)	Terrestrial mobile (aircraft)	1 000

NOTE 1 – Recommendation ITU-R IS.847 supplies the necessary terrestrial station parameters for the bands 1 492-1 530 MHz, 1 555-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660 MHz, 1 675-1 710 MHz, 1 980-2 025 MHz, 2 160-2 200 MHz, 2 483.5-2 520 MHz, and 2 655-2 690 MHz.

TABLE 3

Non-GSO MSS feeder-link earth stations

Frequency sharing situation		**Coordination distance (in sharing situations involving services allocated with equal rights)**
Frequency band and earth station for which coordination area is determined	**Other service or station (station in terrestrial service or earth station)**	
19.3-19.7 GHz and 29.1-29.5 GHz; earth station operating co-directionally with other earth stations	Ground-based stations in terrestrial services	Determined using Recommendations ITU-R IS.847 and ITU-R IS.849 with the parameters specified therein for terrestrial stations and all applicable equations and figures.
Bands in which the FSS is already allocated; earth station operating in opposite direction	Ground-based stations in terrestrial services	A) 19.3-19.7 GHz: 170 km; B) 6 700-7 075 MHz: 300 km
All bands and earth stations	Terrestrial mobile (aircraft)	500 km
Bands in which the FSS is already allocated; earth station operating in opposite direction	Earth station operating in opposite direction of transmission	A) 19.3-19.7 GHz: 170 km; B) 6 700-7 075 MHz: 300 km

TABLE 4

Non-GSO FSS earth stations

Frequency sharing situation		**Coordination distance (in sharing situations involving services allocated with equal rights)**
Frequency band and earth station for which coordination area is determined	**Other service or station (station in terrestrial service or earth station)**	
18.9-19.3 GHz and 28.7-29.1 GHz; earth station operating co-directionally with other earth stations	Ground-based stations in terrestrial services	Determined using Recommendations ITU-R IS.847 and ITU-R IS.849 with the parameters specified therein for terrestrial stations and all applicable equations and figures.

APPENDIX S7

Method for the determination of the coordination area around an earth station in frequency bands between 1 GHz and 40 GHz shared between space and terrestrial radiocommunication services

1 Objectives

The coordination area (see No. **S1.171**) is determined by calculating, in all directions of azimuth from the earth station, the coordination distances (see No. **S1.173**) and drawing to scale on an appropriate map the coordination contour (see No. **S1.172**).

It must be emphasized that the presence or installation of a terrestrial station within the coordination area of an earth station would not necessarily preclude the successful operation of either the earth station or that terrestrial station, since the method is based on the most unfavourable case assumptions as regards interference.

For the determination of the coordination area two cases may have to be considered:

1) for the earth station when it is transmitting (and hence capable of interfering with terrestrial stations);

2) for the earth station when it is receiving (and hence capable of being interfered with by terrestrial stations).

Where an earth station is intended to transmit a variety of classes of emissions, the earth station parameters to be used in the determination of the coordination contour shall be those which lead to the greatest coordination distances, for each earth station antenna beam and in each allocated frequency band which the earth station proposes to share with the terrestrial services.

Where an earth station is intended to receive a variety of classes of emissions, the earth station parameters to be used in the determination of the coordination contour shall be those which lead to the greatest coordination distances, for each earth station antenna beam and in each allocated frequency band which the earth station proposes to share with the terrestrial services, except in the case where the administration responsible for the earth station determines that a smaller coordination contour would adequately protect all the transmissions intended to be received by the earth station. When the determination of such a smaller coordination contour is based on a departure from the procedure of this Appendix, the notifying administration shall indicate, in detail, the nature of such departure.

If subsequently an administration decides to protect its receiving earth station through notification of a coordination contour which is greater than the one it had notified under a departure from the method of this Appendix, it must recoordinate the earth station. Any resulting greater protection shall be effective from the date of publication of the notice in Part II of the Radiocommunication Bureau Weekly Circular.

This Appendix provides methods which are suitable for either graphical or computer determination of the coordination area.

It is suggested to draw, together with the coordination contour, auxiliary contours based on less unfavourable assumptions than those chosen for the determination of the coordination contour. These auxiliary contours may be used during subsequent negotiations between the administrations concerned with a view to eliminating from the discussions (without the need for more precise calculations) the case of certain existing or planned stations located within the coordination area. The determination and use of these auxiliary contours is explained in Annex I.

2 General considerations

2.1 Concept of minimum permissible transmission loss

The determination of coordination distance, as the distance from an earth station beyond which interference from or to a terrestrial station may be considered to be negligible, is based on the premise that the attenuation of an unwanted signal is a monotonically increasing function of distance.

The amount of attenuation required between an interfering transmitter and an interfered-with receiver is given by the minimum permissible transmission loss (dB) for p% of the time, a value which must be exceeded by the predicted transmission loss for $(100 - p)$% of the time.

$$L(p) = P_{t'} - P_r(p) \quad (1)$$

where:

$P_{t'}$ [1]: maximum available transmitting power level (dBW) in the reference bandwidth at the input to the antenna of an interfering station;

$P_r(p)$: permissible level of an interfering emission (dBW) in the reference bandwidth, to be exceeded for no more than p% of the time at the output of the receiving antenna of an interfered-with station, where the interfering emission originates from a single source.

$P_{t'}$ and $P_r(p)$ are defined for the same radio frequency bandwidth (reference bandwidth) and $L(p)$ and $P_r(p)$ for the same percentage of the time, dictated by the performance criteria of the interfered-with system.

For the small percentages of the time which are of interest here, it is necessary to distinguish between two significantly different attenuation mechanisms:

– attenuation of signals subject to tropospheric propagation via near-great circle paths; propagation mode (1) see § 3;

– attenuation of signals subject to scatter due to hydrometeors; propagation mode (2) see § 4.

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[1] Primes refer to the parameters associated with the interfering station.

2.2 Concept of minimum permissible basic transmission loss

In the case of propagation mode (1) the transmission loss is defined in terms of separable parameters, viz.: a basic transmission loss, (i.e. attenuation between isotropic antennae) and the effective antenna gains at either end of an interference path. The minimum permissible basic transmission loss may then be expressed as:

$$L_b(p) = P_{t'} + G_{t'} + G_r - P_r(p) \quad (2)$$

where:

$L_b(p)$: minimum permissible basic transmission loss (dB) for p% of the time; this value must be exceeded by the predicted basic transmission loss for $(100 - p)$% of the time;

$G_{t'}$: gain (dB relative to isotropic) of the transmitting antenna of the interfering station. If the interfering station is an earth station, this is the antenna gain towards the physical horizon on the azimuth considered; in the case of a terrestrial station, the maximum antenna gain is to be used;

G_r : gain (dB relative to isotropic) of the receiving antenna of the interfered-with station. If the interfered-with station is an earth station, this is the gain towards the physical horizon on the azimuth considered; in the case of a terrestrial station, the maximum antenna gain is to be used.

Annex II provides numerical and graphical methods to determine the angle between the earth station antenna main beam and the physical horizon, and also the horizon antenna gain, as functions of azimuth angle.

When considering non-geostationary satellites, $G_{t'}$ or G_r (whichever pertains to the earth station antenna) is variable with time. In such cases, an equivalent time-invariant earth station antenna gain is to be used[2]. This equivalent gain is either 10 dB less than the maximum horizon antenna gain or is that value of horizon antenna gain exceeded for no more than 10% of the time (if available), whichever is the greater.

2.3 Derivation and tabulation of interference parameters

2.3.1 Permissible level of the interfering emission

The permissible level of the interfering emission (dBW) in the reference bandwidth, to be exceeded for no more than p% of the time at the output of the receiving antenna of a station subject to interference, from each source of interference, is given by the general formula below:

$$P_r(p) = 10 \log (kT_eB) + J + M(p) - W \quad (3)$$

[2] This equivalent antenna gain is not to be used when the earth station antenna points in the same direction for appreciable periods of time (e.g. when working to space probes or to satellites which are almost geostationary).

where:

$$M(p) \equiv M(p_0/n) = M_0(p_0) \quad (4)$$

with:

k : Boltzmann's constant (1.38×10^{-23} J/K);

T_e : thermal noise temperature of the receiving system (K), at the output of the receiving antenna (see Note 1);

B : reference bandwidth (Hz) (bandwidth, of the interfered with system, over which the power of the interfering emission can be averaged);

J : ratio (dB) of the permissible long term (20% of the time) interfering emission power to the thermal noise power of the receiving system, referred to the output terminals of the receiving antenna (see Note 2);

p_0 : percentage of the time during which the interference from all sources may exceed the permissible value;

n : number of expected entries of interference, assumed to be uncorrelated;

p : percentage of the time during which the interference from one source may exceed the permissible value; since the entries of interference are not likely to occur simultaneously: $p = p_0/n$;

$M_0(p_0)$: ratio (dB) between the permissible powers of the interfering emission, during p_0% and 20% of the time, respectively, for all entries of interference (see Note 3);

$M(p)$: ratio (dB) between the permissible powers of the interfering emission during p% of the time for one entry of interference, and during 20% of the time for all entries of interference;

W : equivalence factor (dB) relating interference from interfering emissions to that caused by the introduction of additional thermal noise of equal power in the reference bandwidth. It is positive when the interfering emissions would cause more degradation than thermal noise (see Note 4).

Tables I and II list values for the above parameters.

In certain cases, an administration may have reason to believe that, for its specific earth station, a departure from the values associated with the earth station, as listed in Table II, may be justified. Attention is drawn to the fact that for specific systems the bandwidths B or, as for instance in the case of demand assignment systems, the percentages of the time p and p_0 may have to be changed from the values given in Table II. For further information see § 2.3.2.

NOTE 1 – The noise temperature (K) of the receiving system, referred to the output terminals of the receiving antenna, may be determined from:

$$T_e = T_a + (e - 1)\,290 + eT_r \quad (5a)$$

where:

T_a : noise temperature (K) contributed by the receiving antenna;

e : numerical loss in the transmission line (e.g. a waveguide) between antenna and receiver front end;

T_r : noise temperature (K) of the receiver front end, including all successive stages, referred to the front end input.

For radio-relay receivers and where the waveguide loss of a receiving earth station is not known, a value of $e = 1.0$ is to be used.

NOTE 2 – The factor J (dB) is defined as the ratio of total permissible long term (20% of the time) power of interfering emissions in the system, to the long term thermal radio frequency noise power in a single receiver. In the computation of this factor, the interfering emission is considered to have a flat power spectral density, its actual spectrum shape being taken into account by the factor W (see below). For example, in a 50-hop terrestrial hypothetical reference circuit, the total allowable additive interference power is 1 000 pW0p (Recommendation ITU-R SF.357-3) and the mean thermal noise power in a single hop may be assumed to be 25 pW0p. Therefore, since in a frequency-division multiplex/frequency modulation (FDM/FM) system the ratio of a flat interfering noise power to the thermal noise power in the same reference band is the same before and after demodulation, J is given by the ratio 1 000/25 expressed in dB, i.e. $J = 16$ dB. In a fixed-satellite service system, the total allowable interference power is also 1 000 pW0p (Recommendation ITU-R SF.356-4), but the thermal noise contribution of the down-link is not likely to exceed 7 000 pW0p, hence $J \geq -8.5$ dB.

In digital systems interference is measured and prescribed in terms of the bit error rate or its permissible increase. While the bit error rate increase is additive in a reference circuit comprising tandem links, the radio frequency power of interfering emissions giving rise to such bit error rate increase is not additive, because bit error rate is not a linear function of the level of the radio frequency power of interfering emissions. Thus, it may be necessary to protect each receiver individually. For digital radio-relay systems operating above 10 GHz, and for all digital satellite systems, the long term interference power may be of the same order of magnitude as the long term thermal noise, hence $J = 0$ dB. For digital radio-relay systems operating below 10 GHz, long term interference power should not decrease the receiver fade margin by more than 1 dB. Thus the long term interference power should be about 6 dB below the thermal noise power and hence $J = -6$ dB.

NOTE 3 – $M_0(p_0)$ (dB) is the "interference margin" between the short term (p_0%) and the long term (20%) allowable powers of an interfering emission.

For analogue radio-relay and fixed-satellite systems in bands between 1 GHz and 15 GHz, this is equal to the ratio (dB) between 50 000 and 1 000 pW0p (17 dB).

In the case of digital systems, system performance at frequencies above 10 GHz can, in most areas of the world, usefully be defined as the percentage of the time p_0 for which the wanted signal is allowed to drop below its operating threshold, defined by a given bit error rate. During non-faded operation of the system, the desired signal will exceed its threshold level by some margin M_s which depends on the rain climate in which the station operates. The greater this margin, the greater the enhancement of the interfering emission which would degrade the system to threshold performance. As a first order estimate it may be assumed that, for small percentages of the time (of the order of 0.001% to 0.003%), the level of interfering emissions may be allowed to equal the thermal noise which exists at the demodulator input during faded conditions. Thus, M_0 in Tables I and II may, for digital systems operating above 10 GHz, be assumed to be equal to the fade margin M_s of the system. For digital radio-relay systems operating below 10 GHz it is assumed that the short term power of an interfering emission can be allowed to exceed the long term power of the interfering emission by an amount equal to the fade margin of the system minus J, i.e. 41 dB, where $J = -6$ dB.

NOTE 4 – The factor *W* (dB) is the ratio of radio frequency thermal noise power to the power of an interfering emission in the reference bandwidth when both produce the same interference after demodulation (e.g. in a FDM/FM system it would be expressed for equal voice channel performance; in a digital system it would be expressed for equal bit error probabilities). For FM signals, it is defined as follows:

$$W = 10 \log \left\{ \frac{\text{Thermal noise power at the output of the receiving antenna in the reference bandwidth}}{\text{Power of the interfering emission at the radio frequency in the reference bandwidth, at the output of the receiving antenna}} \times \frac{\text{Interference power in the receiving system after demodulation}}{\text{Thermal noise power in the receiving system after demodulation}} \right\} \quad (5b)$$

The factor *W* depends on the characteristics of the wanted and the interfering signals. To avoid the need for considering a wide range of characteristics, upper limit values were determined for the factor *W*. When the wanted signal uses frequency modulation with r.m.s. modulation indices which are greater than unity, *W* is not higher than 4 dB. In such cases, a conservative figure of 4 dB will be used for the factor *W* in equation (3), regardless of the characteristics of the interfering signal. For low-index FDM/FM systems a very small reference bandwidth (4 kHz) implies values of *W* not greater than 0 dB. In such cases, a conservative figure of 0 dB will be used for *W* in equation (3), regardless of the characteristics of the interfering signal.

When the wanted signal is digital, *W* is usually equal to or less than 0 dB, regardless of the characteristics of the interfering signal.

2.3.2 Coordination parameters for very narrow-band transmissions (receiving earth station)

2.3.2.1 General

In the case of an earth station which receives both broad-band and very narrow-band transmissions (e.g. single channel per carrier (SCPC) transmissions) it may be desirable to draw two separate coordination contours: one for the narrow-band transmissions and one for broad-band transmissions, giving the specific sections of frequency bands used for very narrow-band transmissions.

2.3.2.2 Pre-assigned narrow-band transmissions

For such transmissions, it is appropriate to change the value of the reference bandwidth to the value of the bandwidth occupied by one such narrow-band transmission.

2.3.2.3 Demand-assigned narrow-band transmissions

For such transmissions, in addition, it may be appropriate to take into account the reduced probability that a particular frequency channel will be suffering interference at the time when it is actually selected for use at an earth station.

Administrations shall furnish all relevant technical data used in the determination of the coordination contour(s) for such transmissions.

3 Determination of coordination distance for propagation mode (1) – Great circle propagation mechanisms

3.1 Radio-climatic zones

In the calculation of coordination distance for propagation mode (1), the world is divided into three basic radio-climatic zones termed Zones A, B and C. These Zones are defined as follows:

Zone A: Entirely land.

Zone B: Seas, oceans and substantial bodies of inland water (as a criterion of a substantial body of water, one which can encompass a circle of diameter 100 km) at latitudes greater than 23° 30′ N or S, but excepting the Black Sea and the Mediterranean.

Zone C: Seas, oceans and substantial bodies of inland water (as a criterion of a substantial body of water, one which can encompass a circle of diameter 100 km) at latitudes less than 23° 30′ N or S, and the Black Sea and the Mediterranean.

3.2 Calculation of coordination distance for paths within a single radio-climatic zone

3.2.1 General

Equation (2) provides the value of minimum permissible basic transmission loss $L_b(p)$ for p% of the time. From this minimum permissible basic transmission loss, the coordination distance in each radio-climatic zone is derived using either of two alternative methods. The first method, described in § 3.2.2, is a numerical method comprising several mathematical equations, and is intended principally for use with the aid of a computer. The second method is a graphical method and is described in § 3.2.3.

Where the distance derived in § 3.2.2 or § 3.2.3 lies entirely within the boundary of the radio-climatic zone appropriate to the earth station, that distance is taken as the actual coordination distance for propagation mode (1). If the distance extends beyond the boundary of one radio-climatic zone, the overall coordination distance is obtained using the method given in § 3.3.

3.2.2 Numerical method

The minimum permissible basic transmission loss is related to coordination distance by the following expression:

$$L_b(p) = A_0 + \beta d_1 + A_h \quad (6)$$

in which:

$A_0 = 120 + 20 \log f$ (dB)

β : rate of attenuation (dB/km);

d_1 : coordination distance for propagation mode (1) (km);

A_h : horizon angle correction (dB);

f : frequency (GHz).

A_h is given by:

$$A_h = 20 \log (1 + 4.5 f^{1/2} \varepsilon) + f^{1/3} \varepsilon \quad \text{for } \varepsilon > 0° \tag{7a}$$[3]

$$A_h = 8 \varepsilon \quad \text{for } -0.5° \leq \varepsilon \leq 0° \tag{7b}$$

$$A_h = -4 \quad \text{for } \varepsilon \leq -0.5° \tag{7c}$$

in which:

ε : horizon angle[4] (degrees)

From equation (6) the coordination distance d_1 may be found as follows:

$$d_1 = (L_b(p) - A_0 - A_h)/\beta \tag{8}$$

The value of β depends on the radio-climatic zone and the percentage of time p, and is the sum of three components:

$$\beta = \beta_z + \beta_v + \beta_o \tag{9}$$

in which:

β_z : rate of attenuation (dB/km) due to all effects except atmospheric gases;

β_v : rate of attenuation (dB/km) due to atmospheric water vapour;

β_o : rate of attenuation (dB/km) due to oxygen.

β_z depends on the radio-climatic zone, frequency and the percentage of time as follows:

for Zone A,

$$\beta_{zA} = 0.154 (1 + 3.05 \log f)^{0.4} (0.9028 + 0.0486 \log p)^2 \tag{10}$$

---

[3] Equation (7a) and thus Fig. 1 should be used with caution at frequencies higher than about 20 GHz or for horizon angles above 5° until further studies have been completed by the ITU-R in accordance with Resolution **60**.

[4] Horizon angle is defined here as the angle viewed from the centre of the earth station antenna, between the horizontal plane and a ray that grazes the visible physical horizon in the direction concerned.

for Zones B and C,

$$\beta_{zB} = \beta_{zC} = (0.272 + 0.047 \log p)^2 \quad (11)$$

β_v depends on the frequency and the density of water vapour in the air as follows (β_v may be neglected when $f < 15$ GHz):

$$\beta_v = 3.5 \times 10^{-4} \rho \left[\frac{1}{\left(1 - \frac{22.3}{f}\right)^2 + \frac{9}{f^2}} + \frac{1}{\left(1 + \frac{22.3}{f}\right)^2} \right] + 3 \times 10^{-6} \rho f^2 \quad (12)$$

where ρ is the water vapour density (g/m^3), and depends on the radio-climatic zone. The following values are to be used:

Zone A, $\rho = 1$ g/m^3

Zone B, $\rho = 2$ g/m^3

Zone C, $\rho = 5$ g/m^3

β_o depends on the frequency as follows:

$$\beta_o = 68 \times 10^{-4} \times f^2 \left\{ \frac{1}{(60 - f)^2} + \frac{1}{(60 + f)^2} + \frac{1}{(f^2 + 0.36)} \right\} \quad (13)$$

Thus the coordination distance in Zone A is derived for the appropriate frequency, percentage of time and horizon angle using equations (7), (8), (9), (10), (12) and (13). Similarly, the coordination distance in Zone B or C is derived using equations (7), (8), (9), (11), (12) and (13).

3.2.3 Graphical method

The equations given in § 3.2.2 have been converted into graphical form, to provide a second method of obtaining coordination distance for propagation mode (1). It is emphasized that the procedure described in this section is an alternative to that described in § 3.2.2. and each administration should use the method which is considered most convenient.

The minimum permissible basic transmission loss $L_b(p)$ is obtained from equation (2). The "coordination loss" L_1 is obtained from the minimum permissible basic transmission loss by subtraction of the horizon angle correction A_h:

$$L_1 = L_b(p) - A_h \quad (14)$$

Values for the horizon angle correction are obtained from Fig. 1 for the appropriate frequency and horizon angle[5].

The coordination distance in each radio-climatic zone is to be obtained as follows. Taking Zone A first, the coordination distance for 0.01% of the time d_A (0.01) is obtained with the appropriate value of coordination loss L_1 and frequency from Fig. 2. The Zone A coordination distance for p% of the time is then obtained by multiplying the distance for 0.01% of the time by the factor Δp_A given in Fig. 3.

$$d_A = d_A\,(0.01) \times \Delta p_A \tag{15}$$

In a similar manner, the coordination distance in Zone B is obtained using values for d_B (0.01) and Δp_{BC} obtained from Figs. 4 and 3 respectively. The coordination distance in Zone C is obtained using values for d_C (0.01) and Δp_{BC} obtained from Figs. 5 and 3 respectively.

3.3 Mixed paths

If the distance being calculated extends through more than one radio-climatic zone (mixed path), the prediction is made as follows:

Designating the successive path sections in different zones by use of the suffixes i, j, k . . ., it follows that:

$$L_b(p) - A_0 - A_h = \beta_\mathrm{i}\, d_\mathrm{i} \tag{16}$$

where β_i is the rate of attenuation in the first zone (i).

Now, in the direction considered, if the value d_i is greater than the distance D_i in the first zone (i), it follows that:

$$L_b(p) - A_0 - A_h - \beta_\mathrm{i}\, D_\mathrm{i} = \beta_\mathrm{j}\, d_\mathrm{j} \tag{17}$$

and so d_j is found. If the value d_j is greater than the distance D_j of the path in the second zone (j), it can then be stated that:

$$L_b(p) - A_0 - A_h - \beta_\mathrm{i}\, D_\mathrm{i} - \beta_\mathrm{j}\, D_\mathrm{j} = \beta_\mathrm{k}\, d_\mathrm{k} \tag{18}$$

from which d_k may be found. This method may be extended as necessary, and in the case given the total distance d_1 may now be expressed as:

$$d_1 = D_\mathrm{i} + D_\mathrm{j} + d_\mathrm{k} \qquad \text{km} \tag{19}$$

Annex III provides examples for the graphical application of this procedure.

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[5] Horizon angle is defined here as the angle viewed from the centre of the earth station antenna, between the horizontal plane and a ray that grazes the visible physical horizon in the direction concerned.

3.4 Maximum coordination distance for propagation mode (1)

In the process of determining the coordination distance for propagation mode (1), if values result which exceed the appropriate value given in Fig. 6 or in Table III, the coordination distance for propagation mode (1) shall be the value given in Fig. 6 or in Table III. In the case of mixed paths, the values to be considered are those given for Zones B or C, as appropriate. In the case of mixed paths with more than one segment in Zone A, the total distance in Zone A shall not exceed the value given in Fig. 6 or in Table III for Zone A.

4 Determination of the coordination contour for propagation mode (2) – Scattering from hydrometeors

The determination of the coordination contour for scattering from hydrometeors (rain-scatter) is predicated on a path geometry which is substantially different from that of the great circle propagation mechanisms. As a first approximation, energy is scattered isotropically by rain, so that interference may result for large scattering angles, and for beam intersections away from the great circle path.

4.1 Normalized transmission loss L_2 (0.01)

To determine the coordination contour associated with rain-scatter it is necessary to calculate a "normalized transmission loss", given by:

$$L_2(0.01) = P_{t'} + \Delta G - P_r(p) - F(p, f) \quad (20)$$

where:

ΔG: difference (dB) between the maximum gain of terrestrial station antennae in the frequency band under investigation and the value of 42 dB. When the earth station is a transmitting station, the values shown in Table I should be used; when it is a receiving station, the values shown in Table II should be used.

$F(p, f)$: correction (dB) to relate the effective percentage of the time p to 0.01% in the frequency band under consideration (see Fig. 7).

All other parameters have been defined in § 2. For terrestrial stations, values of $P_{t'}$ are listed in Table II.

4.2 Rain-climatic zones

The world has been divided into five basic rain-climatic zones numbered 1 to 5 as shown in Fig. 8. The climatic characteristics of these zones for 0.01% of the time are given in Table IV.

4.3 Calculation of the rain-scatter distance, d_r

4.3.1 Numerical method

The normalized transmission loss is composed of six terms:

$$L_2(0.01) = A_1 - A_2 + A_3 - A_4 - A_5 + A_6 \quad (21)$$

in which:

$$A_1 = 157 + 20 \log d_r - 20 \log f \quad \text{dB} \quad (22)$$

where d_r is the rain-scatter distance (km).

$$A_2 = 26 + 14 \log R - 5.88 \times 10^{-5} (d_r - 40)^2 \quad \text{dB} \quad (23)$$

where R is the surface rainfall rate in mm/h (Table IV). The horizon distance of the terrestrial station is taken to be 40 km.

$$A_3 = 0.005 (f - 10)^{1.7} R^{0.4} \text{ dB} \quad \text{for } 10 < f < 40 \text{ GHz} \quad (24a)$$

$$= 0 \text{ dB} \quad \text{for } f \leq 10 \text{ GHz} \quad (24b)$$

$$A_4 = 10 \log \left[\frac{2.17}{\gamma \cdot D} \left(1 - 10^{-(\gamma \cdot D)/5} \right) \right] \text{ dB} \quad \text{for } f > 5 \text{ GHz} \quad (25a)$$

$$= 0 \text{ dB} \quad \text{for } f \leq 5 \text{ GHz} \quad (25b)$$

where D is the diameter of the rain cell in km (Table IV)

and

$$\gamma = 0.008 R (f - 5) \quad \text{for } f > 5 \text{ GHz} \quad (26a)$$

$$= 0 \quad \text{for } f \leq 5 \text{ GHz} \quad (26b)$$

$$A_5 = 10 \log D \quad \text{dB} \quad (27)$$

$$A_6 = d_o \beta_o + d_v \beta_v \quad (28)$$

where:

$$d_o = 0.7 d_r + 32 \text{ km} \quad \text{for } d_r < 340 \text{ km} \quad (29a)$$

$$= 270 \text{ km} \quad \text{for } d_r \geq 340 \text{ km} \quad (29b)$$

$$d_v = 0.7 d_r + 32 \text{ km} \quad \text{for } d_r < 240 \text{ km} \quad (30a)$$

$$= 200 \text{ km} \quad \text{for } d_r \geq 240 \text{ km} \quad (30b)$$

β_v is given in equation (12), where ρ is to be replaced by ρ_m (Table IV).

β_o is given in equation (13).

Thus, for a given rain-climatic zone the parameters in Table IV are used to calculate the rain-scatter distance d_r by an iterative process.

4.3.2 Graphical method

The equations of § 4.3.1 have been converted into graphical form to give an alternative method of determining rain-scatter distance d_r.

To obtain the rain-scatter distance for rain-climatic Zone 1, the normalized transmission loss, obtained by solving equation (20), is used together with the appropriate frequency in Fig. 9 to yield the rain-scatter distance d_r.

Figures 10 to 13 show corresponding curves for rain-climatic Zones 2 to 5. In all cases, the rain-climate to be chosen is that which corresponds to the location of the earth station.

4.4 Maximum rain-scatter distances

In the process of determining the rain-scatter distance for propagation mode (2), if values result which exceed the appropriate value given in Table V, the rain-scatter distance d_r for propagation mode (2) shall be the value given in that Table.

4.5 Construction of the rain-scatter coordination contour

Due to the peculiar geometry associated with rain-scatter propagation, the location of the centre of the rain-scatter coordination contour does not coincide with the location of the earth station. The distance by which these locations are separated is designated Δd.

The rain-scatter distance d_r, together with the elevation angle ε_s of the main beam of the earth station antenna, are used to determine Δd using the equation:

$$\Delta d = 5.88 \times 10^{-5} (d_r - 40)^2 \cot \varepsilon_s \quad \text{km} \tag{31}$$

Alternatively, Δd may be determined from Fig. 14.

The distance Δd is measured on a map of appropriate scale from the earth station location along the azimuth of the main beam of the earth station antenna; a circle of radius d_r is drawn around the point so reached. The circle is the rain-scatter coordination contour.

The rain-scatter coordination distance, to be labelled d_2, is the distance from the earth station site to the rain-scatter coordination contour on the azimuth under consideration.

4.6 Absence of mixed path effects

As the only significant rain-scatter is that occurring in the general area of the earth station, the question of a mixed path does not arise. The rain-climatic zone relevant to the earth station is applied, together with the appropriate maximum rain-scatter distance from Table V.

5 Minimum value of coordination distance

If the method for determining d_1, the coordination distance for propagation mode (1), leads to a result less than 100 km, d_1 shall be taken as equal to 100 km. Similarly, if the method for determining the rain-scatter distance d_r leads to a result less than 100 km, d_r shall be taken as equal to 100 km.

6 Coordination distance

On any azimuth, the greater of the coordination distances d_1 or d_2 is the coordination distance to be used for the coordination procedure.

An example of a coordination contour is shown in Fig. 15.

7 Mobile (except aeronautical mobile) earth stations

For the purpose of establishing whether prior agreement with another administration under § 6 of Appendix **S5** is required, it is necessary to determine the coordination area which would encompass all coordination areas determined for each location within the service area within which operation of the mobile earth stations is proposed.

The preceding method may be used for this purpose by determining the appropriate individual coordination contours for a sufficiently large number of locations within and on the periphery of the proposed service area and by determining from those a composite coordination area which contains all possible individual coordination areas.

8 Revision of propagation data

The material contained in § 3, 4 and 6 and in Annex III of this Appendix is based, directly or indirectly, on propagation data compiled, interpreted and documented in ITU-R Reports and Recommendations. Knowledge regarding propagation is subject to change as new data become available, and such change may require or strongly suggest corresponding amendments to the propagation-related material in this Appendix.

Resolution **60** provides for the mechanism by which an updating of the propagation-related elements of this Appendix is to be implemented.

TABLE I

Parameters required for the determination of coordination distance for a transmitting earth station

Space radiocommunication service designation		**Space operation**	**Fixed-satellite Mobile-satellite**	**Fixed-satellite**	**Space research**	**Fixed-satellite Mobile-satellite Meteorological-satellite**	**Fixed-satellite**[5]	**Fixed-satellite**	**Fixed-satellite**[5]	**Fixed-satellite**[5]	**Fixed-satellite**
Frequency bands (GHz)		1.427-1.429	2.655-2.690	5.725-7.075	7.145-7.235	7.900-8.400	10.7-11.7	12.5-14.5	14.5-14.8	17.7-18.1	27-37.5
Modulation at terrestrial station[1]		A	A	A	A	A	A	A	A	N	N
Interference parameters and criteria	p_0 (%)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003	0.003
	n	2	1	2	2	2	2	2	2	1	1
	p (%)	0.005	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.003	0.003
	J (dB)	16	9	16	16	16	16	16	16	0	0
	$M_0\ (p_0)$ (dB)	17	17	17	17	17	17	17	17	30	30
	W (dB)	0	0	0	0	0	0	0	0	0	0
Terrestrial station parameters	B (Hz)	4×10^3	4×10^3	4×10^3	4×10^3	4×10^3	4×10^3	4×10^3	4×10^3	1×10^6	1×10^6
	G_r (dB)[2]	35	52 [3]	45	47	47	50	50	50	50	50
	ΔG (dB)	−7	10 [3]	3	5	5	8	8	8	8	8
	T_r (K)	750	500 [3]	750	750	750	1 500	1 500	1 500	3 200	3 200
Auxiliary parameters	S (dBW)[4]	166	192	176	178	178	178	178	178	154	154
	$P_r\ (p)$ (dBW) in B	−131	−140	−131	−131	−131	−128	−128	−128	−104	−104

[1] A = analogue modulation; N = digital modulation.
[2] Feeder losses are not included.
[3] In these bands the parameters for the terrestrial station associated with transhorizon systems have been used.
[4] For a definition of the parameter S see Annex I.
[5] The parameters associated with these columns are for feeder links to broadcasting satellites and are provisional pending further study by the ITU-R.

TABLE II

Parameters required for the determination of coordination distance for a receiving earth station

Space radiocommunication service designation		Space operation[1]	Meteorological-satellite[1]	Meteorological-satellite	Space Research			Fixed-satellite		Fixed-satellite		Fixed-satellite		Fixed-satellite Meteorological-satellite Mobile-satellite		Earth exploration-satellite[1]	Space Research		Fixed-satellite		Meteorological-satellite	Fixed-satellite	Mobile-satellite
					Near Earth, unmanned; space operation	Near Earth manned	Deep space										Near Earth	Deep space					
Frequency bands (GHz)		1.525-1.535	1.670-1.700	1.700-1.790	1.700-1.710 2.200-2.290	2.200-2.290	2.290-2.300	2.500-2.690		3.400-4.200		4.500-4.800		7.250-7.750		8.025-8.400	8.400-8.500		10.7-12.75		17.7-40.0		
Modulation at earth station[2]					–	–	–	A	N	A	N	A	N	A	N	–	–	–	A	N		N	
Interference parameters and criteria	p_0 (%)				0.1	0.001	0.001	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.003	1.0	0.1	0.001	0.03	0.003		0.003	
	n				1 [9]	1	1	3	3	3	3	3	3	3	3		2	1	2	1		1	
	p (%)				0.1 [9]	0.001	0.001	0.01	0.001	0.01	0.001	0.01	0.001	0.01	0.001		0.05	0.001	0.015	0.003		0.003	
	J (dB)				–	–	–	–8	0	–8	0	–8	0	–8	0		–	–	–8	0		0	
	$M_0(p_0)$ (dB)				–	–	–	17	5	17	5 [3]	17	5 [3]	17	5 [3]		–	–	17	5 [3]		5 [3]	
	W (dB)				–	–	–	4	0	4	0	4	0	4	0		–	–	4	0		0	
Terrestrial station parameters	E (dBW) in B[8]	55	55	92 [6]	62 [4,6]	62 [4,6]	62 [4,6]	92 [6]	92 [6]	55	55	92 [6]	92 [6]	55	55	55	25 [4]	25 [4]	55	55		35 [5]	
	P_t (dBW) in B	13	13	40 [6]	10 [4,6]	10 [4,6]	10 [4,6]	40 [6]	40 [6]	13	13	40 [6]	40 [6]	13	13	13	–17 [4]	–17 [4]	10	10		–10 [5]	
	ΔG (dB)	0	0	10 [6]	10 [6]	10 [6]	10 [6]	10 [6]	10 [6]	0	0	10 [6]	10 [6]	0	0	0	0	0	3	3		3	
Reference bandwidth[7]	B(Hz)			10^6	1	1	1	10^6	10^6	10^6	10^6	10^6	10^6	10^6	10^6	10^6	1	1	10^6	10^6		10^6	
Permissible interference power	$Pr(p)$ (dBW) in B				–216	–216	–222	–	–	–	–	–	–	–	–	–154	–216	–220	–	–		–	

1 Parameters associated with these services may vary over a rather wide range. Further study is required before representative values become available.

2 A = analogue modulation; N = digital modulation.

3 See Note 3 in § 2. $M_0(p_0)$ may assume values between 5 et 40 dB, depending on frequency, rain-climatic zone and system design.

4 These values are estimated for 1 Hz bandwidth and are 30 dB below the total power assumed for emission.

5 These values assume a radio frequency bandwidth of no less than 100 MHz, and are 20 dB below total power assumed per emission.

6 In these bands, the parameters for the terrestrial stations associated with transhorizon systems have been used. If an administration believes that transhorizon systems do not need to be considered, the line-of-sight radio-relay parameters associated with the frequency band of 3 400-4 200 MHz may be used to determine the coordination area in accordance with § 2.3.1.

7 In certain systems in fixed-satellite service it may be desirable to choose a greater reference bandwidth B when the system requirements indicate that this may be done. However, a greater bandwidth will result in smaller coordination distances and a later decision to reduce the reference bandwidth may require recoordination of the earth station. For narrow-band transmissions the reference bandwidth B should be assumed to be equal to the bandwidth occupied.

8 For the definition of E, see Annex I.

9 n is taken to be 1 for earth stations supporting low orbit satellites. For earth stations supporting geostationary satellites, n takes a value of 2 and p becomes 0.05.

TABLE III

Maximum coordination distance for propagation mode (1)

	Percentage of time			
	$p = 0.001$	$p = 0.01$	$p = 0.1$	$p = 1$
Zone A	375	350	300	200
Zone B	1 050	1 000	900	700
Zone C	1 400	1 350	1 200	950

TABLE IV

Characteristic values of parameters for the five rain-climatic zones (0.01% of the time)

Parameter	Rain-climatic zone					Unit
	1	2	3	4	5	
Surface rainfall rate (R)	75	55	37	26	14	mm/h
Rain cell diameter (D)	2.5	2.8	3	3	4.5	km
Water vapour density (ρ_m)	10	5	2	2	2	g/m^3

TABLE V

Maximum rain-scatter distances (km)

Rain-climatic zone	Percentage of time		
	$0.001 \leq p < 0.01$	$0.01 \leq p < 0.1$	$p = 0.1$
1	540	470	390
2	470	390	330
3, 4 and 5	390	330	270

FIGURE 1

Horizon angle correction A_h as a function of horizon angle and frequency

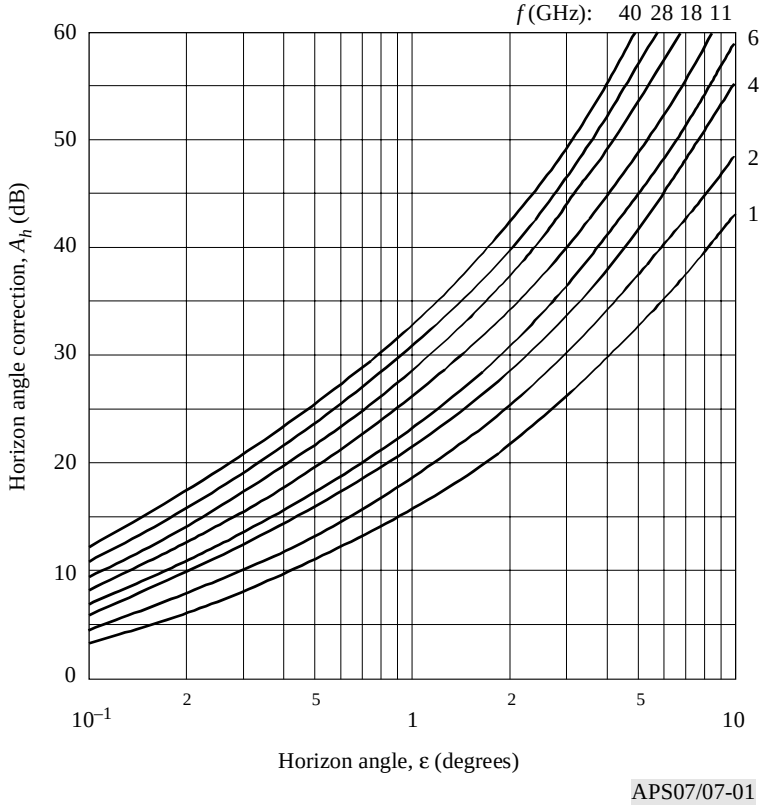

FIGURE 2

Coordination distance $d_A(0.01)$ for 0.01% of the time due to propagation mode (1), as a function of frequency and coordination loss in Zone A

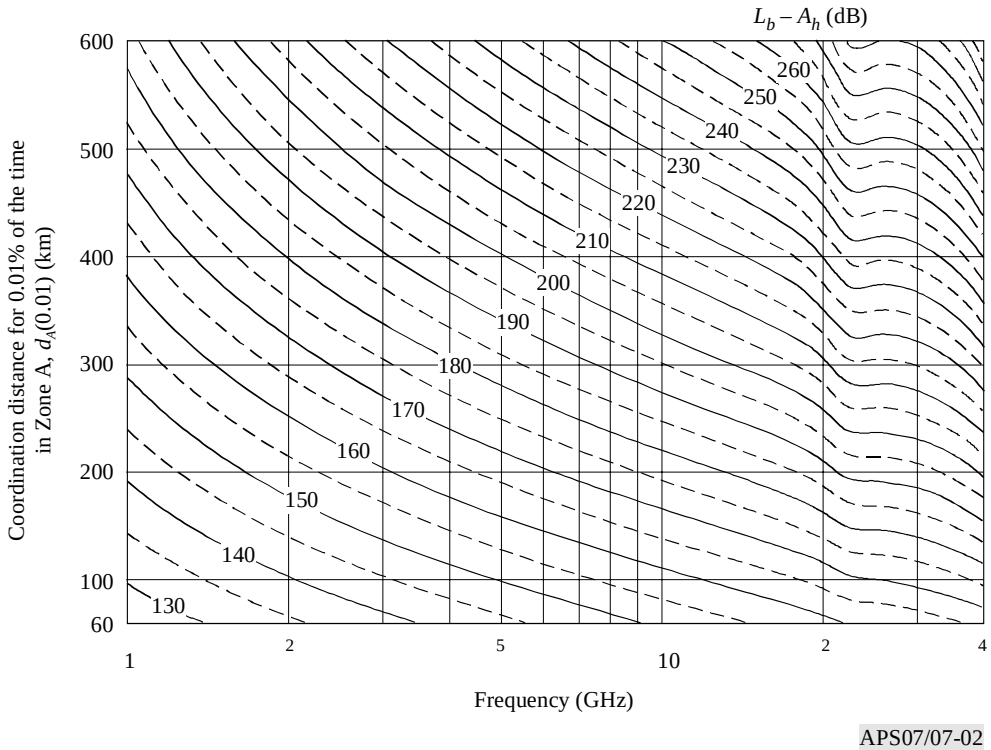

FIGURE 3

Coordination distance correction factor for propagation mode (1) for percentages of time other than 0.01

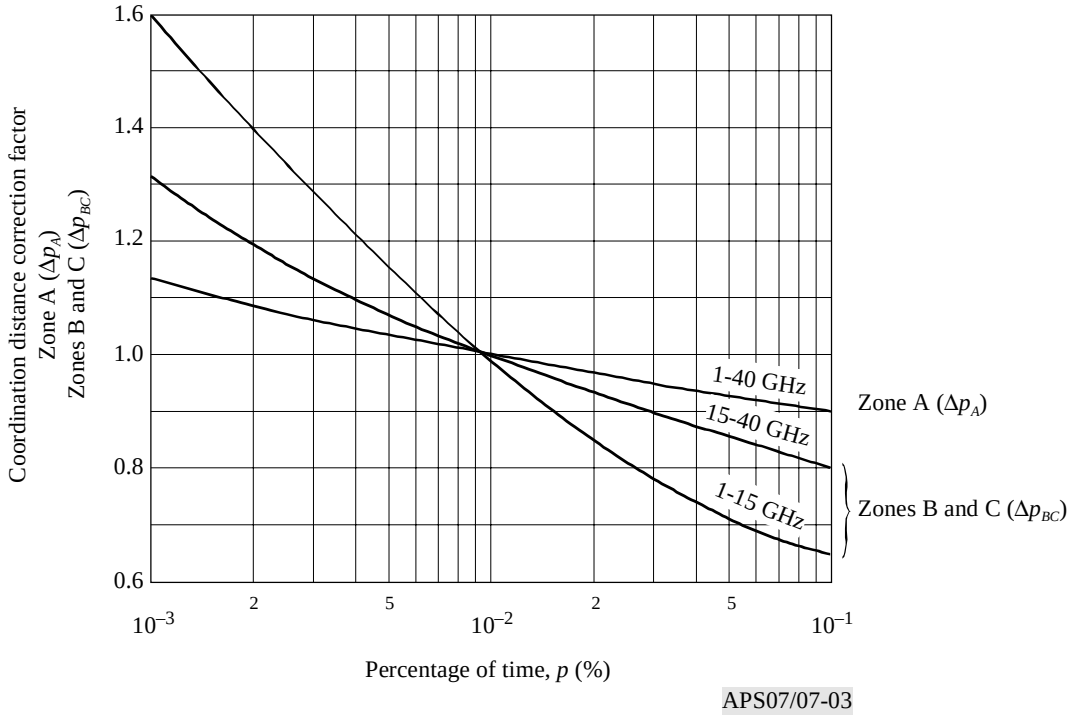

FIGURE 4

Coordination distance d_B(0.01) for 0.01% of the time due to propagation mode (1), as a function of frequency and coordination loss in Zone B

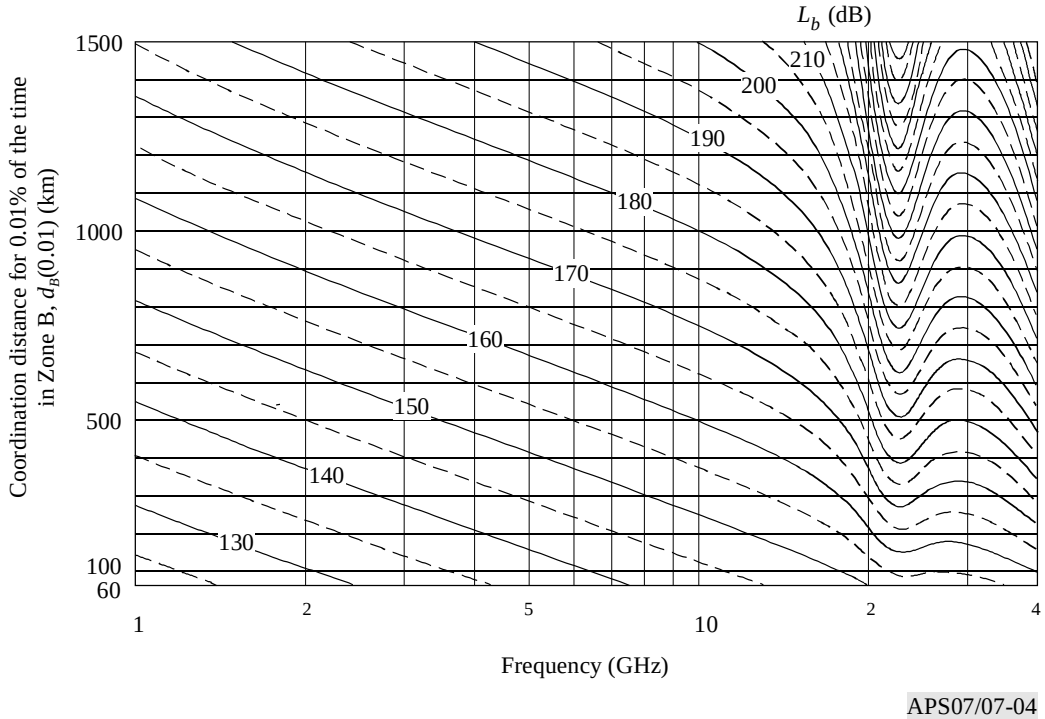

FIGURE 5

Coordination distance $d_C(0.01)$ for 0.01% of the time due to propagation mode (1), as a function of frequency and coordination loss in Zone C

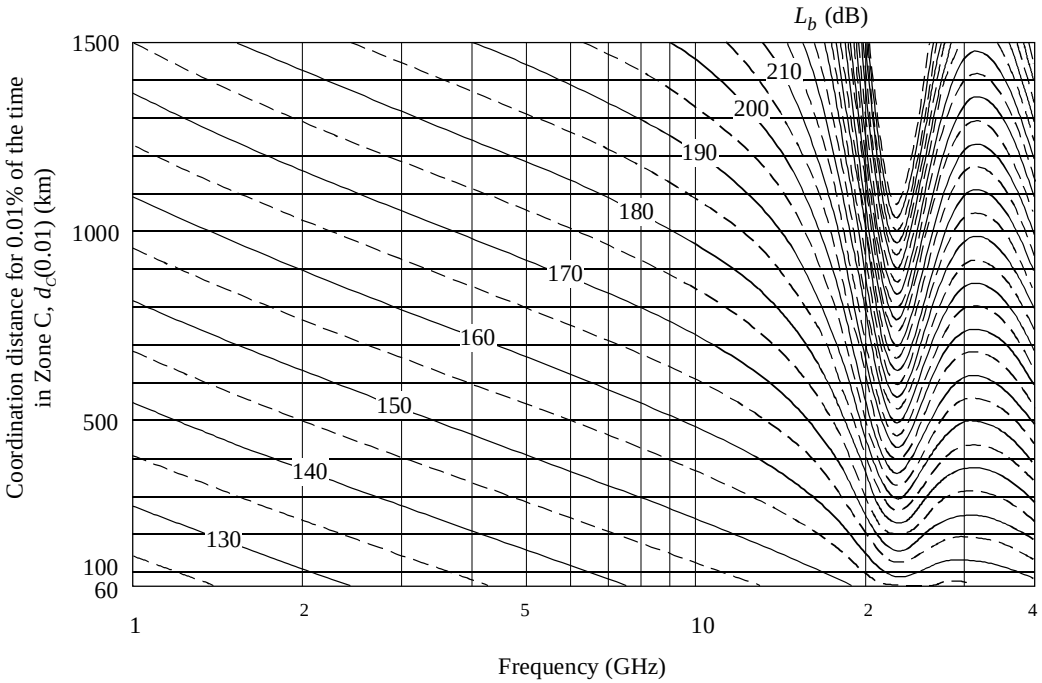

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FIGURE 6

Maximum coordination distance for propagation mode (1) as a function of percentage of time

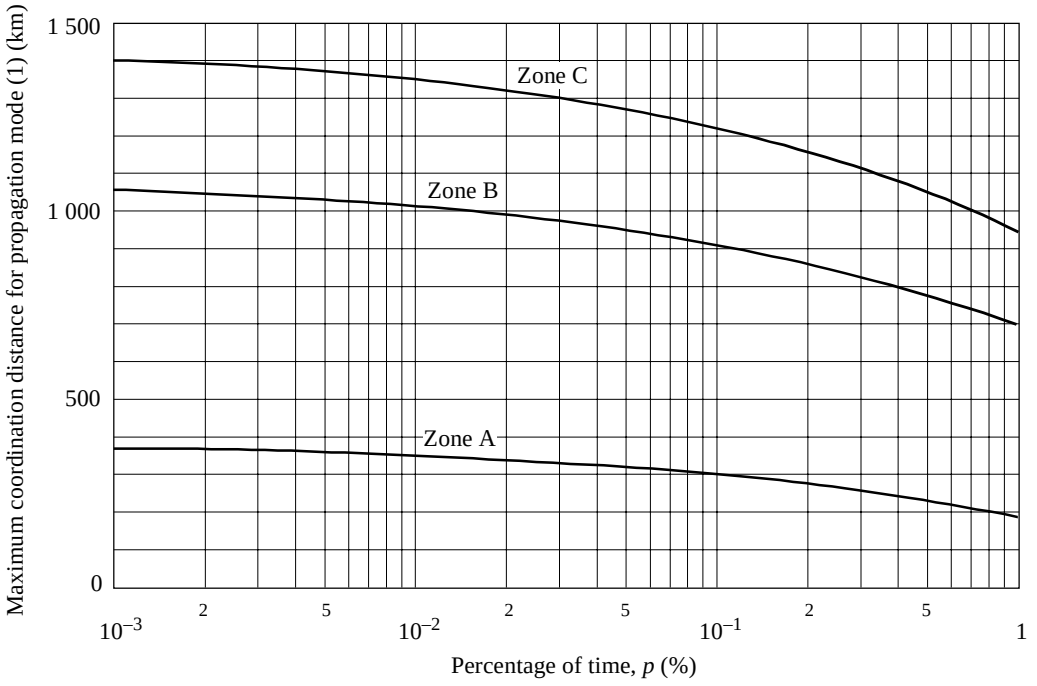

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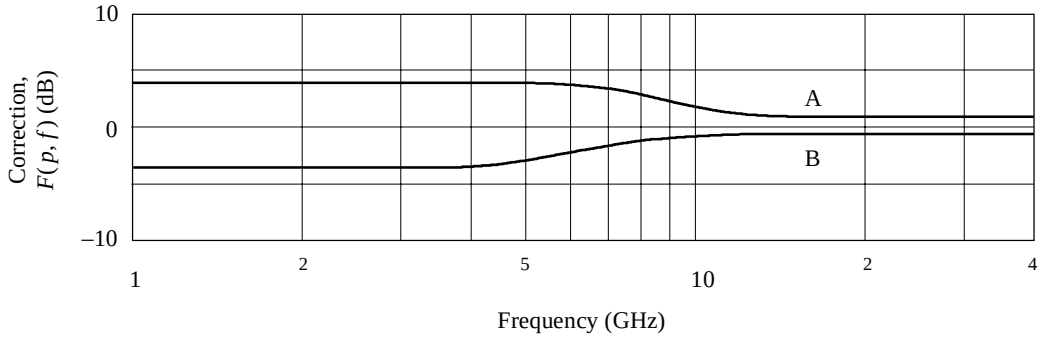
FIGURE 7

Correction for conversion from 0.01% of the time for all rain-climatic zones



Curves A: conversion to 0.1%
B: conversion to 0.001 %

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FIGURE 8

Regions corresponding to the five rain-climatic zones

(see § 4.2)

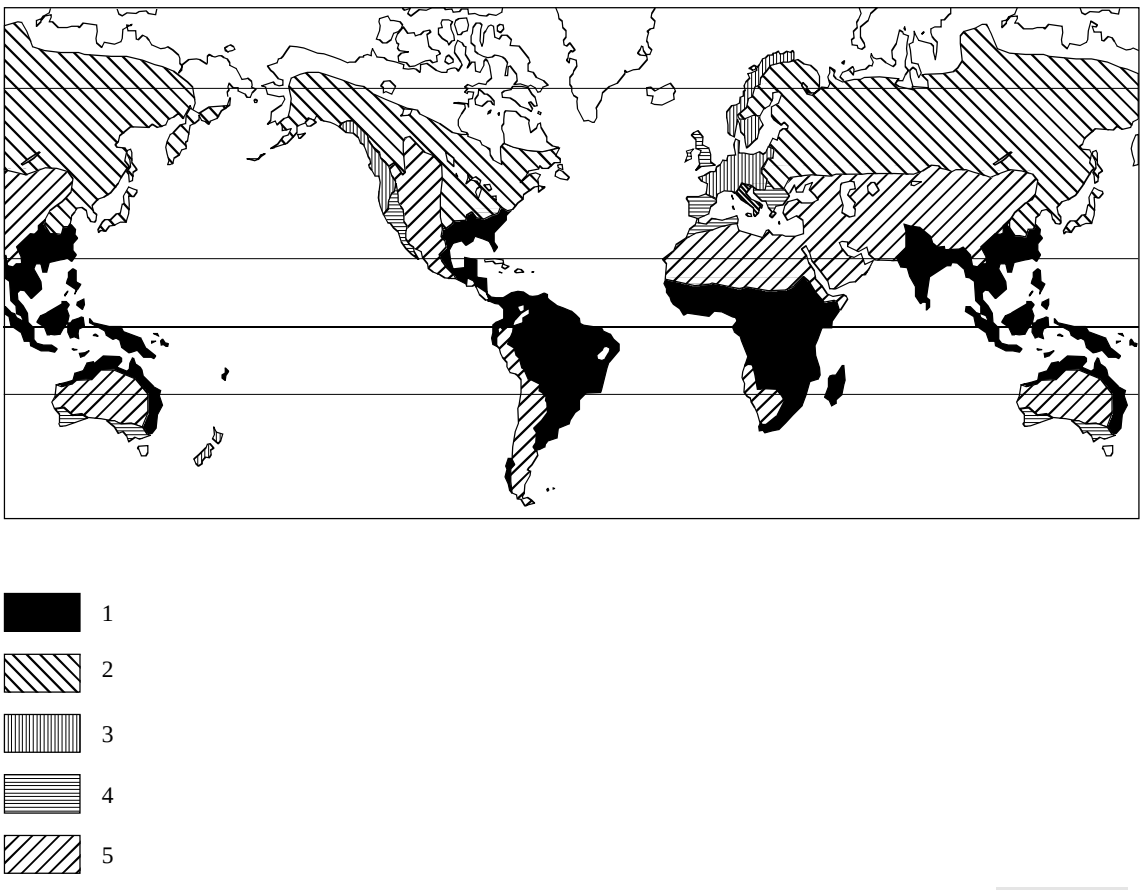

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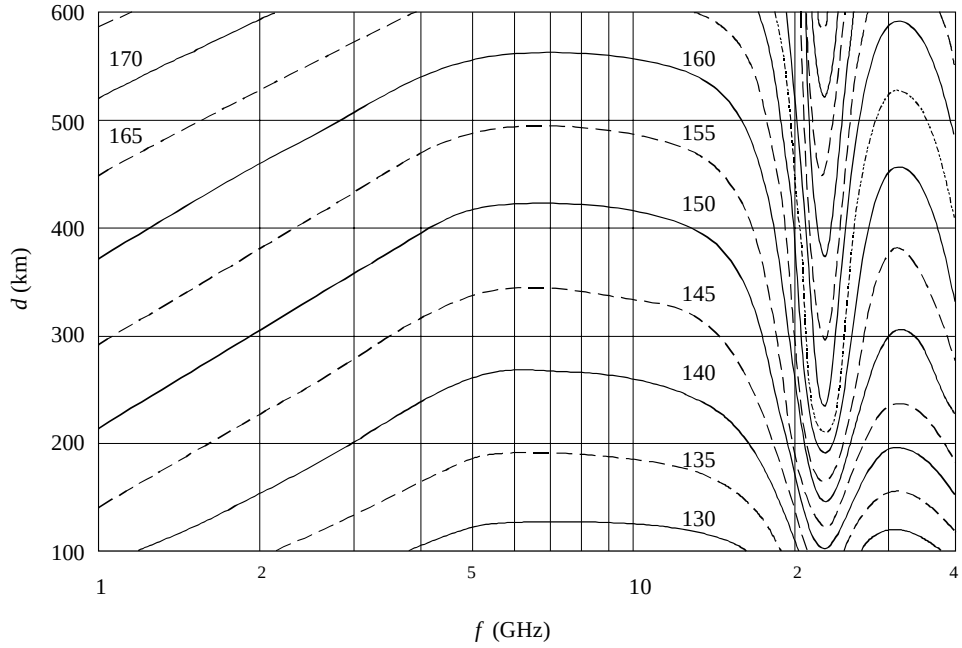
FIGURE 9

Rain-scatter distance as a function of frequency for 0.01% of the time – rain-climatic Zone 1



Contours have transmission loss values shown in dB.

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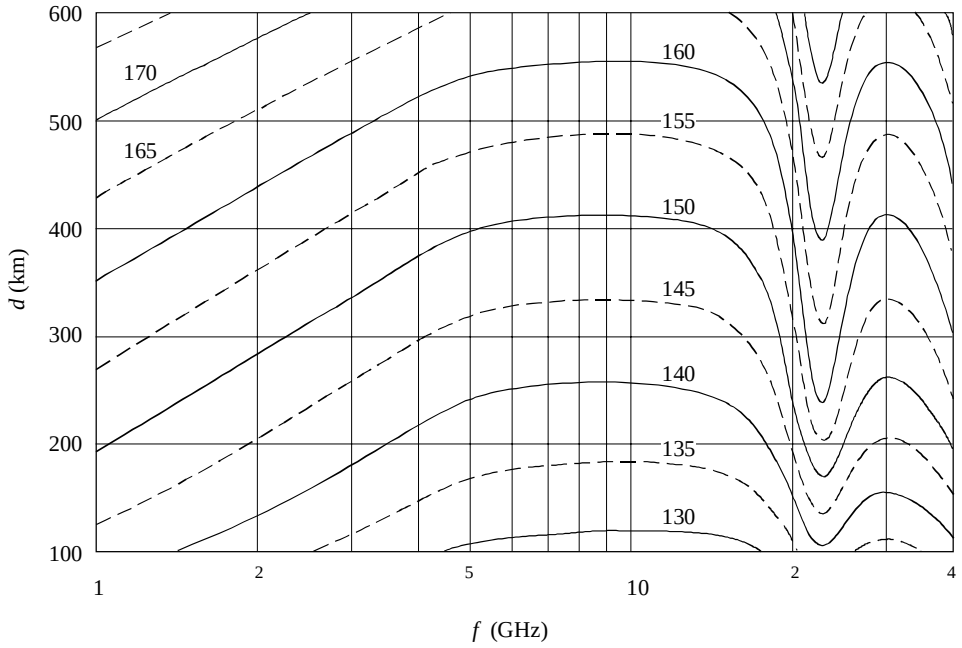
FIGURE 10

Rain-scatter distance as a function of frequency for 0.01% of the time – rain-climatic Zone 2



Contours have transmission loss values shown in dB.

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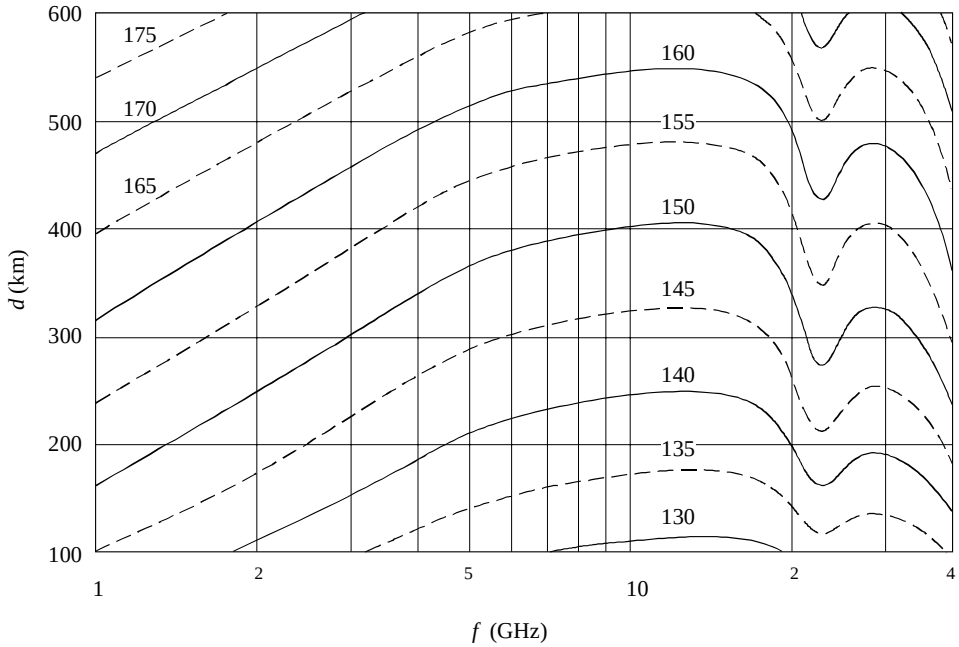
FIGURE 11

Rain-scatter distance as a function of frequency for 0.01% of the time – rain-climatic Zone 3



Contours have transmission loss values shown in dB.

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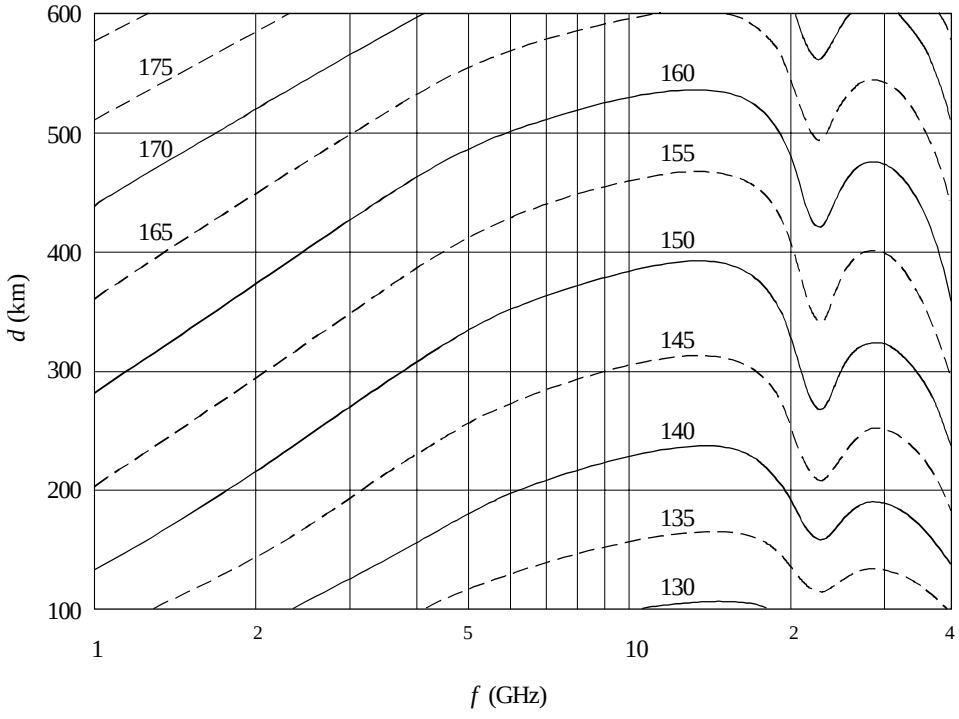
FIGURE 12

Rain-scatter distance as a function of frequency for 0.01% of the time – rain-climatic Zone 4



Contours have transmission loss values shown in dB.

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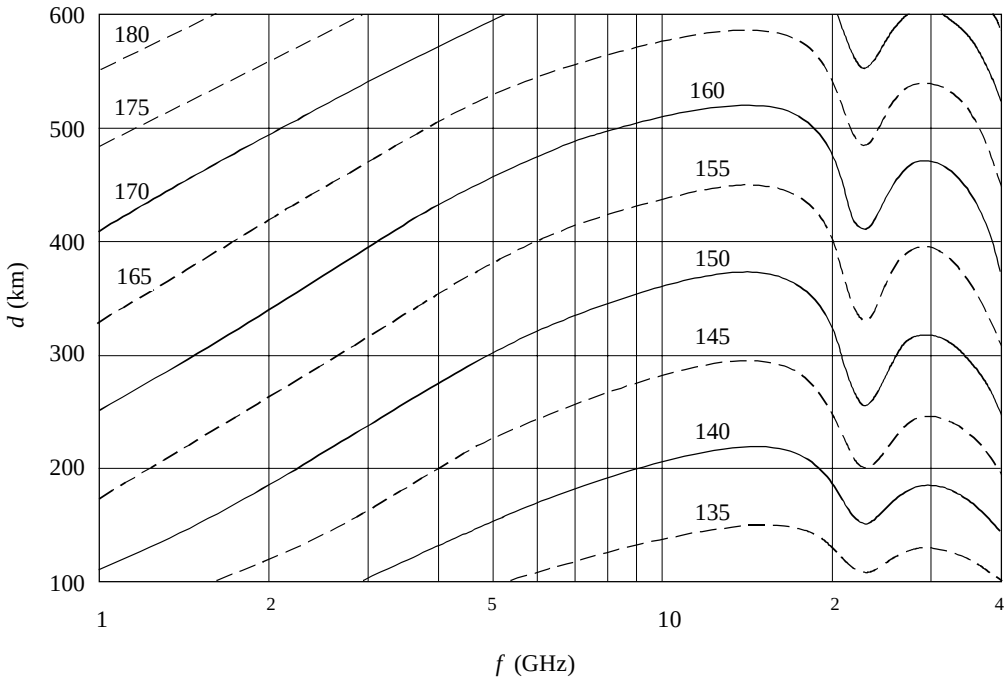
FIGURE 13

Rain-scatter distance as a function of frequency for 0.01% of the time – rain-climatic Zone 5



Contours have transmission loss values shown in dB.

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FIGURE 14

Distance Δd as a function of rain-scatter distance d_r and earth station antenna main beam elevation angle ε_s

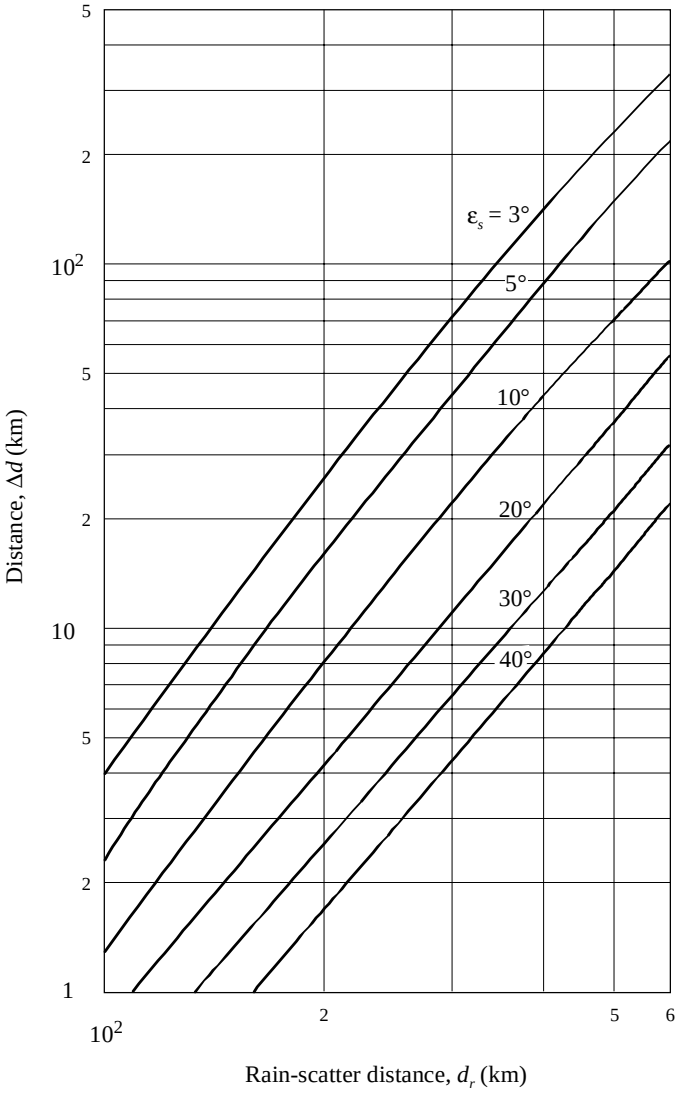

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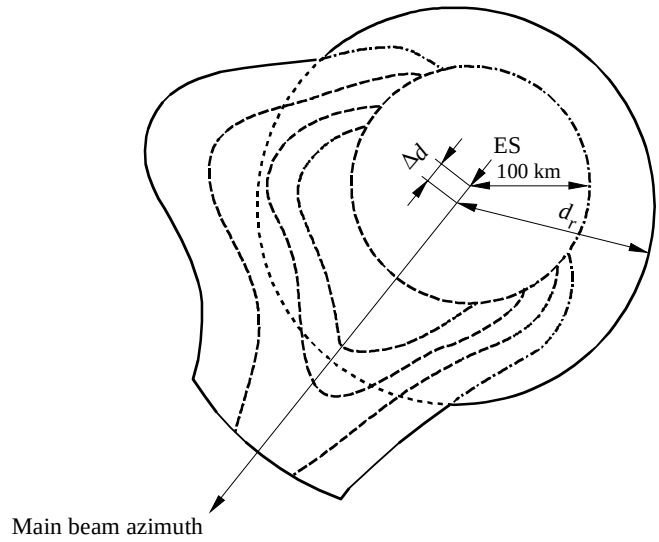
FIGURE 15

Example of a coordination contour



ES: earth station

Coordination contour

Contour for propagation mode (1)

Contour for propagation mode (2)

Auxiliary contours for propagation mode (1)

Note 1 – If by using the auxiliary contours it is seen that a terrestrial station can be eliminated with respect to propagation mode (1) then:

– if that terrestrial station is outside the contour for propagation mode (2), it may be eliminated from any further consideration;

– if that terrestrial station is within the contour for propagation mode (2), it must still be considered, but for this mode only.

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ANNEX I

Determination and use of auxiliary contours

1 Introduction

For great circle propagation mechanisms mode (1) auxiliary contours are of great value in eliminating certain existing or planned terrestrial stations falling within the coordination area without recourse to precise and arduous calculations. The work of both the earth station administration and the affected administrations is therefore eased during subsequent negotiations if these auxiliary contours are supplied.

2 Determination of the auxiliary contours

Two types of contours may be determined, depending on whether the earth station is used for transmission or reception.

2.1 Transmitting earth station

From equation (2) one may isolate the terms $G_r - P_r(p)$ and define an interference sensitivity factor S (dBW) of the interfered-with terrestrial stations:

$$S = G_r - P_r(p) \tag{32}$$

Table I shows values of this factor for various types of terrestrial stations.

The coordination contour is associated with a (maximum) sensitivity factor S and labelled with its value.

The auxiliary contours are determined in the same way as the corresponding coordination contour for propagation mode (1), but using terrestrial station interference sensitivity factor S values (dBW) which are 5, 10, 15, 20 dB, etc. lower than the value (given in Table I) corresponding to the coordination contour.

2.2 Receiving earth station

From equation (2) one may, likewise, isolate the terms $P_{t'} + G_{t'}$ and define the e.i.r.p. E (dBW) of the interfering terrestrial stations:

$$E = P_{t'} + G_{t'} \tag{33}$$

values for which are listed in Table II.

The coordination contour is associated with a maximum value for E and labelled with this value.

The auxiliary contours are determined in the same way as the corresponding coordination contour for propagation mode (1), but using terrestrial station e.i.r.p. values E (dBW) which are 5, 10, 15, 20 dB, etc. lower than the value (given in Table II) corresponding to the coordination contour.

3 Use of auxiliary contours

The auxiliary contours, the coordination contour for great circle propagation mode (1) and the coordination contour for rain-scatter propagation mode (2) are all plotted on the same diagram for a given shared band. An illustrative example is given in Fig. 15.

For each terrestrial station situated within the coordination area, a two stage procedure may be applied, one for the great circle propagation mechanism and the other for scattering from hydrometeors.

3.1 Great circle propagation mechanisms mode (1)

If a transmitting terrestrial station is outside the coordination area corresponding to propagation mode (1), it need not be considered further with respect to propagation mode (1).

For each transmitting terrestrial station situated within the coordination area corresponding to propagation mode (1), the e.i.r.p. value in the direction of the earth station is determined. If this value is less than the value associated with the nearest contour defining an area outside of which the station is situated, the station may be considered not to cause more than a permissible level of interference and therefore may be eliminated from further consideration with respect to propagation mode (1).

For each receiving terrestrial station, the analogous procedure may be applied using the interference sensitivity factor instead of the e.i.r.p. value.

3.2 Elimination of a terrestrial station and rain-scatter propagation mechanism mode (2)

Terrestrial stations eliminated by the above procedure from further consideration with regard to propagation mode (1) need, nevertheless, be further considered with regard to propagation mode (2) when they lie within the rain-scatter coordination area.

ANNEX II

Antenna gain in the direction of the earth station horizon for geostationary satellites

1 General

The gain component of the earth station antenna in the direction of the physical horizon around an earth station is a function of the angular separation φ between the antenna main beam axis and the horizon direction under consideration. Therefore, knowledge of the angle φ is required for each azimuth.

The elevation ε_S and azimuth α_S of geostationary satellites as seen from an earth station at a latitude ζ are uniquely related. Fig. II-1 shows the possible location arcs of geostationary satellites in a rectangular elevation/azimuth plot, each arc corresponding to an earth station latitude.

Specific relative satellite longitudes may not be known beforehand, but even when they are, the possibility of the addition of a new satellite or the repositioning of an existing one suggests that all or a portion of the applicable arc be considered to hold satellites.

2 Graphical method for the determination of $\varphi(\alpha)$

With the correct arc or segment of arc chosen and suitably marked in Fig. II-1, the horizon profile $\varepsilon(\alpha)$ is added to the plot of Fig. II-1, as shown in Fig. II-2, where an example is given for an earth station located at 45° N latitude for a satellite expected to be located somewhere between relative longitudes of 10° E and 45° W.

For each point on the local horizon $\varepsilon(\alpha)$ the smallest distance to the arc is determined and measured on the elevation scale. The example of Fig. II-2 shows the determination of the off-beam angle φ at an azimuth α (= 210°) with a horizontal elevation ε (= 4°). The measurement of φ yields a value of 26°.

When this is done for all azimuths (in suitable increments, e.g. 5°), a relationship $\varphi(\alpha)$ results.

3 Numerical method for the determination of $\varphi(\alpha)$

For this purpose the following equations may be used:

$$\psi = \arccos(\cos\zeta \cdot \cos\delta) \tag{34}$$

$$\alpha'_s = \arccos(\tan\zeta \cdot \cot\psi) \tag{35}$$

$$\alpha_s = \alpha'_s + 180 \quad \text{for earth stations located in the northern hemisphere and satellites located west of the earth station} \tag{36a}$$

$$\alpha_s = 180^\circ - \alpha'_s \quad \text{for earth stations located in the northern hemisphere and satellites located east of the earth station} \tag{36b}$$

$$\alpha_s = 360^\circ - \alpha'_s \quad \text{for earth stations located in the southern hemisphere and satellites located west of the earth station} \tag{36c}$$

$$\alpha_s = \alpha'_s \quad \text{for earth stations located in the southern hemisphere and satellites located east of the earth station} \tag{36d}$$

$$\varepsilon_s = \arctan\left(\frac{K - \cos\psi}{\sin\psi}\right) - \psi \tag{37}$$

$$\varphi(\alpha) = \arccos[\cos\varepsilon \cdot \cos\varepsilon_s \cdot \cos(\alpha - \alpha_s) + \sin\varepsilon \cdot \sin\varepsilon_s] \tag{38}$$

where:

ζ: latitude of the earth station;

δ: difference in longitude between the satellite and the earth station;

ψ: great circle arc between the earth station and the sub-satellite point;

α_s: satellite azimuth as seen from the earth station;

ε_s: satellite elevation angle as seen from the earth station;

α: azimuth of the pertinent direction;

ε: elevation angle of the horizon in the pertinent azimuth α;

$\varphi(\alpha)$: angle between the main beam axis and the horizon direction corresponding to the pertinent azimuth α;

K: orbit radius/Earth radius, assumed to be 6.62.

All arcs mentioned above are in degrees.

4 Determination of antenna gain

The relationship $\varphi(\alpha)$ may be used to derive a function for the horizon antenna gain, G(dB) as a function of the azimuth α, by using the actual earth station antenna pattern, or a formula giving a good approximation. For example, in cases where the ratio between the antenna diameter and the wavelength is not less than 100, the following equation should be used:

$$G(\varphi) = G_{max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda}\varphi\right)^2 \quad \text{for } 0 < \varphi < \varphi_m \tag{39a}$$

$$G(\varphi) = G_1 \quad \text{for } \varphi_m \leq \varphi < \varphi_r \tag{39b}$$

$$G(\varphi) = 32 - 25 \log \varphi \quad \text{for } \varphi_r \leq \varphi < 48° \tag{39c}$$

$$G(\varphi) = -10 \quad \text{for } 48° \leq \varphi \leq 180° \tag{39d}$$

where:

D: antenna diameter
λ: wavelength
} expressed in the same unit

G_1: gain of the first sidelobe $= 2 + 15 \log \frac{D}{\lambda}$

$$\varphi_m = \frac{20\lambda}{D}\sqrt{G_{max} - G_1} \quad \text{degrees}$$

$$\varphi_r = 15.85 \left(\frac{D}{\lambda}\right)^{-0.6} \quad \text{degrees}$$

When it is not possible, for antennae with D/λ of less than 100, to use the above reference antenna pattern and when neither measured data nor a relevant ITU-R Recommendation accepted by the administrations concerned can be used instead, administrations may use the reference diagram as described below:

$$G(\varphi) = G_{max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda}\varphi\right)^2 \qquad \text{for } 0 < \varphi < \varphi_m \qquad (40a)$$

$$G(\varphi) = G_1 \qquad \text{for } \varphi_m \leq \varphi < 100\frac{\lambda}{D} \qquad (40b)$$

$$G(\varphi) = 52 - 10 \log \frac{D}{\lambda} - 25 \log \varphi \qquad \text{for } 100\frac{\lambda}{D} \leq \varphi < 48° \qquad (40c)$$

$$G(\varphi) = 10 - 10 \log \frac{D}{\lambda} \qquad \text{for } 48° \leq \varphi \leq 180° \qquad (40d)$$

where:

D : antenna diameter
λ : wavelength
} expressed in the same unit

G_1: gain of the first sidelobe $= 2 + 15 \log \frac{D}{\lambda}$

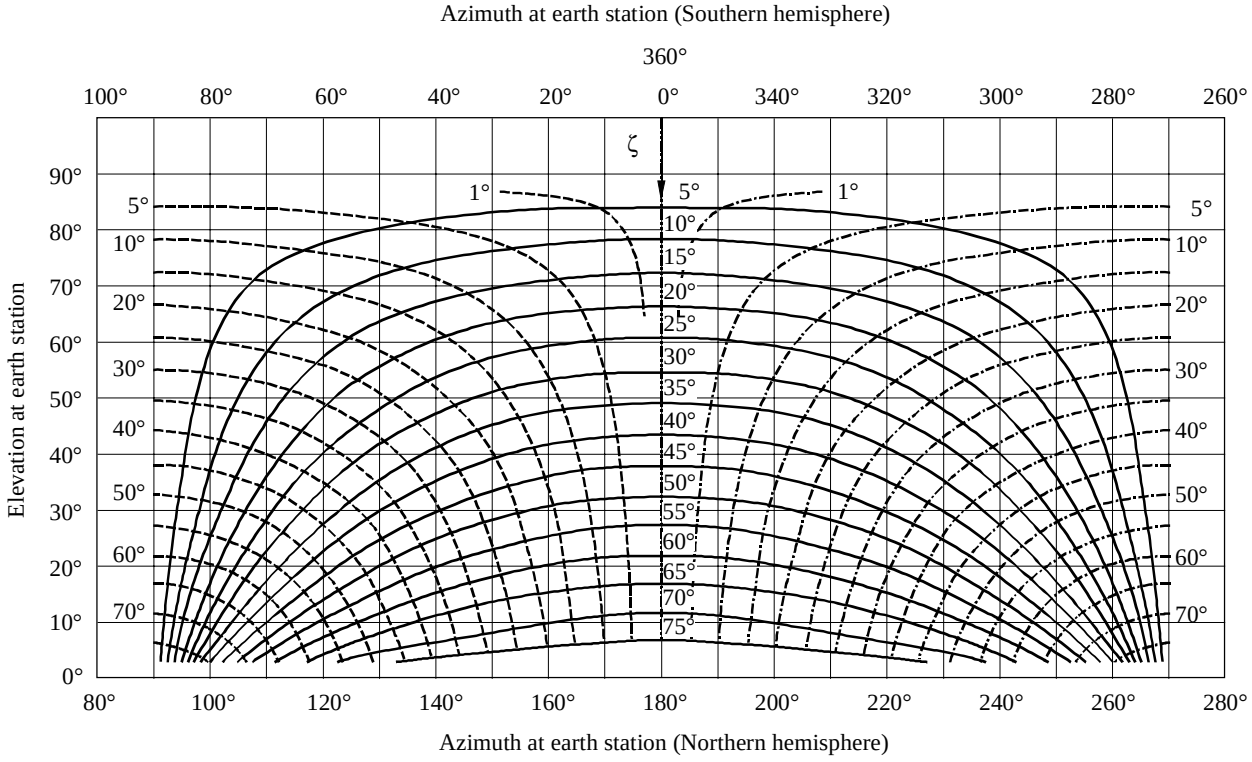
$$\varphi_m = \frac{20\lambda}{D}\sqrt{G_{max} - G_1} \qquad \text{degrees}$$

The above patterns may be modified as appropriate to achieve a better representation of the actual antenna pattern.

In cases where D/λ is not given, it may be estimated from the expression $20 \log D/\lambda \approx G_{max} - 7.7$, where G_{max} is the main lobe antenna gain in dB.

FIGURE II-1

Position arcs of geostationary satellites



——— Arc of geostationary-satellite orbit visible from earth station at terrestrial latitude ζ

Difference in longitude between the earth station and the sub-satellite point:

– – – – – – – – Satellite longitude E of earth station longitude

– · – · – · – · Satellite longitude W of earth station longitude

– · · – · · – · · Satellite longitude equal to the earth station longitude

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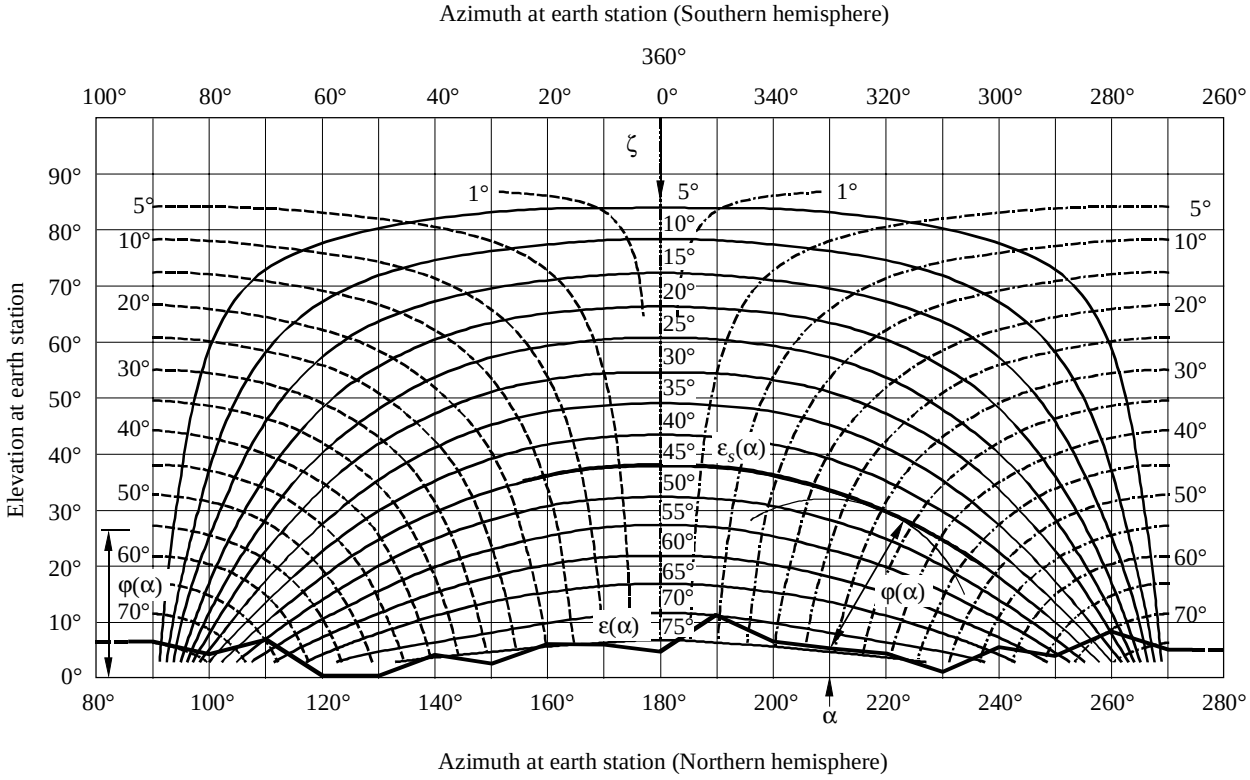
FIGURE II-2
Example of determination of φ



——— Arc of geostationary-satellite orbit visible from earth station at terrestrial latitude ζ

– – – Horizon profile ε(α)

Difference in longitude between earth station and the sub-satellite point:

– – – – Satellite longitude E of earth station longitude

– · – · – Satellite longitude W of earth station longitude

– · · – · · Satellite longitude equal to the earth station longitude

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ANNEX III

Graphical method for the determination of coordination distance for mixed paths

1 Two zones

The procedure to be followed in the case of a mixed path involving two zones is illustrated by the example shown in Fig. III-1 a). The earth station is situated in Zone A at a distance of 75 km from Zone B. The graphical presentation described below is particularly useful where more than one boundary between zones may be involved, as in this example.

In the example given below, the coordination loss is assumed to be 180 dB, the frequency 20 GHz, and the percentage of time 0.01%. The procedure is as follows:

1.1 determine the distance entirely in Zone A that would give the coordination loss. Mark this distance (in this case it is 160 km) from the origin along the abscissa axis of linear graph paper as indicated by the point A (Fig. III-1 b));

1.2 determine the distance entirely in Zone B that would give the same coordination loss. Mark this distance (in this case it is 530 km) from the origin along the ordinate axis of the chart as indicated by the point B;

1.3 draw a straight line between points A and B representing these distances from the origin;

1.4 starting from the origin, the distance of 75 km from the earth station to Zone B is set off along the abscissa axis of the chart as indicated by the point A_1;

1.5 starting from point A_1 the Zone B path length of 150 km is then set off parallel to the ordinate axis of the chart as indicated by the point B_1;

1.6 the further distance in the next Zone A region is then measured parallel to the abscissa axis from the point B_1 to the point of intersection of the mixed path curve as indicated by X. In Fig. III-1 b), this distance is 40 km;

1.7 the coordination distance is the sum of distances $0A_1$, A_1B_1 and B_1X and is equal to:

$$75 + 150 + 40 = 265 \text{ km}.$$

2 Three zones

In some special cases, the mixed path involves all three radio-climatic Zones A, B and C. A solution to this problem can be found in adding a third dimension to the procedure to be followed for mixed paths involving only two zones. Theoretically, it means that the third coordinate has to be determined for a point having coordinates corresponding to the known

distances in the first two zones and lying in a plane defined by three points on the axes X, Y and Z, corresponding to distances in Zones A, B and C, respectively, that would give the required basic transmission loss.

In practice, the procedure can be reduced to a simple graphical method shown in Fig. III-2 a) assuming for example a coordination loss (L_1) of 180 dB at a frequency of 20 GHz. It is required to find the coordination distance from the earth station in the direction given in Fig. III-2 a). Here an earth station is situated in Zone A at a distance of 75 km ($0A_1$) in a given azimuthal direction from Zone B. In the same azimuthal direction Zone B is 150 km (A_1B_1) long and followed by an unknown portion in Zone C (Fig. III-2 a)).

In this case, the procedure to be applied should be as follows (Fig. III-2 b)):

2.1 repeat the same procedure as for mixed paths involving only two zones, given in steps 1.1 to 1.5 above, and continue as follows:

2.2 from the point B_1 draw a line parallel to the line AB to intersect the abscissa axis as indicated by the point D;

2.3 determine the distance, entirely in Zone C, that would give the coordination loss. Mark this distance (in this case it is 350 km) from the origin along the ordinate axis of the chart as indicated by the length 0C. Draw a straight line between points C and A;

2.4 at the point D draw a line parallel to the ordinate axis to intersect the line CA as indicated by X;

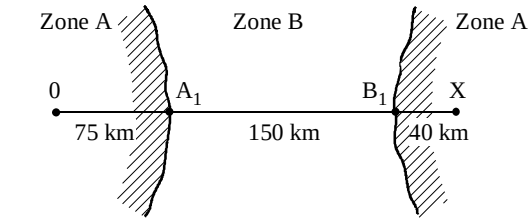
2.5 the distance between the points D and X, which is the unknown distance in Zone C, is found to be 85 km;

2.6 the coordination distance is then the sum of the distances $0A_1$, A_1B_1, and DX and in this example is equal to:

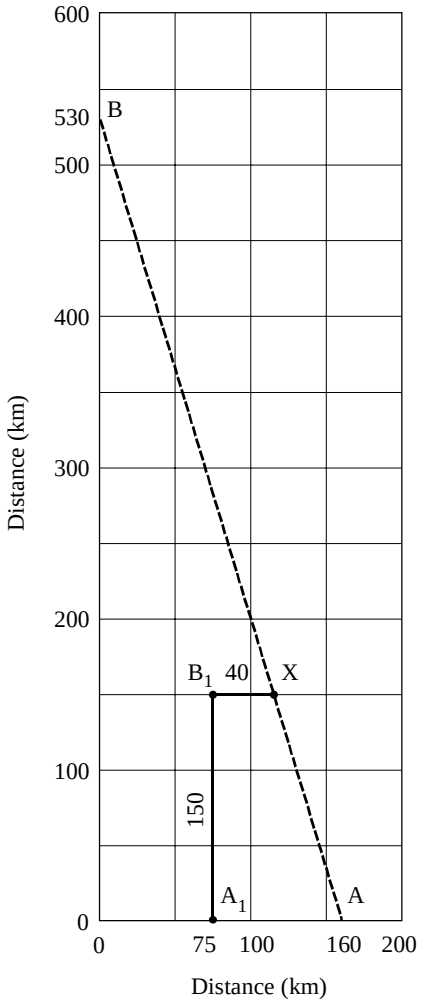
$$75 + 150 + 85 = 310 \text{ km}.$$

FIGURE III-1

Example of determination of coordination distance for mixed paths involving Zones A and B



a)



b)

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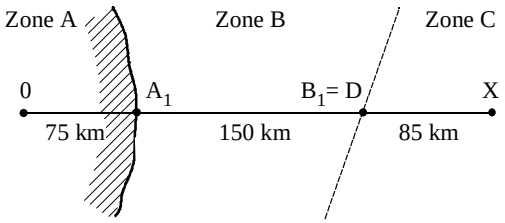
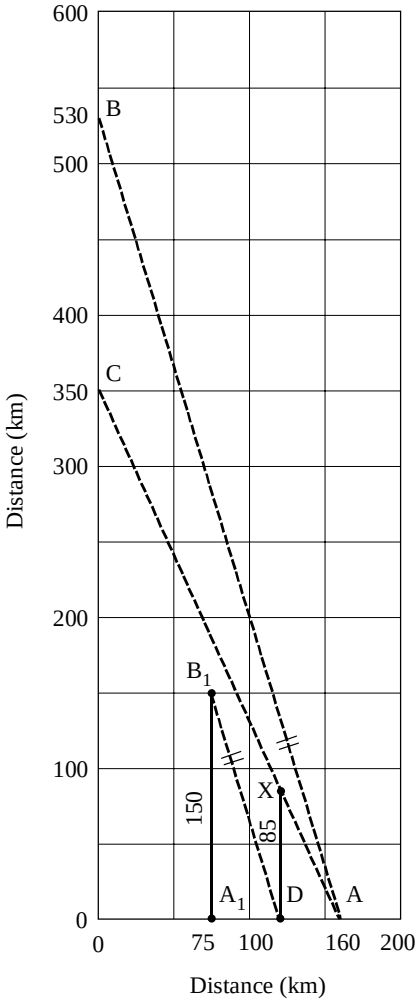
FIGURE III-2

Example of determination of coordination distance for mixed paths involving Zones A, B and C



a)



b)

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APPENDIX S8

Method of calculation for determining if coordination is required between geostationary-satellite networks sharing the same frequency bands

1 Introduction

The method of calculation for determining if coordination is required under provision No. **S9.6/1060** is based on the concept that the noise temperature of a system subject to interference increases as the level of the interfering emission increases. It can, therefore, be applied irrespective of the modulation characteristics of these satellite networks, and of the precise frequencies used.

In this method, the apparent increase in the equivalent satellite link noise temperature resulting from an interfering emission of a given system is calculated (see § 2 below) and the ratio of this increase to the equivalent satellite link noise temperature, expressed as a percentage, is compared to a threshold value (see § 3 below).

2 Calculation of the apparent increase in equivalent noise temperature of the satellite link subject to an interfering emission

Two possible cases are considered:

Case I: wanted and interfering networks share one or more frequency bands, each in the same direction of transmission;

Case II: wanted and interfering networks share one or more frequency bands, each in opposite directions of transmission (bidirectional use).

These two cases cover all relative satellite positions from closely-spaced to near-antipodal positions.

2.1 Parameters

Let A be a satellite link of network R associated with satellite S and A′ be a satellite link of network R′ associated with satellite S′. The symbols relating to satellite link A′ bear primes, those relating to satellite link A do not bear primes.

The parameters are defined as follows (for satellite link A):

T: the equivalent satellite link noise temperature, referred to the output of the receiving antenna of the earth station (K);

T_s: the receiving system noise temperature of the space station, referred to the output of the receiving antenna of the space station (K);

T_e: the receiving system noise temperature of the earth station, referred to the output of the receiving antenna of the earth station (K);

ΔT_s: apparent increase in the receiving system noise temperature of the satellite S, caused by an interfering emission, referred to the output of the receiving antenna of this satellite (K);

ΔT_e: apparent increase in the receiving system noise temperature of the earth station e_R, caused by an interfering emission, referred to the output of the receiving antenna of this station (K);

p_s: maximum power density per Hz delivered to the antenna of satellite S (averaged over the worst 4 kHz band for a carrier frequency below 15 GHz or over the worst 1 MHz band above 15 GHz) (W/Hz);

$g_3(\eta)$: transmitting antenna gain of satellite S in the direction η (numerical power ratio);

η_A: direction, from satellite S, of the receiving earth station e_R of satellite link A;

$\eta_{e'}$: direction, from satellite S, of the receiving earth station e'_R of satellite link A′;

NOTE – The product $p_s\, g_3\ (\eta_{e'})$ is the maximum e.i.r.p. per Hz of satellite S in the direction of the receiving earth station e'_R of satellite link A′.

$\eta_{s'}$: direction, from satellite S, of satellite S′;

p_e: maximum power density per Hz delivered to the antenna of the transmitting earth station e_T (averaged over the worst 4 kHz band for a carrier frequency below 15 GHz or over the worst 1 MHz band above 15 GHz) (W/Hz);

$g_2(\delta)$: receiving antenna gain of satellite S in the direction δ (numerical power ratio);

δ_A: direction, from satellite S, of the transmitting earth station e_T of satellite link A;

$\delta_{e'}$: direction, from satellite S, of the transmitting earth station e'_T of satellite link A′;

$\delta_{s'}$: direction, from satellite S, of satellite S′;

θ_t: topocentric angular separation in degrees between the two satellites[1], taking the longitudinal station-keeping tolerances into account;

NOTE – Only the topocentric angle θ_t should be used in dealing with Case I.

---

[1] A method for calculation of the topocentric angular separation is given in Annex I.

θ_g: geocentric angular separation in degrees between the two satellites, taking the longitudinal station-keeping tolerances into account;

NOTE – Only the geocentric angle θ_g should be used in dealing with Case II.

$g_1(\theta_t)$: transmitting antenna gain of the earth station e_T in the direction of satellite S′ (numerical power ratio);

$g_4(\theta_t)$: receiving antenna gain of the earth station e_R in the direction of satellite S′ (numerical power ratio);

k: Boltzmann's constant (1.38×10^{-23} J/K);

l_d: free-space transmission loss[2] on the downlink (numerical power ratio), evaluated from satellite S to the receiving earth station e_R for satellite link A;

NOTE – The free-space transmission loss on any downlink evaluated from the satellites S or S′ to the receiving earth stations e_R or e'_R is considered to be equal to l_d.

l_u: free-space transmission loss[2] on the uplink (numerical power ratio), evaluated from the earth station e_T, to satellite S for satellite link A;

NOTE – The free-space loss on any uplink evaluated from the earth stations e_T or e'_T to the satellite S or S′ is considered to be equal to l_u.

l_s: free-space transmission loss[2] on the inter-satellite link (numerical power ratio), evaluated from satellite S′ to satellite S;

γ: transmission gain of a specific satellite link subject to interference evaluated from the output of the receiving antenna of satellite S to the output of the receiving antenna of the earth station e_R (numerical power ratio, usually less than 1).

2.2 General method

In the following equations, the frequency to be used for the calculation of l_d, l_u, and l_s is the average frequency of the band common to both networks in the direction considered. If, in a given direction, there is no overlap of the assigned frequency bands of the two networks, the corresponding value (ΔT_s or ΔT_e) is taken to be equal to zero. For cases where the Appendix **S4** data have not been published, the assigned frequency band for that network shall be considered as being the frequency range as provided for in Appendix **S4**.

2.2.1 Case I – Wanted and interfering networks sharing the same frequency band in the same direction of transmission

The gains $g_1(\theta_t)$ and $g_4(\theta_t)$ are those of the earth stations concerned. When neither measured data nor a relevant ITU-R Recommendation accepted by the administrations concerned are available the radiation patterns set out in Annex III should be used.

---

[2] A method for calculation of the free-space transmission loss is given in Annex II.

2.2.1.1 Simple frequency-changing transponder on board the satellite

The parameters ΔT_s and ΔT_e are given by the following equations:

$$\Delta T_s = \frac{p'_e\, g'_1\,(\theta_t)\, g_2\,(\delta_{e'})}{kl_u} \tag{1}$$

$$\Delta T_e = \frac{p'_s\, g'_3\,(\eta_e)\, g_4\,(\theta_t)}{kl_d} \tag{2}$$

The symbol ΔT will be used to denote the apparent increase in the equivalent noise temperature for the entire satellite link referred to the output of the receiving antenna of the receiving earth station e_R due to the interfering emission from link A′.

This increase is the result of the interfering emissions entering at both the satellite and the earth station receiver of link A and can accordingly be expressed as:

$$\Delta T = \gamma \Delta T_s + \Delta T_e \tag{3}$$

Hence,

$$\Delta T = \gamma \frac{p'_e\, g'_1\,(\theta_t)\, g_2\,(\delta_{e'})}{kl_u} + \frac{p'_s\, g'_3\,(\eta_e)\, g_4\,(\theta_t)}{kl_d} \tag{4}$$

An example calculation for the application of the method of this Appendix in Case I is given in Annex IV.

In the same way, the increase $\Delta T'$ in the equivalent noise temperature for the entire satellite link, referred to the output of the receiving antenna of the receiving earth station e'_R, under the effect of the interference caused by satellite link A, is given by the following equations:

$$\Delta T'_{s'} = \frac{p_e\, g_1\,(\theta_t)\, g'_2\,(\delta_e)}{kl_u} \tag{5}$$

$$\Delta T'_{e'} = \frac{p_s\, g_3\,(\eta_{e'})\, g'_4\,(\theta_t)}{kl_d} \tag{6}$$

$$\Delta T' = \gamma' \frac{p_e\, g_1\,(\theta_t)\, g'_2\,(\delta_e)}{kl_u} + \frac{p_s\, g_3\,(\eta_{e'})\, g'_4\,(\theta_t)}{kl_d} \tag{7}$$

2.2.1.2 Cases requiring independent treatment of the uplink and the downlink

If there is a change of modulation in the satellite or if the transmission originates on board the satellite, then the apparent increase in the noise temperature must be related to the total receiving system noise temperature of the specific link being examined (the space station or the earth

station, whichever is applicable). In this case, the equivalent noise temperature of the entire satellite link and the transmission gain are not used and equations (1) and (2) above are used separately as required (see § 3.2).

2.2.2 Case II – Wanted and interfering networks sharing the same frequency band in opposite directions of transmission (bidirectional use)

The calculation method below only applies to interfering emissions between satellites.

Interference between earth stations using the same frequency band in opposite directions of transmission (bidirectional use) is to be dealt with by coordination procedures analogous to those used for coordination between earth and terrestrial stations.

All the equations relating to Case II shall use the geocentric angle θ_g.

2.2.2.1 Simple frequency-changing transponder on board the satellite

The noise temperature increase ΔT_S referred to the output of the receiving antenna of the satellite of link A is given by:

$$\Delta T_S = \frac{p'_S \, g'_3 (\eta_S) \, g_2 (\delta_{S'})}{k l_S} \tag{8}$$

The apparent increase in equivalent link noise temperature is then given by:

$$\Delta T = \gamma \, \Delta T_S \tag{9}$$

The increase $\Delta T'$ in the equivalent noise temperature of the link A′ caused by interfering emissions from the satellite associated with the link A is given by:

$$\Delta T' = \gamma' \, \Delta T'_S = \frac{\gamma' \, p_S \, g_3 (\eta_{S'}) \, g'_2 (\delta_S)}{k l_S} \tag{10}$$

2.2.2.2 Cases requiring independent treatment of the uplink and downlink

In this case equation (8) is used directly with T_S to obtain the percentage increase. The increase $\Delta T'_S$ in the noise temperature of link A′ caused by interfering emissions from the satellite associated with link A is obtained in a similar manner.

2.2.3 Consideration of polarization isolation

The polarization isolation factor described in this paragraph shall be considered only if the administration responsible for each network has consented to such a course and has notified its

polarization or published it for coordination under No. **S9.6/1060**. In this case, the apparent increase in the equivalent satellite link noise temperature shall be determined by the following expressions:

Case I $$\Delta T = \frac{\gamma \Delta T_s}{Y_u} + \frac{\Delta T_e}{Y_d}$$

Case II $$\Delta T = \frac{\gamma \Delta T_s}{Y_{ss}}$$

where the values of ΔT_s and ΔT_e are those given in § 2.2.1 and § 2.2.2 and the values of the factors of polarization isolation Y_u, Y_d and Y_{ss} are those given in the table below.

Polarization		**Factor of polarization isolation (numerical ratio)** ***Y***
network R	**network R′**	
LHC	RHC	4
LHC	L	1.4
RHC	L	1.4
LHC	LHC	1
RHC	RHC	1
L	L	1

Where: LHC = left-hand circular (anti-clockwise)
RHC = right-hand circular (clockwise)
L = linear

2.3 Determination of the satellite links to be considered in calculating the increase in equivalent satellite link noise temperature (Case I only)

The greatest increase in equivalent satellite link noise temperature caused to any link of another satellite network, existing or planned, by interfering emissions of the proposed satellite network must be determined.

The most unfavourably sited transmitting earth station of the interfering satellite network should be determined for each satellite receiving antenna of the network subject to interference by superimposing the “Earth-to-space” service areas of the interfering network on the space station receiving antenna gain contours plotted on a map of the Earth's surface. The most unfavourably sited transmitting earth station is the one in the direction of which the satellite receiving antenna gain of the network subject to interference is the greatest.

The most unfavourably sited receiving earth station of the network subject to interference should be determined in an analogous manner for each “space-to-Earth” service area of that network. The most unfavourably sited receiving earth station is the one in the direction of which the satellite transmitting antenna gain of the interfering network is the greatest.

2.4 Use of information furnished under Appendix S4

When an administration elects to use information furnished under Appendix **S4** with the calculation procedures of § 2.2.1.1 and § 2.2.2.1 in order to formulate comments to the advance publication of a new network, the calculations need to be made for both sets of values of γ and T furnished. The greater of the two values of $\Delta T/T$ resulting from these calculations is the one to be used.

3 Comparison between calculated percentage increase in noise temperature and the threshold value

3.1 Simple frequency-changing transponder on board the satellite

The calculated values of the $\Delta T/T$ and $\Delta T'/T'$, expressed as percentages, shall be compared with the threshold value of 6%[3].

– If the calculated value of $\Delta T/T$, expressed as a percentage, due to any interfering emission from satellite link A′ to satellite link A, is no greater than the threshold value, coordination is not required with respect to interference from link A′ to link A.

– If the calculated value of $\Delta T/T$, expressed as a percentage, is greater than the threshold value, coordination is required.

The comparison of $\Delta T'/T'$, with the threshold value, expressed as a percentage, shall be carried out in a similar manner.

3.2 Cases requiring independent treatment of the uplink and the downlink

a) In the case of interference into only one link, the uplink or the downlink, the value $\Delta T_e/T_e$ or $\Delta T_s/T_s$, expressed as a percentage, shall be compared with the threshold value of 6%[3].

b) In the case of interference into both the uplink and the downlink, between which there is a change of modulation on board the satellite, the values of $\Delta T_e/T_e$ and $\Delta T_s/T_s$, expressed as a percentage, shall each be compared with the threshold value of 6%[3].

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[3] Values other than 6% are used in the application of Appendix **S30** and Appendix **S30A**.

4 Consideration of narrow-band and FM-TV carriers

The method of calculation described in this Appendix may underestimate the interference from slow swept TV carriers into certain narrow-band (single channel per carrier (SCPC)) carriers.

In order to facilitate coordination between the satellite systems and to reduce the number of administrations involved in this procedure, the administrations whose SCPC assignments are either recorded in the Master International Frequency Register or are under coordination may inform an administration notifying its new assignment of the radio frequency channels used in their systems for SCPC transmission, so that the notifying administration may be able to avoid using these channels for FM-TV transmissions.

For this special case, administrations are referred to relevant ITU-R texts for guidance in facilitating subsequent coordination.

Conversely, administrations introducing new systems using SCPC transmissions may seek appropriate information from other administrations on their FM-TV transmissions.

ANNEX I

Calculation of the topocentric angular separation between two geostationary satellites

The topocentric angular separation θ_t between two geostationary satellites from a given earth station can be determined by using the equation:

$$\theta_t = \arccos\left(\frac{d_1^2 + d_2^2 - \left(84\,332 \sin\frac{\theta_g}{2}\right)^2}{2d_1 \cdot d_2}\right)$$

where d_1 and d_2 are the distances (km), from the earth station to the two satellites respectively, and evaluated as d by the method described in Annex II, and θ_g is as defined in § 2.1.

ANNEX II

Calculation of the free-space transmission loss

The free-space transmission loss L can be determined by using the following equation:

$$L = 20 (\log f + \log d) + 32.45 \qquad \text{dB}$$

where:

f: frequency (MHz);

d: distance (km).

a) The distance d between an earth station and a geostationary satellite is given by the equation:

$$d = 42\,644 \sqrt{1 - 0.2954 \cos \psi} \qquad \text{km}$$

where:

$$\cos \psi = \cos \zeta \times \cos \beta$$

where:

ζ: latitude of the earth station;

β: difference in longitude between the satellite and the earth station.

NOTE – If $\cos \psi < 0.151$, the satellite is below the horizontal plane.

b) The distance d_S between two geostationary satellites is determined as follows:

$$d_S = 84\,332 \sin \frac{\theta_g}{2} \qquad \text{km}$$

where:

θ_g: geocentric angular separation as defined in § 2.1.

ANNEX III

Radiation patterns for earth station antennae to be used when they are not published

When neither measured data nor relevant ITU-R Recommendations accepted by the administrations concerned are available then administrations should use the reference patterns as described below (dB):

a) for values of $\frac{D}{\lambda} \geq 100$ [4] (maximum gain ≥ 48 dB approximately):

$$G(\varphi) = G_{max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda}\varphi\right)^2 \qquad \text{for } 0 < \varphi < \varphi_m$$

$$G(\varphi) = G_1 \qquad \text{for } \varphi_m \leq \varphi < \varphi_r$$

$$G(\varphi) = 32 - 25 \log \varphi \qquad \text{for } \varphi_r \leq \varphi < 48°$$

$$G(\varphi) = -10 \qquad \text{for } 48° \leq \varphi \leq 180°$$

where:

D: antenna diameter
λ: wavelength
} expressed in the same unit

φ: off-axis angle of the antenna, in degrees, equal to θ_t or θ_g, as applicable

G_1: gain of the first sidelobe $= 2 + 15 \log \frac{D}{\lambda}$

$$\varphi_m = \frac{20\lambda}{D} \sqrt{G_{max} - G_1} \qquad \text{degrees}$$

$$\varphi_r = 15.85 \left(\frac{D}{\lambda}\right)^{-0.6} \qquad \text{degrees}$$

b) for values of $\frac{D}{\lambda} < 100$ [4] (maximum gain < 48 dB approximately):

$$G(\varphi) = G_{max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda}\varphi\right)^2 \qquad \text{for } 0 < \varphi < \varphi_m$$

$$G(\varphi) = G_1 \qquad \text{for } \varphi_m \leq \varphi < 100 \frac{\lambda}{D}$$

---

[4] In cases where $\frac{D}{\lambda}$ is not given, it may be estimated from the expression $20 \log \frac{D}{\lambda} \approx G_{max} - 7.7$, where G_{max} is the main lobe antenna gain (dB).

$$G(\varphi) = 52 - 10 \log \frac{D}{\lambda} - 25 \log \varphi \qquad \text{for } 100 \frac{\lambda}{D} \leq \varphi < 48°$$

$$G(\varphi) = 10 - 10 \log \frac{D}{\lambda} \qquad \text{for } 48° \leq \varphi \leq 180°$$

The above patterns may be modified as appropriate to achieve a better representation of the actual antenna pattern.

ANNEX IV

Example of an application of Appendix S8

1 General

In this example of Case I (see § 2.2.1), two identical satellite networks each with a simple frequency-changing transponder and a global coverage antenna are assumed.

All topocentric angles θ_t are assumed to be equal to 5°.

For this angular separation and for an earth station antenna with D/λ greater than 100, the reference radiation pattern ($32 - 25 \log \theta_t$) gives a gain of 14.5 dB in the direction of the satellite of the other network.

The input data are furnished in § 2 below and are expressed in decibels except for the parameters T and θ_t. In § 3 the calculations are performed in decibels.

It may be noted that since both satellites use global beams there is practically no antenna discrimination between wanted and unwanted signals at the satellite, and that this constitutes a worst case.

2 Input data

The values of the network parameters given in the table below are derived from those published in accordance with Appendix **S4**.

	Symbol*	Value	Unit
Uplink at 6 175 MHz	P_e'	–37	dB(W/Hz)
	$G_1'(\theta_t)$	14.5	dB
	$G_2(\delta_{e'})$	15.5	dB
	L_u	200	dB
Downlink at 3 950 MHz	P_s'	–57	dB(W/Hz)
	$G_3'(\eta_e)$	15.5	dB
	$G_4(\theta_t)$	14.5	dB
	L_d	196	dB
	10 log γ	–15	dB
	T	105	K
	θ_t	5	degrees

* All capital symbols, except *T*, refer to parameters given in logarithmic units.

3 Calculation of $\frac{\Delta T}{T}$

From equation (1)

$$10 \log \Delta T_s = P_e' + G_1'(\theta_t) + G_2(\delta_{e'}) + 228.6 - L_u$$
$$= -37 + 14.5 + 15.5 + 228.6 - 200 = 21.6 \text{ dBK}$$

Therefore,

$$\Delta T_s = 145 \text{ K}$$

From equation (2)

$$10 \log \Delta T_e = P_s' + G_3'(\eta_e) + G_4(\theta_t) + 228.6 - L_d$$
$$= -57 + 15.5 + 14.5 + 228.6 - 196 = 5.6 \text{ dBK}$$

Therefore,

$$\Delta T_e = 3.6 \text{ K}$$

From equation (3)

$$\begin{aligned} \Delta T &= \gamma \Delta T_s + \Delta T_e \\ &= 0.032 \times 145 + 3.6 = 8.2 \text{ K} \end{aligned}$$

Thus

$$\frac{\Delta T}{T} \times 100 = \frac{8.2 \times 100}{105} = 7.8\%$$

4 Conclusion

In the example shown, the percentage increase in equivalent satellite link noise temperature is 7.8%. Since it exceeds the threshold value of 6%, coordination between the two networks is required.

APPENDIX S9

Report of an irregularity or infringement

(See Article **S15**, Section V)

Particulars concerning the station infringing the Radio Regulations:

1 Name [1] if known (in BLOCK letters) .....

2 Call sign or other identification (in BLOCK letters) .....

3 Nationality, if known .....

4 Frequency used (kHz, MHz, GHz or THz) .....

5 Class of emission [2] .....

6 Class of station and nature of service, if known .....

7 Location [3, 4, 5] .....

Particulars concerning the station, the centralizing office or inspection service reporting the irregularity or infringement:

8 Name (in BLOCK letters) .....

9 Call sign or other identification (in BLOCK letters) .....

10 Nationality .....

11 Location [3, 4] .....

Particulars of the irregularity or infringement:

12 Name [6] of the station (in BLOCK letters) in communication with the station committing the irregularity or infringement .....

13 Call sign or other identification (in BLOCK letters) of the station in communication with the station committing the irregularity or infringement .....

14 Date and time [7] .....

15 Nature of the irregularity or infringement [8] .....

16 Extracts from ship log or other information supporting the report .....

Particulars concerning the transmitting station interfered with [9]*:*

17 Name of the station (in BLOCK letters) .....

18 Call sign or other identification (in BLOCK letters) .....

19 Frequency assigned (kHz, MHz, GHz or THz) .....

20 Frequency measured at the time of the interference .....

21 Class of emission [2] and bandwidth (indicate whether measured or estimated, or indicate the necessary bandwidth notified to the Radiocommunication Bureau) .....

22 Receiving location [3, 4] (in BLOCK letters) where the interference was experienced .....

23 Certificate:

I certify that the foregoing report represents, to the best of my knowledge, a complete and accurate account of what took place. .....

Signatures [10] ..... Date: .....

....

Instructions for filling in this form

[1] Each report shall refer to only one station (see Note 6). If it is forwarded as a letter, it shall be in duplicate, and whenever practicable should be typewritten. It may also be forwarded as a telegram.

[2] The class of emission shall contain the basic characteristics listed in Appendix **S1**. If any characteristic cannot be determined, indicate the unknown symbol with a dash. However, if a station is not able to identify unambiguously whether the modulation is frequency or phase modulation, indicate frequency modulation (F).

[3] In the case of land, fixed, or earth stations, the position shall be expressed in latitude and longitude (Greenwich). If the position cannot be furnished, the area of operation should be indicated.

[4] In the case of ship or aircraft stations, the position shall be expressed either in latitude and longitude (Greenwich) or by a true bearing in degrees and distance in nautical miles, or in kilometres, from some well known place. If the position cannot be furnished, the area of operation should be indicated.

[5] Where space stations are concerned, information shall be furnished on the orbit.

[6] If both communicating stations infringe the Regulations, a separate report shall be made for each of these stations.

[7] The time must be expressed as Coordinated Universal Time (UTC) by a group of four figures (0000 to 2359). If the infringement is prolonged or repeated, the dates and times shall be shown.

[8] A separate report is required for each irregularity or infringement, unless they are repeated within a short time.

[9] This information is to be given only in case of a complaint about interference.

[10] This report shall be signed by the operator who has reported the infringement and countersigned by the Master of the ship or person responsible for the aircraft, or the officer in charge of the station in the case of an infringement reported by a station of the mobile service. When the report originates from a centralizing office or from an inspection service, it shall be signed by the head of that office or service and countersigned by an official of the administration sending it.

For the use of the administration only

1 Company controlling the installation of the station against which complaint is made .....

2 Name of the operator of the station held responsible for the irregularity or infringement of the Regulations .....

3 Action taken .....

APPENDIX S10

Report of harmful interference

(See Article **S15**, Section VI)

Particulars concerning the station causing the interference:

a Name, call sign or other means of identification .....

b Frequency measured .....

Date: .....

Time (UTC): .....

c Class of emission [1] .....

d Bandwidth (indicate whether measured or estimated) .....

e Measured field strength or power flux-density[2] .....

Date: .....

Time (UTC): .....

f Observed polarization .....

g Class of station and nature of service .....

h Location/position/area/bearing (QTE) .....

i Location of the facility which made the above measurements .....

Particulars concerning the transmitting station interfered with:

j Name, call sign or other means of identification .....

k Frequency assigned .....

---

[1] The class of emission shall contain the basic characteristics listed in Appendix **S1**. If any characteristic cannot be determined, indicate the unknown symbol with a dash. However, if a station is not able to identify unambiguously whether the modulation is frequency or phase modulation, indicate frequency modulation (F).

[2] When measurements are not available, signal strengths according to the QSA scale should be provided.

l Frequency measured .....

Date: .....

Time (UTC): .....

m Class of emission[3] .....

n Bandwidth (indicate whether measured or estimated, or indicate the necessary bandwidth notified to the Radiocommunication Bureau) .....

o Location/position/area .....

p Location of the facility which made the above measurements .....

Particulars furnished by the receiving station experiencing the interference:

q Name of station .....

r Location/position/area .....

s Dates and times (UTC) of occurrence of harmful interference .....

t Bearings (QTE) or other particulars .....

u Nature of interference .....

v Field strength or power flux-density of the wanted emission at the receiving station experiencing the interference[4] .....

Date: .....

Time (UTC): .....

w Polarization of the receiving antenna or observed polarization .....

x Action requested .....

NOTE – For convenience and brevity, telegraphic reports shall be in the format above, using the letters in the order listed in lieu of the explanatory titles, but only those letters for which information is provided should be used. However, sufficient information shall be provided to the administration receiving the report, so that an appropriate investigation can be conducted.

---

[3] See footnote 1.

[4] See footnote 2.

APPENDIX S11

Double-sideband (DSB) and single-sideband (SSB) system specifications in the HF broadcasting service

Double-sideband (DSB) system

1 System parameters

1.1 Channel spacing

The nominal spacing for DSB shall be 10 kHz. However, the interleaved channels with a separation of 5 kHz may be used in accordance with the relative protection criteria, provided that the interleaved emission is not to the same geographical area as either of the emissions between which it is interleaved.

2 Emission characteristics

2.1 Nominal carrier frequencies

Nominal carrier frequencies shall be integral multiples of 5 kHz.

2.2 Audio-frequency band

The upper limit of the audio-frequency band (at −3 dB) of the transmitter shall not exceed 4.5 kHz and the lower limit shall be 150 Hz, with lower frequencies attenuated at a slope of 6 dB per octave.

2.3 Modulation processing

If audio-frequency signal processing is used, the dynamic range of the modulating signal shall be not less than 20 dB.

2.4 Necessary bandwidth

The necessary bandwidth shall not exceed 9 kHz.

PART B – Single-sideband (SSB) system

1 System parameters

1.1 Channel spacing

During the transition period (see Resolution **517 (Rev.WRC-97)**), the channel spacing shall be 10 kHz. In the interest of spectrum conservation, during the transition period, it is also permissible to interleave SSB emissions midway between two adjacent DSB channels, i.e., with 5 kHz separation between carrier frequencies, provided that the interleaved emission is not to the same geographical area as either of the emissions between which it is interleaved.

After the end of the transition period the channel spacing and carrier frequency separation shall be 5 kHz.

1.2 Equivalent sideband power

When the carrier reduction relative to peak envelope power is 6 dB, an equivalent SSB emission is one giving the same audio-frequency signal-to-noise ratio at the receiver output as the corresponding DSB emission, when it is received by a DSB receiver with envelope detection. This is achieved when the sideband power of the SSB emission is 3 dB larger than the total sideband power of the DSB emission. (The peak envelope power of the equivalent SSB emission and the carrier power are the same as that of the DSB emission.)

2 Emission characteristics

2.1 Nominal carrier frequencies

Nominal carrier frequencies shall be integral multiples of 5 kHz.

2.2 Frequency tolerance

The frequency tolerance shall be 10 Hz.[1]

2.3 Audio-frequency band

The upper limit of the audio-frequency band (at −3 dB) of the transmitter shall not exceed 4.5 kHz with a further slope of attenuation of 35 dB/kHz and the lower limit shall be 150 Hz with lower frequencies attenuated at a slope of 6 dB per octave.

---

[1] See Note 21 of Appendix **S2**.

2.4 Modulation processing

If audio-frequency signal processing is used, the dynamic range of the modulating signal shall be not less than 20 dB.

2.5 Necessary bandwidth

The necessary bandwidth shall not exceed 4.5 kHz.

2.6 Carrier reduction (relative to peak envelope power)

During the transition period the carrier reduction shall be 6 dB to allow SSB emissions to be received by conventional DSB receivers with envelope detection without significant deterioration of the reception quality.

At the end of the transition period, the carrier reduction shall be 12 dB.

2.7 Sideband to be emitted

Only the upper sideband shall be used.

2.8 Attenuation of the unwanted sideband

The attenuation of the unwanted sideband (lower sideband) and of intermodulation products in that part of the emission spectrum shall be at least 35 dB relative to the wanted sideband signal level. However, since there is in practice a large difference between signal amplitudes in adjacent channels, a greater attenuation is recommended.

3 Characteristics of the reference receiver

The reference receiver has the main characteristics as given below. For more detailed characteristics see the relevant ITU-R Recommendations.

3.1 Noise limited sensitivity

The value of the noise limited sensitivity is equal to or less than 40 dB(μV/m).

3.2 Demodulator and carrier acquisition

The reference receiver is equipped with a synchronous demodulator, using for the carrier acquisition a device which regenerates a carrier by means of a suitable control loop which locks the receiver to the incoming carrier. The reference receiver should work as well with DSB

emissions as with SSB emissions having a carrier reduced to 6 or 12 dB below peak envelope power.

3.3 Overall selectivity

The reference receiver has an overall bandwidth (at –3 dB) of 4 kHz, with a slope of attenuation of 35 dB/kHz.

NOTE – Other combinations of bandwidth and slope of attenuation are possible, as given below, and will provide the same performance at 5 kHz carrier difference.

Slope of attenuation	**Overall bandwidth (–3 dB)**
25 dB/kHz	3 300 Hz
15 dB/kHz	2 700 Hz

APPENDIX S12

Special rules applicable to radiobeacons

(see Article **S28**)

Section I – Aeronautical radiobeacons

1) The assignment of frequencies to aeronautical radiobeacons operating in the bands between 160 kHz and 535 kHz shall be based on a protection ratio against interference of at least 15 dB for each beacon throughout its service area.

2) The radiated power should be kept to the minimum value necessary to give the desired field strength at the service range.

3) The daylight service range of radiobeacons referred to in § 1) above shall be based on the following field strengths:

4) *Regions 1 and 2*

– 70 μV/m for radiobeacons north of 30° N;

– 120 μV/m for radiobeacons between 30° N and 30° S;

– 70 μV/m for radiobeacons south of 30° S.

5) *Region 3*

– 70 μV/m for radiobeacons north of 40° N;

– 120 μV/m for radiobeacons between 40° N and 50° S;

– 70 μV/m for radiobeacons south of 50° S.

Section II – Maritime Radiobeacons

1) The protection ratio required for assignment of frequencies to maritime radiobeacons operating in the bands between 283.5 kHz and 335 kHz shall be based on the effective radiated power being kept to the minimum value necessary to give the desired field strength at the service range and the need to provide adequate geographical separation between radiobeacons operating on the same frequency and at the same time, to avoid harmful interference.

2) The daylight service range of the radiobeacons referred to in § 1) above shall be based on the following field strengths:

3) *Region 1*

– 50 μV/m for radiobeacons north of 43° N;

– 75 μV/m for radiobeacons between 43° N and 30° N;

– 100 μV/m for radiobeacons between 30° N and 30° S;

– 75 μV/m for radiobeacons between 30° S and 43° S;

– 50 μV/m for radiobeacons south of 43° S.

4) *Region 2*

– 50 μV/m for radiobeacons north of 40° N;

– 75 μV/m for radiobeacons between 40° N and 31° N;

– 100 μV/m for radiobeacons between 31° N and 30° S;

– 75 μV/m for radiobeacons between 30° S and 43° S;

– 50 μV/m for radiobeacons south of 43° S.

5) *Region 3*

– 75 μV/m for radiobeacons north of 40° N;

– 100 μV/m for radiobeacons between 40° N and 50° S;

– 75 μV/m for radiobeacons south of 50° S.

6) The carrier frequencies of maritime radiobeacons and the separation between channels shall be based on the use of integer multiples of 100 Hz. The separation between adjacent carrier frequencies should be based on relevant ITU-R Recommendations.

APPENDIX S13*

Distress and safety communications (non-GMDSS)

(see Article **S30**)

Part A1 – General provisions

§ 1 The provisions specified in this Appendix are obligatory (see Resolution **331 (Rev.WRC-97)**) in the maritime mobile service for stations using the frequencies and techniques prescribed in this Appendix and for communications between those stations and aircraft stations. However, stations of the maritime mobile service, when additionally fitted with any of the equipment used by stations operating in conformity with the provisions specified in Chapter **SVII** shall, when using that equipment, comply with the appropriate provisions of that Chapter. The provisions of this Appendix are also applicable to the aeronautical mobile service except in the case of special arrangements between the governments concerned.

§ 2 The procedure specified in this Chapter is obligatory in the maritime mobile-satellite service and for communications between stations on board aircraft and stations of the maritime mobile-satellite service, where this service or stations of this service are specifically mentioned. Paragraphs 1, 3 3), 6 of Part A3, and paragraphs 3 1), 3 4) and 14 1) of Part A4 are also applicable.

§ 3 1) No provision of these Regulations prevents the use by a mobile station or mobile earth station in distress of any means at its disposal to attract attention, make known its position, and obtain help.

2) No provision of these Regulations prevents the use by stations on board aircraft or ships engaged in search and rescue operations, in exceptional circumstances, of any means at their disposal to assist a mobile station or mobile earth station in distress.

3) No provision of these Regulations prevents the use by a land station or coast earth station, in exceptional circumstances, of any means at its disposal to assist a mobile station or mobile earth station in distress (see also No. **S4.16**).

---

* For the purposes of this Appendix, distress and safety communications include distress, urgency and safety calls and messages.

§ 3A Ship earth stations located at Rescue Coordination Centres[1] may be authorized by an administration to communicate for distress and safety purposes with any other station using bands allocated to the maritime mobile-satellite service, when special circumstances make it essential, notwithstanding the methods of working provided for in these Regulations.

§ 4 In cases of distress, urgency or safety, transmissions:

a) by telegraphy, when using Morse, shall not in general exceed a speed of sixteen words a minute;

b) by radiotelephony, shall be made slowly and distinctly, each word being clearly pronounced to facilitate transcription.

§ 4A Distress, urgency and safety transmissions may also be made, taking into account § 10, using digital selective calling and satellite techniques and/or direct-printing telegraphy, in accordance with relevant ITU-R Recommendations.

§ 5 The abbreviations and signals of ITU-R Recommendation M.1172 and the Phonetic Alphabet and Figure Code in Appendix **S14** should be used where applicable[2].

§ 6 1) The International Convention for the Safety of Life at Sea prescribes which ships and which of their survival craft shall be fitted with radio equipment and which ships shall carry portable radio equipment for use in survival craft. It also prescribes the requirements which shall be complied with by such installations.

2) The Annexes to the Convention on International Civil Aviation state which aircraft should be fitted with radio equipment and which aircraft should carry portable survival radio equipment. They state also the requirements which should be complied with by such installations.

§ 7 The applicable provisions of the present Regulations shall, however, be observed in the use of all such installations.

§ 8 Mobile stations[3] of the maritime mobile service may communicate, for safety purposes, with stations of the aeronautical mobile service. Such communications shall normally be made on the frequencies authorized, and under the conditions specified, in Section I of Part A2 (see also § 3 1)).

---

[1] The term “Rescue Coordination Centre” as defined in the International Convention on Maritime Search and Rescue, 1979, refers to a unit responsible for promoting the efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

[2] The use of the Standard Marine Communication Phrases and, where language difficulties exist, the International Code of Signals, both published by the International Maritime Organization, is also recommended.

[3] Mobile stations communicating with the stations of the aeronautical mobile (R) service in bands allocated to the aeronautical mobile (R) service shall conform to the provisions of the Regulations which relate to that service and, as appropriate, any special arrangements between the governments concerned by which the aeronautical mobile (R) service is regulated.

§ 8A Mobile stations of the aeronautical mobile service may communicate, for distress and safety purposes, with stations of the maritime mobile service in conformity with the provisions of this Appendix.

§ 9 Any aircraft required by national or international regulations to communicate for distress, urgency or safety purposes with stations of the maritime mobile service shall be capable:

a) until the full implementation of the Global Maritime Distress and Safety System (GMDSS), of transmitting preferably class A2A or H2A and receiving preferably class A2A and H2A emissions on the carrier frequency 500 kHz or, on the carrier frequency 2 182 kHz, transmitting class J3E or H3E and receiving class A3E, J3E and H3E emissions[4] or, on the carrier frequency 4 125 kHz, transmitting and receiving class J3E emissions or, on the carrier frequency 156.8 MHz, transmitting and receiving class G3E emissions (see also Resolution **331 (Rev.WRC-97)**);

b) after the full implementation of the GMDSS, of transmitting and receiving class J3E emissions when using the carrier frequency 2 182 kHz or the carrier frequency 4 125 kHz or class G3E emissions when using the frequency 156.8 MHz and, optionally, 156.3 MHz.

§ 10 All provisions of the Radio Regulations pertaining to the distress, urgency and safety communications using the techniques and frequencies described in this Appendix shall be maintained in force for all stations using these techniques and frequencies for distress, urgency and safety communications (see Resolution **331 (Rev.WRC-97)**).

Part A2 – Frequencies for distress and safety

Section I – Availability of frequencies

A – 500 kHz

§ 1 1) The frequency 500 kHz is the international distress frequency for Morse telegraphy (see also No. **S5.82**); it shall be used for this purpose by ship, aircraft and survival craft stations which employ Morse telegraphy on frequencies in the bands between 415 kHz and 535 kHz when requesting assistance from the maritime services. It shall be used for the distress call and distress traffic, for the urgency signal and urgency messages, for the safety signal and, outside regions of heavy traffic, for short safety messages. When practicable, safety messages shall be transmitted on the working frequency after a preliminary announcement on 500 kHz (see also No. **S52.38**). For distress and safety purposes, the classes of emission to be used on 500 kHz shall be A2A, A2B, H2A or H2B (see also § 20 1) and Resolution **331 (Rev.WRC-97)**).

---

[4] As an exception, the requirement to receive class A3E emissions on the carrier frequency 2 182 kHz may be made optional when permitted by national regulations.

2) However, ship and aircraft stations which cannot transmit on 500 kHz should use any other available frequency on which attention might be attracted.

B – 518 kHz

§ 1A In the maritime mobile service, the frequency 518 kHz is used exclusively for the transmission by coast stations of meteorological and navigational warnings and urgent information to ships, by means of narrow-band direct-printing telegraphy using the international NAVTEX system.

C – 2 182 kHz

§ 2 1) The carrier frequency 2 182 kHz is an international distress frequency for radiotelephony (see also Nos. **S5.108** and **S5.111**); it shall be used for this purpose by ship, aircraft and survival craft stations and by emergency position-indicating radiobeacons using frequencies in the authorized bands between 1 605 kHz and 4 000 kHz when requesting assistance from the maritime services. It is used for distress calls and distress traffic, for signals of emergency position-indicating radiobeacons, for the urgency signal and urgency messages and for the safety signal. Safety messages shall be transmitted, where practicable, on a working frequency after a preliminary announcement on 2 182 kHz. The class of emission to be used for radiotelephony on the frequency 2 182 kHz shall be J3E. The class of emission to be used by emergency position-indicating radiobeacons shall be as specified in Appendix **S19** (see also Part A5, § 3). Distress traffic on 2 182 kHz following the reception of a distress call using digital selective calling should take into account that some shipping in the vicinity may not be able to receive this traffic (see also Appendix **S15** and Resolution **331 (Rev.WRC-97)**).

2) If a distress message on the carrier frequency 2 182 kHz has not been acknowledged, the radiotelephone alarm signal, whenever possible followed by the distress call and message, may be transmitted again on a carrier frequency of 4 125 kHz or 6 215 kHz, as appropriate (see § 4 1), 6 and 24 1)).

3) However, ship and aircraft stations which can transmit neither on the carrier frequency 2 182 kHz nor, in accordance with § 2 2), on the carrier frequencies 4 125 kHz or 6 215 kHz, should use any other available frequency on which attention might be attracted.

4) Any coast station using the carrier frequency 2 182 kHz for distress purposes shall be able to transmit the radiotelephone alarm signal described in Part A5, § 6 1) (see also Part A5, § 8 1) *a), b)* and *c)*).

5) Any coast station authorized to send navigational warnings should be able to transmit the navigational warning signal described in Part A5, § 12 1), 2) and 3).

D – 3 023 kHz

§ 3 The aeronautical carrier (reference) frequency 3 023 kHz may be used for intercommunication between mobile stations when they are engaged in coordinated search and

rescue operations, and for communication between these stations and participating land stations, in accordance with the provisions of Appendix **S27** (see Nos. **S5.111** and **S5.115**).

E – 4 125 kHz

§ 4 1) The carrier frequency 4 125 kHz is used to supplement the carrier frequency 2 182 kHz for distress and safety purposes and for call and reply (see also No. **S5.130**). This frequency is also used for distress and safety traffic by radiotelephony (see also Appendix **S15** and Resolution **331 (Rev.WRC-97)**).

2) The carrier frequency 4 125 kHz may be used by aircraft stations to communicate with stations of the maritime mobile service for distress and safety purposes, including search and rescue (see Part A1 § 9, 9 *a)* and 9 *b)*).

F – 5 680 kHz

§ 5 The aeronautical carrier (reference) frequency 5 680 kHz may be used for intercommunication between mobile stations when they are engaged in coordinated search and rescue operations, and for communication between these stations and participating land stations, in accordance with the provisions of Appendix **S27** (see also Nos. **S5.111** and **S5.115**).

G – 6 215 kHz

§ 6 The carrier frequency 6 215 kHz is used to supplement the carrier frequency 2 182 kHz for distress and safety purposes and for call and reply (see also No. **S5.130**). This frequency is also used for distress and safety traffic by radiotelephony (see also Appendix **S15** and Resolution **331 (Rev.WRC-97)**).

H – 8 364 kHz

§ 7 The frequency 8 364 kHz is designated for use by survival craft stations if they are equipped to transmit on frequencies in the bands between 4 000 kHz and 27 500 kHz and if they wish to establish communications relating to search and rescue operations with stations of the maritime and aeronautical mobile services (see also No. **S5.111** and Resolution **331 (Rev.WRC-97)**).

I – 121.5 MHz and 123.1 MHz

§ 8 1A) The aeronautical emergency frequency 121.5 MHz[5] is used for the purposes of distress and urgency for radiotelephony by stations of the aeronautical mobile service using

[5] Normally aircraft stations transmit distress and urgency messages on the working frequency in use at the time of the distress or urgency incident.

frequencies in the band between 117.975 MHz and 136 MHz (137 MHz after 1 January 1990). This frequency may also be used for these purposes in survival craft stations and emergency position-indicating radiobeacons.

1B) The aeronautical auxiliary frequency 123.1 MHz, which is auxiliary to the aeronautical emergency frequency 121.5 MHz, is for use by stations of the aeronautical mobile service and by other mobile and land stations engaged in coordinated search and rescue operations (see also No. **S5.200**).

2) Mobile stations of the maritime mobile service may communicate with stations of the aeronautical mobile service on the aeronautical emergency frequency 121.5 MHz for the purposes of distress and urgency only, and on the aeronautical auxiliary frequency 123.1 MHz for coordinated search and rescue operations, using class A3E emissions for both frequencies (see also Nos. **S5.111** and **S5.200**). They shall then comply with any special arrangements between the governments concerned by which the aeronautical mobile service is regulated.

J – 156.3 MHz

§ 9 The frequency 156.3 MHz may be used for communication between ship stations and aircraft stations, using G3E emission, engaged in coordinated search and rescue operations. It may also be used by aircraft stations to communicate with ship stations for other safety purposes (see also note *f)* of Appendix **S18**).

K – 156.650 MHz

§ 9B The frequency 156.650 MHz is used for ship-to-ship communications relating to the safety of navigation in accordance with note *k)* of Appendix **S18**.

L – 156.8 MHz

§ 10 1) The frequency 156.8 MHz is the international distress, safety and calling frequency for radiotelephony for stations of the maritime mobile service when they use frequencies in the authorized bands between 156 MHz and 174 MHz (see also Nos. **S5.111** and **S5.226**). It is used for the distress signal, the distress call and distress traffic, as well as for the urgency signal, urgency traffic and the safety signal (see also § 10 3)). Safety messages shall be transmitted where practicable on a working frequency after a preliminary announcement on 156.8 MHz (see Appendix **S15**, ITU-R Recommendation M.489-2 and also Resolution **331 (Rev.WRC-97)**).

2) However, ship stations which cannot transmit on 156.8 MHz should use any other available frequency on which attention might be attracted.

3) The frequency 156.8 MHz may be used by aircraft stations for safety purposes only.

M – 243 MHz
(See Nos. **S5.111** and **S5.256**)

N – 406-406.1 MHz band

§ 10B The frequency band 406-406.1 MHz is used exclusively by satellite emergency position-indicating radiobeacons in the Earth-to-space direction (see No. **S5.266**).

O – 1 544-1 545 MHz band

§ 10C Use of the band 1 544-1 545 MHz (space-to-Earth) is limited to distress and safety operations (see No. **S5.356**); including:

a) feeder links of satellites needed to relay the emissions of satellite emergency position-indicating radiobeacons to earth stations;

b) narrow-band (space-to-Earth) links from space stations to mobile stations.

P – 1 645.5-1 646.5 MHz band

§ 10D Use of the band 1 645.5-1 646.5 MHz (Earth-to-space) is limited to distress and safety operations (see No. **S5.375**); including:

a) transmissions from satellite EPIRBs;

b) relay of distress alerts received by satellites in low polar earth orbits to geostationary satellites.

Q – Aircraft in distress

§ 11 Any aircraft in distress shall transmit the distress call on the frequency on which watch is kept by the land or mobile stations capable of helping it. When the call is intended for stations in the maritime mobile service, the provisions of § 1 1) and 1 2) or 2 1) and 2 3) or 10 1) and 10 2) shall be complied with.

R – Survival craft stations

§ 12 Equipment provided for use in survival craft stations shall, if capable of operating on any frequency:

a) *in the authorized bands between 415 kHz and 526.5 kHz*, be able to transmit with a carrier frequency of 500 kHz using either class A2A and A2B* or H2A and H2B* emissions. If a receiver is provided for any of these bands, it shall be able to receive class A2A and H2A emissions on a carrier frequency of 500 kHz;

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* This is to cater for the automatic reception of the radiotelegraph alarm signal.

b) *in the bands between 1 605 kHz and 2 850 kHz,* be able to transmit with a carrier frequency of 2 182 kHz using class A3E or H3E emissions. If a receiver is provided for any of these bands, it shall be able to receive class A3E and H3E emissions on a carrier frequency of 2 182 kHz;

c) *in the bands between 4 000 kHz and 27 500 kHz,* be able to transmit with a carrier frequency of 8 364 kHz using class A2A or H2A emissions. If a receiver is provided for any of these bands, it shall be able to receive class A1A, A2A and H2A emissions throughout the band 8 341.75 -8 728.5 kHz;

d) *in the bands between 117.975 MHz and 136 MHz* (137 MHz after 1 January 1990), be able to transmit on 121.5 MHz, using amplitude modulated emissions. If a receiver is provided for any of these bands, it shall be able to receive class A3E emissions on 121.5 MHz;

e) *in the bands between 156 MHz and 174 MHz*, be able to transmit on 156.8 MHz using class G3E emissions. If a receiver is provided for any of these bands it shall be able to receive class G3E emissions on 156.8 MHz;

f) *in the bands between 235 MHz and 328.6 MHz*, be able to transmit on the frequency 243 MHz

Section II – Protection of Distress and Safety Frequencies

A – General

§ 13 Except as provided for in these Regulations, any emission capable of causing harmful interference to distress, alarm, urgency or safety communications on the frequencies 500 kHz, 2 174.5 kHz, 2 182 kHz, 2 187.5 kHz, 4 125 kHz, 4 177.5 kHz, 4 207.5 kHz, 6 215 kHz, 6 268 kHz, 6 312 kHz, 8 291 kHz, 8 376.5 kHz, 8 414.5 kHz, 12 290 kHz, 12 520 kHz, 12 577 kHz, 16 420 kHz, 16 695 kHz, 16 804.5 kHz, 121.5 MHz, 156.525 MHz, 156.8 MHz or in the frequency bands 406-406.1 MHz, 1 544-1 545 MHz and 1 645.5-1 646.5 MHz (see also Appendix **S15**) is prohibited. Any emission causing harmful interference to distress and safety communications on any of the other discrete frequencies identified in Part A2, Section I of this Appendix and in Appendix **S15** is prohibited.

§ 14 1) Test transmissions shall be kept to a minimum on the frequencies identified in Section I of this Part and should, wherever practicable, be carried out on artificial antennas or with reduced power.

2) It is not permitted to transmit complete alarm signals for testing purposes on any frequency except for essential tests coordinated with the competent authorities. As an exception, such tests are permitted for radiotelephone equipment which can operate only on either of the international distress frequencies 2 182 kHz and 156.8 MHz, in which case a suitable artificial antenna shall be employed.

§ 14A 1) Before transmitting on any of the frequencies identified in Section I of this Part for distress and safety, a station shall listen on the frequency concerned to make sure that no distress transmission is being sent (see ITU-R Recommendation M.1171).

2) The provisions of § 14A 1) do not apply to stations in distress.

B – 500 kHz

§ 15 1) Apart from the transmissions authorized on 500 kHz, and taking account of No. **S52.28**, all transmissions on the frequencies included between 495 kHz and 505 kHz are forbidden. Until 1 February 1999, this applies to frequencies between 490 kHz and 510 kHz.

2) In order to facilitate the reception of distress calls, other transmissions on the frequency 500 kHz shall be reduced to a minimum, and in any case shall not exceed one minute.

C – 2 182 kHz

§ 16 1) Except for transmissions authorized on the carrier frequency 2 182 kHz and on the frequencies 2 174.5 kHz, 2 177 kHz, 2 187.5 kHz and 2 189.5 kHz, all transmissions on the frequencies between 2 173.5 kHz and 2 190.5 kHz are forbidden (see also Appendix **S15**).

2) To facilitate the reception of distress calls, all transmissions on 2 182 kHz shall be kept to a minimum.

3) At sea it is not permitted to radiate test transmissions of the radiotelephone alarm signal on the carrier frequency 2 182 kHz. The function of the generator of the radiotelephone alarm signal shall be checked by aural monitoring without operating a transmitter. The transmitter shall be checked independently. During tests of the radio installation carried out by an administration or on behalf of an administration the radiotelephone alarm signal device should be checked with a suitable artificial antenna on frequencies other than 2 182 kHz. If the installation is capable of operating only on the frequency 2 182 kHz a suitable artificial antenna should be employed (see § 14 2)).

4) Before and after the tests performed using an artificial antenna in accordance with § 16 3), a suitable announcement should be made on the test frequency that the signals are or were for testing purposes only. The identification of the station should be included in the announcement.

D – 121.5 MHz, 123.1 MHz and 243 MHz

§ 17A On the frequencies 121.5 MHz, 123.1 MHz and 243 MHz transmissions other than those authorized are forbidden (see Nos. **S5.111**, **S5.200** and **S5.256** and § 8 1A) and 8 1B)).

§ 17B In order to avoid unjustified alerts in automatic emergency systems, transmissions of non-operational test signals on the emergency frequencies 121.5 MHz and 243 MHz should be coordinated with the competent authorities and carried out only during the first five minutes of each hour, with each test transmission lasting no longer than ten seconds (see also § 14 1)).

E – 156.7625-156.8375 MHz Band

§ 18 1) All emissions in the band 156.7625-156.8375 MHz capable of causing harmful interference to the authorized transmissions of stations of the maritime mobile service on 156.8 MHz are forbidden.

2) To facilitate the reception of distress calls all transmissions on 156.8 MHz shall be kept to a minimum and shall not exceed one minute.

Section III – Watch on distress frequencies

A – 500 kHz

§ 19 1) In order to increase the safety of life at sea and over the sea, all stations of the maritime mobile service normally keeping watch on frequencies in the authorized bands between 415 kHz and 526.5 kHz which employ Morse telegraphy shall, during their hours of service, take the necessary measures to ensure watch on the international distress frequency 500 kHz for three minutes twice an hour beginning at x h 15 and x h 45, Coordinated Universal Time (UTC), by an operator using headphones or loudspeaker (see also Resolution **331 (Rev.WRC-97)**).

1A) § 19 1) does not apply to a coast station open to public correspondence when its operational area for distress purposes is covered by one or more coast stations keeping watch on 500 kHz in accordance with an agreement between the administrations concerned. These administrations shall inform the Secretary-General of the details of such agreements for publication in the List of Coast Stations (see Article **S20**).

2) During the periods mentioned above, except for the emissions provided for in this Appendix on the frequency 500 kHz:

a) transmissions shall cease in the band between 490 kHz and 510 kHz. From 1 February 1999, this band is reduced to the band between 495 kHz and 505 kHz;

b) outside these bands, transmissions of stations of the mobile service may continue; stations of the maritime mobile service may listen to these transmissions on the express condition that they first ensure watch on the distress frequency as required by § 19 1) (see also Resolution **331 (Rev.WRC-97)**).

§ 20 1) Stations of the maritime mobile service open to Morse telegraphy public correspondence and using frequencies in the authorized bands between 415 kHz and 526.5 kHz shall, during their hours of service, remain on watch on 500 kHz except in the situation referred to in § 19 1A). This watch is obligatory only for class A2A and H2A emissions (see also Resolution **331 (Rev.WRC-97)**).

2) These stations, while observing the provisions of § 19 1), are authorized to relinquish this watch only when they are engaged in communications on other frequencies.

3) When they are engaged in such communications:

a) ship stations may maintain this watch on 500 kHz by means of an operator using headphones or a loudspeaker or by some appropriate means such as an automatic alarm receiver;

b) coast stations may maintain this watch on 500 kHz by means of an operator using headphones or a loudspeaker; in the latter case an indication may be inserted in the List of Coast Stations.

4) Ship stations, while observing the provisions of § 19 1) are also authorized to relinquish this watch[6] when it is impractical to listen by split headphones or by loudspeaker, and by order of the master in order to repair or carry out maintenance required to prevent imminent malfunction of:

a) equipment for radiocommunication used for safety;

b) radionavigational equipment;

c) other electronic navigational equipment.

5) Ship stations fitted with an automatic alarm receiver should ensure the equipment is in operation whenever watch is relinquished under the terms of § 20 4).

§ 20A The provisions of § 19 to 20 remain mandatory until 1 February 1999.

B – 2 182 kHz

§ 21 1) Coast stations which are open to public correspondence and which form an essential part of the coverage of the area for distress purposes using the techniques and frequencies described in this Appendix on 2 182 kHz should, during their hours of service, maintain a watch on 2 182 kHz (see also Resolution **331 (Rev.WRC-97)**). Such watch should be indicated in the List of Coast Stations.

2) These stations should maintain this watch by means of an operator using some aural method, such as headphones, split headphones or loudspeaker.

3) In addition, ship stations should keep the maximum watch practicable on the carrier frequency 2 182 kHz for receiving by any appropriate means the radiotelephone alarm signal described in Part A5, § 6 1), and the navigational warning signal described in Part A5, § 12 1), 2) and 3), as well as distress, urgency and safety signals. (See also Resolution **331 (Rev.WRC-97)**.)

§ 22 Ship stations open to public correspondence should, as far as possible during their hours of service, keep watch on 2 182 kHz (see also Resolution **331 (Rev.WRC-97)**).

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[6] For additional information see the relevant provisions of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (see also Resolution **331 (Rev.WRC-97)**).

§ 23 In order to increase the safety of life at sea and over the sea, all stations of the maritime mobile service normally keeping watch on frequencies in the authorized bands between 1605 kHz and 2850 kHz using the techniques described in this Appendix for distress purposes should, during their hours of service, and as far as possible, take steps to keep watch on the international distress carrier frequency 2182 kHz for three minutes twice each hour beginning at x h 00 and x h 30, Coordinated Universal Time (UTC) (see also Resolution **331 (Rev.WRC-97)**). Such watch, in the case of coast stations, should be indicated in the List of Coast Stations.

§ 23A During the periods referred to in § 23 all transmissions in the band 2173.5-2190.5 kHz shall cease, except those on 2177 kHz and 2189.5 kHz and those provided for in this Appendix and in Chapter **SVII**.

§ 23B The provisions of § 21 to 23A remain mandatory until 1 February 1999.

C – 4125 kHz, 6215 kHz, 8291 kHz, 12290 kHz and 16420 kHz

§ 24 1) All coast stations which are open to public correspondence and which form an essential part of the coverage of the area for distress purposes may, during their hours of service, maintain a watch on the carrier frequencies 4125 kHz, 6215 kHz, 8291 kHz, 12290 kHz and 16420 kHz (see § 4 1) and 6 above, as well as Table S15-1 of Appendix **S15**). Such watch should be indicated in the List of Coast Stations.

2) These stations should maintain this watch by means of an operator using some aural method, such as headphones, split headphones or loudspeaker.

D – 156.8 MHz

§ 25 1) A coast station providing an international maritime mobile radiotelephone service in the band 156-174 MHz and which forms an essential part of the coverage of the area for distress purposes using the techniques and frequencies described in this Appendix should, during its working hours in that band, maintain an efficient aural watch on 156.8 MHz (see also Resolution **331 (Rev.WRC-97)**). Such watch should be indicated in the List of Coast Stations.

2) Ship stations should, where practicable, maintain watch on 156.8 MHz when within the service area of a coast station providing international maritime mobile radiotelephone service in the band 156-174 MHz, using the techniques and frequencies described in this Appendix. Ship stations fitted only with radiotelephone equipment operating in the authorized bands between 156 MHz and 174 MHz should maintain watch on 156.8 MHz when at sea (see also Resolution **331 (Rev.WRC-97)**).

3) Ship stations, when in communication with a port station, using the techniques and frequencies described in this Appendix, may on an exceptional basis and subject to the agreement of the administration concerned, continue to maintain watch, on the appropriate

port operations frequency only, provided that watch on 156.8 MHz is being maintained by the port station (see also Resolution **331 (Rev.WRC-97)**). Such watch by port stations should be indicated in the List of Coast Stations.

4) Ship stations, when in communication with a coast station in the ship movement service using the techniques and frequencies described in this Appendix, and subject to the agreement of the administrations concerned, may continue to maintain watch on the appropriate ship movement service frequency only, provided the watch on 156.8 MHz is being maintained by the coast station (see also Resolution **331 (Rev.WRC-97)**). Such watch by coast stations in the ship movement service should be indicated in the List of Coast Stations.

Part A3 – Distress communications

Section I – General

§ 1 The distress call shall have absolute priority over all other transmissions. All stations which hear it shall immediately cease any transmission capable of interfering with the distress traffic and shall continue to listen on the frequency used for the emission of the distress call. This call shall not be addressed to a particular station and acknowledgement of receipt shall not be given before the distress message which follows it is sent.

§ 2 The distress call and message shall be sent only on the authority of the master or person responsible for the ship, aircraft or other vehicle carrying the mobile station or ship earth station.

Section II – Distress signal

§ 3 1) The Morse radiotelegraph distress signal consists of the group · · · — — — · · ·, symbolized herein by $\overline{\text{SOS}}$, transmitted as a single signal in which the dashes are emphasized so as to be distinguished clearly from the dots.

2) The radiotelephone distress signal consists of the word MAYDAY pronounced as the French expression “m'aider”.

3) These distress signals indicate that a ship, aircraft or other vehicle is threatened by grave and imminent danger and requests immediate assistance (see also Part A5, § 8 1) *c)*).

Section III – Distress call

§ 4 1) The distress call sent by Morse radiotelegraphy consists of:

– the distress signal $\overline{\text{SOS}}$, sent three times;

– the word DE;

– the call sign of the mobile station in distress, sent three times.

2) The distress call sent by radiotelephony consists of:

– the distress signal MAYDAY, spoken three times;

– the words THIS IS (or DE spoken as DELTA ECHO in case of language difficulties);

– the call sign or other identification of the mobile station in distress, spoken three times.

Section IV – Distress messages

§ 5 1) The Morse radiotelegraph distress message consists of:

– the distress signal $\overline{\text{SOS}}$;

– the name, or other identification, of the mobile station in distress;

– particulars of its position;

– the nature of the distress and the kind of assistance desired;

– any other information which might facilitate the rescue.

2) The radiotelephone distress message consists of:

– the distress signal MAYDAY;

– the name, or other identification, of the mobile station in distress;

– particulars of its position;

– the nature of the distress and the kind of assistance desired;

– any other information which might facilitate the rescue.

§ 6 1) As a general rule, a ship shall signal its position in latitude and longitude (Greenwich), using figures for the degrees and minutes, together with one of the words NORTH or SOUTH and one of the words EAST or WEST. In Morse radiotelegraphy, the signal · — · — · — shall be used to separate the degrees from the minutes; however, this shall not necessarily apply to the maritime mobile-satellite service. When practicable, the true bearing and distance in nautical miles from a known geographical position may be given.

2) As a general rule, and if time permits, an aircraft shall transmit in its distress message the following information:

– estimated position and time of the estimate;

– heading in degrees (state whether magnetic or true);

– indicated air speed;

– altitude;

– type of aircraft;

– nature of distress and type of assistance desired;

– any other information which might facilitate the rescue (including the intention of the person in command, such as forced alighting on the sea or crash landing).

3) As a general rule, an aircraft in flight shall signal its position either in radiotelephony or Morse radiotelegraphy;

– by latitude and longitude (Greenwich) using figures for the degrees and minutes, together with one of the words NORTH or SOUTH and one of the words EAST or WEST; or

– by the name of the nearest place, and its approximate distance in relation thereto, together with one of the words NORTH, SOUTH, EAST or WEST, as the case may be, or when practicable, by words indicating intermediate directions.

4) However, in Morse radiotelegraphy, the words NORTH or SOUTH and EAST or WEST, indicated in § 6 1) and 6 3), may be replaced by the letters N or S and E or W.

Section V – Procedures

A – Morse radiotelegraphy

§ 7 1) The Morse radiotelegraph distress procedure shall consist of:

– the alarm signal; followed in order by:

– the distress call and an interval of two minutes;

– the distress call;

– the distress message;

– two dashes of ten to fifteen seconds' duration each;

– the call sign of the station in distress.

2) However, when time is vital, the second step of this procedure (§ 7 1), 2nd indent) or even the first and second steps (§ 7 1), 1st and 2nd indents), may be omitted or shortened. These two steps of the distress procedure may also be omitted in circumstances where transmission of the alarm signal is considered unnecessary.

§ 8 1) The distress message, preceded by the distress call, shall be repeated at intervals, especially during the periods of silence prescribed in Part A2, § 19 1) for Morse radiotelegraphy, until an answer is received.

2) The intervals shall, however, be sufficiently long to allow time for stations preparing to reply to start their sending apparatus.

3) The alarm signal may also be repeated, if necessary.

§ 9 The transmissions under § 7 1), 5th and 6th indents, which are to permit direction-finding stations to determine the position of the station in distress, may be repeated at frequent intervals if necessary.

§ 10 When the mobile station in distress receives no answer to a distress message sent on the distress frequency, the message may be repeated on any other available frequency on which attention might be attracted.

§ 11 Immediately before a crash landing or a forced landing (on land or sea) of an aircraft, as well as before total abandonment of a ship or an aircraft, the radio apparatus should be set for continuous emission, if considered necessary and circumstances permit.

B – Radiotelephony

§ 12 The radiotelephone distress procedure shall consist of:

– the alarm signal (whenever possible) followed by:

– the distress call;

– the distress message.

§ 13 After the transmission by radiotelephony of its distress message, the mobile station may be requested to transmit suitable signals followed by its call sign or other identification, to permit direction-finding stations to determine its position. This request may be repeated at frequent intervals if necessary.

§ 14 1) The distress message, preceded by the distress call, shall be repeated at intervals, especially during the periods of silence prescribed in Part A2, § 23 for radiotelephony, until an answer is received.

2) The intervals shall, however, be sufficiently long to allow time for stations preparing to reply to start their sending apparatus.

3) This repetition shall be preceded by the alarm signal whenever possible.

§ 15 When the mobile station in distress receives no answer to a distress message sent on the distress frequency, the message may be repeated on any other available frequency on which attention might be attracted.

§ 16 Immediately before a crash landing or a forced landing (on land or sea) of an aircraft, as well as before total abandonment of a ship or an aircraft, the radio apparatus should be set for continuous emission, if considered necessary and circumstances permit.

Section VI – Acknowledgement of receipt of a distress message

§ 17 1) Stations of the mobile service which receive a distress message from a mobile station which is, beyond any possible doubt, in their vicinity, shall immediately acknowledge receipt.

2) However, in areas where reliable communications with one or more coast stations are practicable, ship stations should defer this acknowledgement for a short interval so that a coast station may acknowledge receipt.

3) Stations of the mobile service which receive a distress message from a mobile station which, beyond any possible doubt, is not in their vicinity, shall allow a short interval of time to elapse before acknowledging receipt of the message, in order to permit stations nearer to the mobile station in distress to acknowledge receipt without interference.

4) However, stations in the maritime mobile service which receive a distress message from a mobile station which, beyond any possible doubt, is a long distance away, need not acknowledge receipt of messages except as specified in § 32 *c)*.

§ 18 The acknowledgement of receipt of a distress message shall be given in the following form:

a) Morse radiotelegraphy:

– the distress signal $\overline{\text{SOS}}$;

– the call sign of the station sending the distress message, sent three times;

– the word DE;

– the call sign of the station acknowledging receipt, sent three times;

– the group RRR;

– the distress signal $\overline{\text{SOS}}$.

b) Radiotelephony:

– the distress signal MAYDAY;

– the call sign or other identification of the station sending the distress message, spoken three times;

– the words THIS IS (or DE spoken as DELTA ECHO in case of language difficulties);

– the call sign or other identification of the station acknowledging receipt, spoken three times;

– the word RECEIVED (or RRR spoken as ROMEO ROMEO ROMEO in case of language difficulties);

– the distress signal MAYDAY.

§ 19 1) Every mobile station which acknowledges receipt of a distress message shall, on the order of the master or person responsible for the ship, aircraft or other vehicle, transmit, as soon as possible, the following information in the order shown:

– its name;

– its position in the form prescribed in § 6 1), 6 3) and 6 4);

– the speed at which it is proceeding towards, and the approximate time it will take to reach, the mobile station in distress;

– additionally, if the position of the ship in distress appears doubtful, ship stations should also transmit, when available, the true bearing of the ship in distress preceded by the abbreviation QTE.

2) Before transmitting the message specified in § 19 1), the station shall ensure that it will not interfere with the emissions of other stations better situated to render immediate assistance to the station in distress.

Section VII – Distress traffic

§ 20 Distress traffic consists of all messages relating to the immediate assistance required by the mobile station in distress.

§ 21 In distress traffic, the distress signal shall be sent before the call and at the beginning of the preamble of any radiotelegram.

§ 22 The control of distress traffic is the responsibility of the mobile station in distress or of the station which, by the application of the provisions of Section VIII, has sent the distress message. These stations may, however, delegate the control of the distress traffic to another station.

§ 23 The station in distress or the station in control of distress traffic may impose silence either on all stations of the mobile service in the area or on any station which interferes with the distress traffic. It shall address these instructions “to all stations” (CQ) or to one station only, according to circumstances. In either case, it shall use:

a) in Morse radiotelegraphy, the abbreviation QRT, followed by the distress signal $\overline{\text{SOS}}$;

b) in radiotelephony, the signal SEELONCE MAYDAY, pronounced as the French expression “silence, m'aider”.

§ 24 If it is believed to be essential, any station of the mobile service near the ship, aircraft or other vehicle in distress may also impose silence. It shall use for this purpose:

a) in Morse radiotelegraphy, the abbreviation QRT, followed by the word DISTRESS and its own call sign;

b) in radiotelephony, the word SEELONCE, pronounced as the French word “silence”, followed by the word DISTRESS and its own call sign.

§ 25 1) In Morse radiotelegraphy, the use of the signal QRT $\overline{\text{SOS}}$ shall be reserved for the mobile station in distress and for the station controlling distress traffic.

2) In radiotelephony, the use of the signal SEELONCE MAYDAY shall be reserved for the mobile station in distress and for the station controlling distress traffic.

§ 26 1) Any station of the mobile service which has knowledge of distress traffic and which cannot itself assist the station in distress shall nevertheless follow such traffic until it is evident that assistance is being provided.

2) Until they receive the message indicating that normal working may be resumed (see § 30 1)), all stations which are aware of the distress traffic, and which are not taking part in it, are forbidden to transmit on the frequencies on which the distress traffic is taking place.

§ 27 A station of the mobile service which, while following distress traffic, is able to continue its normal service, may do so when the distress traffic is well established and on condition that it observes the provisions of § 26 2) and does not interfere with the distress traffic.

§ 28 In cases of exceptional importance and provided that no interference or delay is caused to the handling of distress traffic, urgency and safety messages may be announced during a lull in the distress traffic, preferably by coast stations, on the distress frequencies. This announcement shall include an indication of the working frequency on which the urgency or safety message will be transmitted. In this case, the signals provided for in Part A4, § 1 1), 1 2), 13 1) and 13 2) should only be sent once (e.g. XXX DE ABC QSW . . .).

§ 29 A land station or an earth station in the maritime mobile-satellite service at a specified fixed point receiving a distress message shall, without delay, take the necessary action to advise the appropriate authorities responsible for providing for the operation of rescue facilities.

§ 30 1) When distress traffic has ceased on a frequency which has been used for distress traffic, the station which has controlled this traffic shall transmit on that frequency a message addressed “to all stations” (CQ) indicating that normal working may be resumed.

2) When complete silence is no longer necessary on a frequency which is being used for distress traffic, the station controlling the traffic shall transmit on that frequency a message addressed “to all stations” (CQ) indicating that restricted working may be resumed.

3) *a)* In Morse radiotelegraphy, the message referred to in § 30 1) consists of:

– the distress signal $\overline{\text{SOS}}$;

– the call “to all stations” (CQ) sent three times;

– the word DE;

– the call sign of the station sending the message;

– the time of handing in of the message;

– the name and call sign of the mobile station which was in distress;

– the service abbreviation QUM.

b) In Morse radiotelegraphy, the message referred to in § 30 2) consists of:

– the distress signal $\overline{\text{SOS}}$;

– the call “to all stations” (CQ) sent three times;

– the word DE;

– the call sign of the station sending the message;

– the time of handing in of the message;

– the name and call sign of the mobile station which is in distress;

– the service abbreviation QUZ.

4) *a)* In radiotelephony, the message referred to in § 30 1) consists of:

– the distress signal MAYDAY;

– the call “Hello all stations” or CQ (spoken as CHARLIE QUEBEC) spoken three times;

– the words THIS IS (or DE spoken as DELTA ECHO in case of language difficulties);

– the call sign or other identification of the station sending the message;

– the time of handing in of the message;

– the name and call sign of the mobile station which was in distress;

– the words SEELONCE FEENEE pronounced as the French words “silence fini”.

b) In radiotelephony, the message referred to in § 30 2) consists of:

– the distress signal MAYDAY;

– the call “Hello all stations” or CQ (spoken as CHARLIE QUEBEC) spoken three times;

– the words THIS IS (or DE spoken as DELTA ECHO in case of language difficulties);

– the call sign or other identification of the station sending the message;

– the time of handing in of the message;

– the name and call sign of the mobile station which is in distress;

– the word PRU-DONCE pronounced as the French word “prudence”.

§ 31 When a station in distress has delegated control of distress working to another station, the person in charge of the station in distress should, when he considers silence no longer justified, immediately inform the controlling station, which will act in accordance with the provisions of § 30 1).

Section VIII – Transmission of a distress message by a station not itself in distress

§ 32 A mobile station or a land station which learns that a mobile station is in distress shall transmit a distress message in any of the following cases:

a) when the station in distress is not itself in a position to transmit the distress message;

b) when the master or person responsible for the ship, aircraft or other vehicle not in distress, or the person responsible for the land station, considers that further help is necessary;

c) when, although not in a position to render assistance, it has heard a distress message which has not been acknowledged.

§ 33 1) The transmission of a distress message under the conditions prescribed in § 32 *a)* to 32 *c)* shall be made on one or more of the international distress frequencies (500 kHz, 2 182 kHz, 156.8 MHz) or on any other frequency which may be used in case of distress (see Part A2, § 1 1), 1 2), 2 1), 2 3), 10 1), 10 2) and 11).

2) This transmission of the distress message shall always be preceded by the call indicated below, which shall itself be preceded whenever possible by the radiotelegraph or radiotelephone alarm signal.

3) This call consists of:

a) Morse radiotelegraphy:

– the signal $\overline{\text{DDD}}\ \overline{\text{SOS}}\ \overline{\text{SOS}}\ \overline{\text{SOS}}\ \overline{\text{DDD}}$;

– the word DE;

– the call sign of the transmitting station, sent three times.

b) Radiotelephony:

– the signal MAYDAY RELAY pronounced as the French expression “m'aider relais”, spoken three times;

– the words THIS IS (or DE spoken as DELTA ECHO in case of language difficulties);

– the call sign or other identification of the transmitting station, spoken three times.

§ 34 When the Morse radiotelegraph alarm signal is used, an interval of two minutes shall be allowed, whenever this is considered necessary, before the transmission of the call mentioned in § 33 3) *a).*

§ 35 When a station of the mobile service transmits a distress message under the conditions mentioned in § 32 *c),* it shall take all necessary steps to notify the authorities who may be able to render assistance.

§ 36 A ship station should not acknowledge receipt of a distress message transmitted by a coast station under the conditions mentioned in § 32 until the master or person responsible has confirmed that the ship station concerned is in a position to render assistance.

Part A4 – Urgency and safety transmissions, and medical transports

Section I – Urgency signal and messages

§ 1 1) In Morse radiotelegraphy, the urgency signal consists of three repetitions of the group XXX, sent with the letters of each group and the successive groups clearly separated from each other. It shall be transmitted before the call.

2) In radiotelephony, the urgency signal consists of the group of words PAN PAN, each word of the group pronounced as the French word “panne”. The urgency signal shall be repeated three times before the call.

§ 2 1) The urgency signal shall be sent only on the authority of the master or the person responsible for the ship, aircraft or other vehicle carrying the mobile station or mobile earth station in the maritime mobile-satellite service.

2) The urgency signal may be transmitted by a land station or an earth station in the maritime mobile-satellite service at specified fixed points only with the approval of the responsible authority.

§ 3 1) The urgency signal indicates that the calling station has a very urgent message to transmit concerning the safety of a ship, aircraft or other vehicle, or the safety of a person.

2) The urgency signal and message following it shall be sent on one or more of the international distress frequencies 500 kHz, 2 182 kHz, 156.8 MHz, the supplementary distress frequencies 4 125 kHz and 6 215 kHz, the aeronautical emergency frequency 121.5 MHz, the frequency 243 MHz, or on any other frequency which may be used in case of distress (see also No. **S33.9**).

3) However, in the maritime mobile service, the message shall be transmitted on a working frequency:

a) in the case of a long message or a medical call; *or*

b) in areas of heavy traffic in the case of the repetition of a message transmitted in accordance with the provisions laid down in § 3 2).

An indication to this effect shall be given at the end of the call.

4) The urgency signal shall have priority over all other communications, except distress. All stations which hear it shall take care not to interfere with the transmission of the message which follows the urgency signal.

5) In the maritime mobile service, urgency messages may be addressed either to all stations or to a particular station.

§ 4 Messages preceded by the urgency signal shall, as a general rule, be drawn up in plain language.

§ 5 1) Mobile stations which hear the urgency signal shall continue to listen for at least three minutes. At the end of this period, if no urgency message has been heard, a land station should, if possible, be notified of the receipt of the urgency signal. Thereafter, normal working may be resumed.

2) However, land and mobile stations which are in communication on frequencies other than those used for the transmission of the urgency signal and of the call which follows it may continue their normal work without interruption provided the urgency message is not addressed "to all stations" (CQ).

§ 6 When the urgency signal has been sent before transmitting a message "to all stations" (CQ) which calls for action by the stations receiving the message, the station responsible for its transmission shall cancel it as soon as it knows that action is no longer necessary. This message of cancellation shall likewise be addressed "to all stations" (CQ).

Section II – Medical transports

§ 7 The term "medical transports", as defined in the 1949 Geneva Conventions and Additional Protocols, refers to any means of transportation by land, water or air, whether military or civilian, permanent or temporary, assigned exclusively to medical transportation and under the control of a competent authority of a party to a conflict or of neutral States and of other States not parties to an armed conflict, when these ships, craft and aircraft assist the wounded, the sick and the shipwrecked.

§ 8 For the purpose of announcing and identifying medical transports which are protected under the above-mentioned Conventions, a complete transmission of the urgency signals described in § 1 1) and 1 2) shall be followed by the addition of the single group YYY in Morse radiotelegraphy and by the addition of the single word MAY-DEE-CAL, pronounced as in French "médical", in radiotelephony.

§ 9 The frequencies specified in § 3 2) may be used by medical transports for the purpose of self-identification and to establish communications. As soon as practicable, communications shall be transferred to an appropriate working frequency.

§ 10 The use of the signals described in § 8 indicates that the message which follows concerns a protected medical transport. The message shall convey the following data:

a) the call sign or other recognized means of identification of the medical transport;

b) position of the medical transport;

c) number and type of medical transports;

d) intended route;

e) estimated time en route and of departure and arrival, as appropriate;

f) any other information, such as flight altitude, radio frequencies guarded, languages used and secondary surveillance radar modes and codes.

§ 11 The provisions of Section I of this Part shall apply as appropriate to the use of the urgency signal by medical transports.

§ 11A The identification and location of medical transports at sea may be effected by means of appropriate standard maritime radar transponders (see Recommendation **14 (Mob-87)**).

§ 11B The identification and location of aircraft medical transports may be effected by the use of the secondary surveillance radar (SSR) system specified in Annex 10 to the Convention on International Civil Aviation.

§ 12 The use of radiocommunications for announcing and identifying medical transports is optional; however, if they are used, the provisions of this Appendix and particularly of this Section and of Parts A1 and A2 shall apply.

Section III – Safety signal and messages

§ 13 1) In Morse radiotelegraphy, the safety signal consists of three repetitions of the group TTT, the individual letters of each group and the successive groups being clearly separated from each other. It shall be sent before the call.

2) In radiotelephony, the safety signal consists of the word SÉCURITÉ pronounced clearly as in French. The safety signal shall be repeated three times before the call.

§ 14 1) The safety signal indicates that the station is about to transmit a message containing an important navigational or an important meteorological warning.

2) The safety signal and call shall be sent on one or more of the international distress frequencies (500 kHz, 2 182 kHz, 156.8 MHz) or on any other frequency which may be used in case of distress (see also No. **S33.32**).

3) The safety message which follows the call should be sent on a working frequency. A suitable announcement to this effect shall be made at the end of the call.

4) In the maritime mobile service, safety messages shall generally be addressed to all stations. In some cases, however, they may be addressed to a particular station.

§ 15 1) With the exception of messages transmitted at fixed times, the safety signal, when used in the maritime mobile service, shall be transmitted towards the end of the first available period of silence (see Part A2, § 19 1) for radiotelegraphy and Part A2, § 23 for radiotelephony); the message shall be transmitted immediately after the period of silence.

2) In the cases prescribed in Part A6, § 4 3), 5 1) and 7, the safety signal and the message which follows it shall be transmitted as soon as possible, and shall be repeated at the end of the first period of silence which follows.

§ 16 All stations hearing the safety signal shall listen to the safety message until they are satisfied that the message is of no concern to them. They shall not make any transmission likely to interfere with the message.

Part A5 – Alarm and warning signals

Section I – Emergency position-indicating radiobeacon and satellite emergency position-indicating radiobeacon signals

§ 1 The emergency position-indicating radiobeacon signal consists of:

a) for medium frequencies, i.e. 2 182 kHz[7]:

1) a keyed emission modulated by a tone of 1 300 Hz (± 20 Hz) having a period of emission of 1.0 to 1.2 s and a period of silence (carrier suppressed) of 1.0 to 1.2 s; *or*

2) the radiotelephone alarm signal (see § 6 1)), followed by the Morse letter B and/or the call sign of the ship to which the radiobeacon belongs transmitted by keying a carrier modulated by a tone of either 1 300 Hz or 2 200 Hz;

b) for very high frequencies, i.e. 121.5 MHz and 243 MHz, a signal whose characteristics shall be in accordance with those specified in ITU-R Recommendation M.690-1;

c) for ultra-high frequencies, i.e., in the bands 406-406.1 MHz and 1 645.5-1 646.5 MHz, signals whose characteristics shall be in accordance with the relevant ITU-R Recommendations.

§ 2 1) The essential purpose of the emergency position-indicating radiobeacon signals is to facilitate determining the position of survivors in search and rescue operations.

2) These signals shall indicate that one or more persons are in distress, may no longer be on board a ship or an aircraft, and that receiving facilities may not be available.

3) Any mobile service station receiving one of these signals, while no distress or urgent traffic is being passed, shall consider that the provisions of Part A3, § 32 and 32 *a)* are applicable.

§ 3 The keying cycles in § 1 *a)* 1) and 1 *a)* 2) may be interrupted for speech transmission if administrations so desire.

§ 4 1) Equipment designed to transmit emergency position-indicating radiobeacon signals on the carrier frequency 2 182 kHz shall meet the requirements specified in Appendix **S19**

2) Equipment designed to transmit emergency position-indicating radiobeacon signals on the frequencies 121.5 MHz and 243 MHz shall meet the requirements specified in ITU-R Recommendation M.690-1.

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[7] In Japan, there are emergency position-indicating radiobeacons which transmit the distress signal and identification on frequencies between 2 089.5 kHz and 2 092.5 kHz using class A1A emissions.

Section II – Morse radiotelegraph and radiotelephone alarm signals

§ 5 1) The Morse radiotelegraph alarm signal consists of a series of twelve dashes sent in one minute, the duration of each dash being four seconds and the duration of the interval between consecutive dashes one second. It may be transmitted by hand but its transmission by means of an automatic instrument is recommended.

2) Any ship station working in the bands between 415 kHz and 526.5 kHz which is not provided with an automatic apparatus for the transmission of the Morse radiotelegraph alarm signal shall be permanently equipped with a clock, clearly marking the seconds preferably by means of a concentric seconds hand. This clock shall be placed at a point sufficiently visible from the operator's table so that the operator may, by keeping it in view, easily and correctly time the different elements of the alarm signal.

§ 6 1) The radiotelephone alarm signal consists of two substantially sinusoidal audio frequency tones transmitted alternately. One tone shall have a frequency of 2 200 Hz and the other a frequency of 1 300 Hz, the duration of each tone being 250 ms.

2) The radiotelephone alarm signal, when generated by automatic means, shall be sent continuously for a period of at least thirty seconds but not exceeding one minute; when generated by other means, the signal shall be sent as continuously as practicable over a period of approximately one minute.

3) The radiotelephone alarm signal transmitted by coast stations shall be that described in § 6 1) and 6 2), which may be followed by a single tone of 1 300 Hz for 10 s.

§ 7 The purpose of these special signals is:

a) in Morse radiotelegraphy, to activate automatic devices giving the alarm to attract the attention of the operator when there is no listening watch on the distress frequency;

b) in radiotelephony, to attract the attention of the person on watch or to actuate automatic devices giving the alarm, or activating a silenced loudspeaker for the message which is to follow.

§ 8 1) These signals shall only be used to announce:

a) that a distress call or message is about to follow; *or*

b) the transmission of an urgent cyclone warning, which should be preceded by the safety signal (see Part A4, § 13 1) and 13 2)). In this case they may only be used by coast stations duly authorized by their government; *or*

c) the loss of a person or persons overboard or grave and imminent danger threatening a person or persons. In this case they may only be used when the assistance of other ships is required and cannot be satisfactorily obtained by the use of the urgency signal alone, but the alarm signal shall not be repeated by other stations. The message shall be preceded by the urgency signal (see Part A3, § 3 3) and Part A4, § 1 1) and 1 2)).

2) In the cases referred to in § 8 1) *b)* and 8 1) *c)*, an interval of two minutes should, if possible, separate the end of the Morse radiotelegraph alarm signal and the beginning of the warning or the message.

§ 9 Automatic devices intended for the reception of the Morse radiotelegraph and radiotelephone alarm signals shall meet the requirements specified in ITU-R Recommendation M.1175.

§ 10 Before any such automatic device is approved for use on ships, the administration having jurisdiction over those ships shall be satisfied by practical tests made under operating conditions equivalent to those obtaining in practice (including interference, vibration, etc.) that the apparatus complies with the provisions of these Regulations.

Section III – All ships selective call

§ 11 The characteristics of the "all ships call" in the selective calling system, which is reserved for alarm purposes only, are given in ITU-R Recommendation M.257-3.

Section IV – Navigational warning signal

§ 12 1) The navigational warning signal consists of one substantially sinusoidal tone of the frequency 2 200 Hz, interrupted so that the durations of tone and space are 250 ms each.

2) The signal should be transmitted by coast stations continuously for a period of 15 s before vital navigational warnings on radiotelephony in the medium frequency maritime bands.

2A) In addition, the signal specified in § 12 1) may be transmitted on the carrier frequency 2 182 kHz by off-shore installations or structures in imminent danger of being struck, or by stations that consider a ship is in imminent danger of running aground. The power of this transmission should, where practicable, be limited to the minimum necessary for reception by ships in the immediate vicinity of the off-shore installations or structures or of the land concerned.

2B) The transmission specified in § 12 2A) should be immediately followed by a radiotelephone transmission giving the identity and position of the off-shore installation or structure. Stations that consider a ship is in imminent danger of running around should provide as much identification and position information as possible. This transmission should be followed by a vital navigational warning.

3) The purpose of the signal is to attract the attention of the person on watch using a loudspeaker or a filtered loudspeaker, or to actuate an automatic device to activate a silenced loudspeaker for the message which is to follow.

Part A6 – Special services relating to safety

Section I – Meteorological messages

§ 1 1) Meteorological messages comprise:

a) messages addressed to meteorological services officially entrusted with weather forecasts, more specifically for the protection of maritime and air navigation;

b) messages from these meteorological services intended specially for:

– ship stations;

– protection of aircraft;

– the public.

2) The information contained in these messages may be:

a) observations taken at fixed times;

b) warnings of dangerous phenomena;

c) forecasts and warnings;

d) statements of the general meteorological situation.

§ 2 1) The various national meteorological services mutually agree to prepare common transmission programmes so as to use the transmitters best situated to serve the regions concerned.

2) The meteorological observations contained in the classes mentioned in § 1 1) *a)* to 1 1) *b)* 2nd indent should be drawn up in an international meteorological code, whether they are transmitted by or intended for mobile stations.

§ 3 For observation messages intended for an official meteorological service, use shall be made of the frequencies made available for meteorological purposes, in conformity with regional agreements made by the services concerned for the use of these frequencies.

§ 4 1) Meteorological messages specially intended for all ship stations shall in principle be sent in accordance with a definite timetable, and, as far as possible, at times when they can be received by ship stations with only one operator. In Morse radiotelegraphy the transmission speed shall not exceed sixteen words a minute.

2) During the transmission “to all stations” of meteorological messages intended for stations of the maritime mobile service, all stations of this service whose transmission might interfere with the reception of these messages shall keep silent in order to permit all stations which desire to do so to receive these messages.

3) Meteorological warning messages for the maritime mobile service shall be transmitted without delay. They shall be repeated at the end of the first silence period which follows their receipt (see Part A2, § 19 1) and 23) as well as during the next appropriate

broadcast as indicated in the List of Radiodetermination and Special Service Stations. They shall be preceded by the safety signal and sent on the appropriate frequencies (see Part A4, § 14 2)).

4) In addition to the regular information services contemplated in the preceding sub-paragraphs, administrations shall take the necessary steps to ensure that certain stations shall, upon request, communicate meteorological messages to stations in the maritime mobile service.

5) The provisions of § 4 1) to 4 4) are applicable to the aeronautical mobile service, in so far as they are not contrary to more detailed special agreements which ensure at least equal protection to air navigation.

§ 5 1) Messages originating in mobile stations and containing information concerning the presence of cyclones shall be transmitted, with the least possible delay, to other mobile stations in the vicinity and to the appropriate authorities at the first point of the coast with which contact can be established. Their transmission shall be preceded by the safety signal.

2) Any mobile station may, for its own use, listen to messages containing meteorological observations sent out by other mobile stations, even those which are addressed to a national meteorological service.

3) Stations of the mobile services which transmit meteorological observations addressed to a national meteorological service are not required to repeat them to other stations. However, the exchange between mobile stations, on request, of information relating to the state of the weather is authorized.

Section II – Notices to mariners

§ 6 The provisions of § 4 1) to 4 5) shall apply to notices to mariners.

§ 7 Messages containing information concerning the presence of dangerous ice, dangerous wrecks, or any other imminent danger to marine navigation, shall be transmitted as soon as possible to other ship stations in the vicinity, and to the appropriate authorities at the first point of the coast with which contact can be established. These transmissions shall be preceded by the safety signal.

§ 8 When thought desirable, and provided the sender agrees, administrations may authorize their land stations to communicate information concerning maritime damage or casualties or information of general interest to navigation to the marine information agencies approved by them and subject to the conditions fixed by them.

Section III – Medical advice

§ 9 Mobile stations requiring medical advice may obtain it through any of the land stations shown as providing this service in the List of Radiodetermination and Special Service Stations.

§ 10 Radiotelegrams and radiotelephone calls concerning medical advice may be preceded by the appropriate urgency signal (see Part A4, § 2 1) to 6).

Section IV – Narrow-band direct-printing telegraphy system for transmission of navigational and meteorological warnings and urgent information to ships (NAVTEX)

§ 11 In addition to existing methods, navigational and meteorological warnings and urgent information shall be transmitted by means of narrow-band direct-printing telegraphy, with forward error correction, by selected coast stations and their operational details shall be indicated in the List of Radiodetermination and Special Service Stations (see § 2 1), 4 1) and 6). Information is also published in a separate list in accordance with Resolution **339 (Rev.WRC-97)**.

§ 12 The mode and format of transmission should be in conformity with relevant ITU-R Recommendations.

§ 13 In the maritime mobile service the frequency 518 kHz shall be used for the automatic narrow-band direct-printing telegraphy system for transmission of navigational and meteorological warnings and urgent information to ship stations in the MF band (see No. **S5.84**).

PART B – Requirements for personnel

Section I – Categories of certificates

1.1 There are four categories of certificates, shown in descending order of requirements, for radiotelegraph operators. Each lower order certificate has lesser requirements and except for code speed, its requirements are a subset of the next higher certificate. The highest order Morse code speed certificate is the first-class radiotelegraph;

a) the radiocommunication operator’s general certificate;

b) the first-class radiotelegraph operator’s certificate;

c) the second-class radiotelegraph operator’s certificate;

d) the radiotelegraph operator’s special certificate.

There are two categories of radiotelephone operators’ certificates, general and restricted.

1.2 The holder of a radiocommunication operator’s general certificate, or of a first-class or second-class radiotelegraph operator’s certificate, may carry out the radiotelegraph or radiotelephone service of any ship station.

1.3 The holder of a radiotelephone operator's general certificate may carry out the radiotelephone service of any ship station.

1.4 The holder of a radiotelephone operator's restricted certificate may carry out the radiotelephone service of any ship station, provided that the operation of the transmitter requires only the use of simple external controls, and excludes all manual adjustment of frequency determining elements, with the stability of the frequencies maintained by the transmitter itself within the limits of tolerance specified by Appendix **S2**, and the peak envelope power of the transmitter does not exceed 1.5 kW.

1.5 The radiotelephone operator's restricted certificate may be limited exclusively to one or more of the maritime mobile frequency bands. In such cases the certificate shall be suitably endorsed.

1.6 The radiotelegraph service of ships for which a radiotelegraph installation is not made compulsory by international agreements, as well as the radiotelephone service of ship stations for which only a radiotelephone operator's restricted certificate is required, may be carried out by the holder of a radiotelegraph operator's special certificate[8] .

1.7 However, where the conditions specified in Table 1 are satisfied, the radiotelegraph service of ships for which a radiotelegraph installation is not made compulsory by international agreements, as well as the radiotelephone service of any ship station, may be carried out by the holder of a radiotelegraph operator's special certificate[8].

1.8 Exceptionally, the second-class radiotelegraph operator's certificate as well as the radiotelegraph operator's special certificate may be limited exclusively to the radiotelegraph service. In such cases the certificate shall be suitably endorsed.

Section II – Conditions for the issue of certificates

A – General

2.1 The conditions to be imposed for obtaining the various certificates are contained in the following paragraphs and represent the minimum requirements.

2.2 Each administration is free to fix the number of examinations necessary to obtain each certificate.

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[8] The radiotelegraph service of ships equipped with a radiotelegraph installation in accordance with Regulation 131 (2) (a) of the International Convention for the Safety of Fishing Vessels (Torremolinos, 1977) may be carried out by the holder of a radiotelegraph operator's special certificate.

2.3 The administration which issues a certificate may, before authorizing an operator to carry out the service on board a ship, require the fulfilment of other conditions (for example: experience with automatic communication devices; further technical and professional knowledge relating particularly to navigation; physical fitness; etc.).

2.4 Administrations should take whatever steps they consider necessary to ensure the continued proficiency of operators after prolonged absences from operational duties.

2.5 However, with respect to the maritime mobile service, administrations should also take whatever steps they consider necessary to ensure the continued proficiency of operators while in service.

2.6 The requirements for candidates to obtain one of the certificates described in this section with regard to technical and professional knowledge and qualifications are shown in the following Table 1.

TABLE 1

Conditions for the issue of operator's certificate

The relevant certificate is issued to a candidate who has shown proof of the technical and professional knowledge and qualifications enumerated below, as applicable, and indicated by an asterisk (*) in the appropriate box	**Radiocom-munication operator's general certificate**	**1st-class radio-telegraph operator's certificate**	**2nd-class radio-telegraph operator's certificate**	**Radio-telegraph operator's special certificate**
Knowledge of the principles of electricity and the theory of radio and of electronics sufficient to meet the requirements specified below:	*			
Theoretical knowledge of modern radiocommunication equipment, including marine radiotelegraph and radiotelephone transmitters and receivers, marine antenna systems, automatic alarm devices, radio equipment for lifeboats and other survival craft, direction-finding equipment, together with all auxiliary items including power supply (such as motors, alternators, generators, inverters, rectifiers and accumulators), as well as an elementary knowledge of the principles of other apparatus generally used for radionavigation, with particular reference to maintaining the equipment in service.	*			

TABLE 1 (*continued*)

The relevant certificate is issued to a candidate who has shown proof of the technical and professional knowledge and qualifications enumerated below, as applicable, and indicated by an asterisk (*) in the appropriate box	**Radiocom-munication operator's general certificate**	**1st-class radio-telegraph operator's certificate**	**2nd-class radio-telegraph operator's certificate**	**Radio-telegraph operator's special certificate**
Practical knowledge of the operation, adjustment and maintenance of the apparatus mentioned above, including the taking of direction-finding bearings and knowledge of the principles of the calibration of radio direction-finding apparatus.	*			
Practical knowledge necessary for the location and remedying (using appropriate testing equipment and tools) of faults in the apparatus mentioned above which may occur during a voyage.	*			
Knowledge both of the general principles of electricity and of the theory of radio, knowledge of the adjustment and practical working of various types of radiotelegraph and radiotelephone apparatus used in the mobile service, including apparatus used for radio direction-finding and the taking of direction-finding bearings, as well as elementary knowledge of the principles of operation of other apparatus generally used for radionavigation.		*		
Elementary theoretical and practical knowledge of electricity and radio, knowledge of the adjustment and practical working of various types of radiotelegraph and radiotelephone apparatus used in the mobile service, including apparatus used for radio direction-finding and the taking of direction-finding bearings, as well as an elementary knowledge of the principles of operation of other apparatus generally used for radionavigation.			*	

TABLE 1 (*continued*)

The relevant certificate is issued to a candidate who has shown proof of the technical and professional knowledge and qualifications enumerated below, as applicable, and indicated by an asterisk (*) in the appropriate box	**Radiocom-munication operator's general certificate**	**1st-class radio-telegraph operator's certificate**	**2nd-class radio-telegraph operator's certificate**	**Radio-telegraph operator's special certificate**
Theoretical and practical knowledge of the operation and maintenance of apparatus, such as motor-generators, storage batteries, etc., used in the operation and adjustment of the radiotelegraph, radiotelephone and radio direction-finding apparatus mentioned above.		*		
Elementary theoretical and practical knowledge of the operation and maintenance of apparatus, such as motor-generators, storage batteries, etc., used in the operation and adjustment of the radiotelegraph, radiotelephone and radio direction-finding apparatus mentioned above.			*	
Practical knowledge necessary to repair, with the means available on board, damage which may occur to the radiotelegraph, radiotelephone and radio direction-finding apparatus during a voyage.		*		
Practical knowledge sufficient for effecting repairs in the case of minor damage which may occur to the radiotelegraph, radiotelephone and radio direction-finding apparatus during a voyage.			*	
Ability to send correctly by hand and to receive correctly by ear, in the Morse code, code groups (mixed letters, figures and punctuation marks) at a speed of sixteen groups a minute, and a plain language text at a speed of twenty words a minute. Each code group shall comprise five characters, each figure or punctuation mark counting as two characters. The average word of the text in plain language shall contain five characters. The duration of each test of sending and receiving shall be, as a rule, five minutes.	*		*	*

TABLE 1 (*continued*)

The relevant certificate is issued to a candidate who has shown proof of the technical and professional knowledge and qualifications enumerated below, as applicable, and indicated by an asterisk (*) in the appropriate box	**Radiocom-munication operator's general certificate**	**1st-class radio-telegraph operator's certificate**	**2nd-class radio-telegraph operator's certificate**	**Radio-telegraph operator's special certificate**
Ability to send correctly by hand and to receive correctly by ear, in the Morse code, code groups (mixed letters, figures and punctuation marks) at a speed of twenty groups a minute, and a plain language text at a speed of twenty-five words a minute. Each code group shall comprise five characters, each figure or punctuation mark counting as two characters. The average word of the text in plain language shall contain five characters. The duration of each test of sending and receiving shall be, as a rule, five minutes.		*		
Knowledge of the practical operation and adjustment of radiotelegraph apparatus.				*
Ability to send correctly and to receive correctly by radiotelephone.	*	*		*
Ability to send correctly and to receive correctly by radiotelephone except in the case provided for in § 1.8 of Part B to this Appendix.			*	
Knowledge of the Regulations applying to radiocommunications, knowledge of the documents relating to charges for radiocommunications and knowledge of the provisions of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended which relate to radio.	*		*	
Detailed knowledge of the Regulations applying to radiocommunications, knowledge of the documents relating to charges for radiocommunications and knowledge of the provisions of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended which relate to radio.		*		

TABLE 1 (*end*)

The relevant certificate is issued to a candidate who has shown proof of the technical and professional knowledge and qualifications enumerated below, as applicable, and indicated by an asterisk (*) in the appropriate box	**Radiocom-munication operator's general certificate**	**1st-class radio-telegraph operator's certificate**	**2nd-class radio-telegraph operator's certificate**	**Radio-telegraph operator's special certificate**
Knowledge of the Regulations applying to radiotelegraph communications and specifically of that part of those Regulations relating to the safety of life.				*
Sufficient knowledge of world geography, especially the principal shipping routes and the most important telecommunication routes.	*	*	*	
Knowledge of one of the working languages of the Union. Candidates should be able to express themselves satisfactorily in that language, both orally and in writing. Each administration shall decide for itself the language or languages required.	*			
Sufficient knowledge of one of the working languages of the Union. Candidates should be able to express themselves satisfactorily in that language, both orally and in writing. Each administration shall decide for itself the language or languages required.		*		
If necessary, elementary knowledge of one of the working languages of the Union. Candidates should be able to express themselves satisfactorily in that language, both orally and in writing. Each administration shall decide for itself the language or languages required.			*	

B – Radiotelephone operator's certificates

2.7 The radiotelephone operator's general certificate is issued to candidates who have shown proof of the knowledge and professional qualifications enumerated below (see also § 1.2, 1.3, 1.6 and 1.7):

a) a knowledge of the elementary principles of radiotelephony;

b) detailed knowledge of the practical operation and adjustment of radiotelephone apparatus;

c) ability to send correctly and to receive correctly by radiotelephone;

d) detailed knowledge of the Regulations applying to radiotelephone communications and specifically of that part of those Regulations relating to the safety of life.

2.8 The restricted radiotelephone operator's certificate is issued to candidates who have given proof of the knowledge and professional qualifications enumerated below:

a) practical knowledge of radiotelephone operation and procedure;

b) ability to send correctly and to receive correctly by telephone;

c) general knowledge of the Regulations applying to radiotelephone communications and specifically of that part of those Regulations relating to the safety of life.

2.9 For ship radiotelephone stations where the peak envelope power of the transmitter does not exceed 400 W, each administration may itself fix these conditions for obtaining a restricted radiotelephone operator's certificate, provided that the operation of the transmitter requires only the use of simple external switching devices, excluding all manual adjustment of frequency determining elements, and that the stability of the frequencies is maintained by the transmitter itself within the limits of tolerance specified in Appendix **S2**. However, in fixing the conditions, administrations shall ensure that the operator has an adequate knowledge of radiotelephone operation and procedure, particularly as far as distress, urgency and safety are concerned. This in no way contravenes the provisions of § 2.13.

2.10 Administrations in Region 1 do not issue certificates under § 2.9.

2.11 A radiotelephone operator's certificate shall show whether it is a general certificate or a restricted certificate and, in the latter case, whether it has been issued in conformity with the provisions of § 2.9.

2.12 In the maritime mobile service, a radiotelephone operator's restricted certificate shall show whether it is also limited as provided for in § 1.5.

2.13 In order to meet special needs, special agreements between administrations may fix the conditions to be fulfilled in order to obtain a radiotelephone operator's certificate, intended to be used in radiotelephone stations complying with certain technical conditions and certain operating conditions. These agreements, if made, shall be on the condition that harmful interference to international services shall not result therefrom. These conditions and agreements shall be mentioned in the certificates issued to such operators.

Section III – Class and minimum number of operators

3.1 In the public correspondence service, each government shall take the necessary steps to ensure that stations on board ships of its own nationality have personnel adequate to perform efficient service.

3.2 The personnel of ship stations in the public correspondence service shall, having regard to the provisions of Part A of this Appendix, include at least:

a) ship stations of the first category, except in the case provided for in § 3.2 *e)*: a chief operator holding a radiocommunication operator's general certificate or a first-class radiotelegraph operator's certificate;

b) ship stations of the second and third categories, except in the case provided for in § 3.2 *e)*: a chief operator holding a radiocommunication operator's general certificate or a first- or second-class radiotelegraph operator's certificate;

c) ship stations of the fourth category, except in the cases provided for in § 3.2 *d)* and 3.2 *e)*: one operator holding a radiocommunication operator's general certificate or a first- or second-class radiotelegraph operator's certificate;

d) ship stations in which a radiotelegraph installation is provided but not prescribed by international agreements: one operator holding a radiocommunication operator's general certificate or a first- or second-class radiotelegraph operator's certificate, or a radiotelegraph operator's special certificate;

e) ship stations equipped with a radiotelephone installation only: one operator holding either a radiotelephone operator's certificate or a radiotelegraph operator's certificate.

APPENDIX S14

Phonetic alphabet and figure code

(See Articles **S30, S57** and Appendix **S13**)

1 When it is necessary to spell out call signs, service abbreviations and words, the following letter spelling table shall be used:

Letter to be transmitted	*Code word to be used*	*Spoken as* [1]
A	Alfa	AL FAH
B	Bravo	BRAH VOH
C	Charlie	CHAR LEE or SHAR LEE
D	Delta	DELL TAH
E	Echo	ECK OH
F	Foxtrot	FOKS TROT
G	Golf	GOLF
H	Hotel	HOH TELL
I	India	IN DEE AH
J	Juliett	JEW LEE ETT
K	Kilo	KEY LOH
L	Lima	LEE MAH
M	Mike	MIKE
N	November	NO VEM BER
O	Oscar	OSS CAH
P	Papa	PAH PAH
Q	Quebec	KEH BECK
R	Romeo	ROW ME OH
S	Sierra	SEE AIR RAH
T	Tango	TANG GO
U	Uniform	YOU NEE FORM or OO NEE FORM
V	Victor	VIK TAH
W	Whiskey	WISS KEY
X	X-ray	ECKS RAY
Y	Yankee	YANG KEY
Z	Zulu	ZOO LOO

[1] The syllables to be emphasized are underlined.

2 When it is necessary to spell out figures or marks, the following table shall be used:

Figure or mark to be transmitted	*Code word to be used*	*Spoken as* [2]
0	Nadazero	NAH-DAH-ZAY-ROH
1	Unaone	OO-NAH-WUN
2	Bissotwo	BEES-SOH-TOO
3	Terrathree	TAY-RAH-TREE
4	Kartefour	KAR-TAY-FOWER
5	Pantafive	PAN-TAH-FIVE
6	Soxisix	SOK-SEE-SIX
7	Setteseven	SAY-TAY-SEVEN
8	Oktoeight	OK-TOH-AIT
9	Novenine	NO-VAY-NINER
Decimal point	Decimal	DAY-SEE-MAL
Full stop	Stop	STOP

3 However, stations of the same country, when communicating between themselves, may use any other table recognized by their administration.

2 Each syllable should be equally emphasized.

APPENDIX S15

Frequencies for distress and safety communications for the Global Maritime Distress and Safety System (GMDSS)

(See Article **S31**)

The frequencies for distress and safety communications for the GMDSS are given in Tables S15-1 and S15-2 for frequencies below and above 30 MHz, respectively.

TABLE S15-1

Frequencies below 30 MHz

Frequency (kHz)	Description of usage	Notes
490	MSI	The frequency 490 kHz will be used exclusively for maritime safety information (MSI) after full implementation of the GMDSS.
518	MSI	The frequency 518 kHz is used exclusively by the international NAVTEX system.
*2 174.5	NBDP-COM	
*2 182	RTP-COM	The frequency 2 182 kHz uses class of emission J3E. See also No. **S52.190** and Appendix **S13**.
*2 187.5	DSC	
3 023	AERO-SAR	The aeronautical carrier (reference) frequencies 3 023 kHz and 5 680 kHz may be used for intercommunication between mobile stations engaged in coordinated search and rescue operations, and for communication between these stations and participating land stations, in accordance with the provisions of Appendix **S27** (see Nos. **S5.111** and **S5.115**).
*4 125	RTP-COM	See also No. **S52.221** and Appendix **S13**. The carrier frequency 4 125 kHz may be used by aircraft stations to communicate with stations of the maritime mobile service for distress and safety purposes, including search and rescue (see No. **S30.11**).
*4 177.5	NBDP-COM	
*4 207.5	DSC	
4 209.5	MSI	The frequency 4 209.5 kHz is exclusively used for NAVTEX-type transmissions (see Resolution **339 (Rev.WRC-97)**).
4 210	MSI-HF	
5 680	AERO-SAR	See note under 3 023 kHz above.
*6 215	RTP-COM	See also No. **S52.221** and Appendix **S13**.
*6 268	NBDP-COM	
*6 312	DSC	

TABLE S15-1 (*end*)

Frequency (kHz)	Description of usage	Notes
6 314	MSI-HF	
*8 291	RTP-COM	
*8 376.5	NBDP-COM	
*8 414.5	DSC	
8 416.5	MSI-HF	
*12 290	RTP-COM	
*12 520	NBDP-COM	
*12 577	DSC	
12 579	MSI-HF	
*16 420	RTP-COM	
*16 695	NBDP-COM	
*16 804.5	DSC	
16 806.5	MSI-HF	
19 680.5	MSI-HF	
22 376	MSI-HF	
26 100.5	MSI-HF	

Legend:

AERO-SAR These aeronautical carrier (reference) frequencies may be used for distress and safety purposes by mobile stations engaged in coordinated search and rescue operations.

DSC These frequencies are used exclusively for distress and safety calls using digital selective calling in accordance with No. **S32.5** (see Nos. **S32.9**, **S33.11** and **S33.34**).

MSI In the maritime mobile service, these frequencies are used exclusively for the transmission of maritime safety information (MSI) (including meteorological and navigational warnings and urgent information) by coast stations to ships, by means of narrow-band direct-printing telegraphy.

MSI-HF In the maritime mobile service, these frequencies are used exclusively for the transmission of high seas MSI by coast stations to ships, by means of narrow-band direct-printing telegraphy.

NBDP-COM These frequencies are used exclusively for distress and safety communications (traffic) using narrow-band direct-printing telegraphy.

RTP-COM These carrier frequencies are used for distress and safety communications (traffic) by radio-telephony.

* Except as provided in these Regulations, any emission capable of causing harmful interference to distress, alarm, urgency or safety communications on the frequencies denoted by an asterisk (*) is prohibited. Any emission causing harmful interference to distress and safety communications on any of the discrete frequencies identified in Appendices **S13** and **S15** is prohibited.

TABLE S15-2

Frequencies above 30 MHz (VHF/UHF)

Frequency (MHz)	Description of usage	Notes
*121.5	AERO-SAR	The aeronautical emergency frequency 121.5 MHz is used for the purposes of distress and urgency for radiotelephony by stations of the aeronautical mobile service using frequencies in the band between 117.975 MHz and 137 MHz. This frequency may also be used for these purposes by survival craft stations. Emergency position-indicating radio beacons use the frequency 121.5 MHz as indicated in Recommendation ITU-R M.690-1. Mobile stations of the maritime mobile service may communicate with stations of the aeronautical mobile service on the aeronautical emergency frequency 121.5 MHz for the purposes of distress and urgency only, and on the aeronautical auxiliary frequency 123.1 MHz for coordinated search and rescue operations, using class A3E emissions for both frequencies (see also Nos. **S5.111** and **S5.200**). They shall then comply with any special arrangement between governments concerned by which the aeronautical mobile service is regulated.
123.1	AERO-SAR	The aeronautical auxiliary frequency 123.1 MHz, which is auxiliary to the aeronautical emergency frequency 121.5 MHz, is for use by stations of the aeronautical mobile service and by other mobile and land stations engaged in coordinated search and rescue operations (see also No. **S5.200**). Mobile stations of the maritime mobile service may communicate with stations of the aeronautical mobile service on the aeronautical emergency frequency 121.5 MHz for the purposes of distress and urgency only, and on the aeronautical auxiliary frequency 123.1 MHz for coordinated search and rescue operations, using class A3E emissions for both frequencies (see also Nos. **S5.111** and **S5.200**). They shall then comply with any special arrangement between governments concerned by which the aeronautical mobile service is regulated.
156.3	VHF-CH06	The frequency 156.3 MHz may be used for communication between ship stations and aircraft stations engaged in coordinated search and rescue operations. It may also be used by aircraft stations to communicate with ship stations for other safety purposes (see also Note *f*) in Appendix **S18**).
*156.525	VHF-CH70	The frequency 156.525 MHz is used in the maritime mobile service for distress and safety calls using digital selective calling (see also Nos**. S4.9, S5.227, S30.2** and **S30.3**).
156.650	VHF-CH13	The frequency 156.650 MHz is used for ship-to-ship communications relating to the safety of navigation in accordance with Note *k*) in Appendix **S18**.
*156.8	VHF-CH16	The frequency 156.8 MHz is used for distress and safety communications by radiotelephony (see also Appendix **S13**). Additionally, the frequency 156.8 MHz may be used by aircraft stations for safety purposes only.

TABLE S15-2 (*end*)

Frequency (MHz)	Description of usage	Notes
*406-406.1	406-EPIRB	This frequency band is used exclusively by satellite emergency position-indicating radio beacons in the Earth-to-space direction (see No. **S5.266**).
1 530-1 544	SAT-COM	In addition to its availability for routine non-safety purposes, the band 1 530-1 544 MHz is used for distress and safety purposes in the space-to-Earth direction in the maritime mobile-satellite service. GMDSS distress, urgency and safety communications have priority in this band (see No. **S5.353A**).
*1 544-1 545	D&S-OPS	Use of the band 1 544-1 545 MHz (space-to-Earth) is limited to distress and safety operations (see No. **S5.356**), including feeder links of satellites needed to relay the emissions of satellite emergency position-indicating radio beacons to earth stations and narrow-band (space-to-Earth) links from space stations to mobile stations.
1 626.5-1 645.5	SAT-COM	In addition to its availability for routine non-safety purposes, the band 1 626.5-1 645.5 MHz is used for distress and safety purposes in the Earth-to-space direction in the maritime mobile-satellite service. GMDSS distress, urgency and safety communications have priority in this band (see No. **S5.353A**).
*1 645.5-1 646.5	D&S-OPS	Use of the band 1 645.5-1 646.5 MHz (Earth-to-space) is limited to distress and safety operations (see No. **S5.375**), including transmissions from satellite EPIRBs and relay of distress alerts received by satellites in low polar Earth orbits to geostationary satellites.
9 200-9 500	SARTS	This frequency band is used by radar transponders to facilitate search and rescue.

Legend:

AERO-SAR These aeronautical carrier (reference) frequencies may be used for distress and safety purposes by mobile stations engaged in coordinated search and rescue operations.

D&S-OPS The use of these bands is limited to distress and safety operations of satellite emergency position-indicating radio beacons (EPIRBs).

SAT-COM These frequency bands are available for distress and safety purposes in the maritime mobile-satellite service (see Notes).

VHF-CH# These VHF frequencies are used for distress and safety purposes. The channel number (CH#) refers to the VHF channel as listed in Appendix **S18,** which should also be consulted.

* Except as provided in these Regulations, any emission capable of causing harmful interference to distress, alarm, urgency or safety communications on the frequencies denoted by an asterisk (*) is prohibited. Any emission causing harmful interference to distress and safety communications on any of the discrete frequencies identified in Appendices **S13** and **S15** is prohibited.

APPENDIX S16

Documents with which stations on board ships and aircraft shall be provided

(see Articles **S42** and **S51**)

Section I – Ship stations for which a Morse radiotelegraph installation is required by international agreement

These stations shall be provided with:

1 the licence prescribed by Article **S18**;

2 certificates of the operator or operators;

3 a log in which the following are recorded as they occur, together with the time of the occurrence, unless administrations have adopted other arrangements for recording all information which the log should contain:

a) all communications relating to distress traffic in full;

b) urgency and safety communications;

c) observance of watch on the international distress frequency during silence periods;

d) communications exchanged between the ship station and land or mobile stations;

e) service incidents of all kinds;

f) if the ship's rules permit, the position of the ship at least once a day;

g) the opening and closing of each period of service;

4 the Alphabetical List of Call Signs of Stations used in the Maritime Mobile Service;

5 the List of Coast Stations;

6 the List of Ship Stations (the carriage of the supplement is optional);

7 the List of Radiodetermination and Special Service Stations;

8 the Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services;

9 telegraph tariffs of the countries for which the station most frequently accepts radiotelegrams.

Section II – Other ship stations with Morse radiotelegraph facilities

These stations shall be provided with the documents mentioned in items 1 to 6, 8 and 9 of Section I.

Section III – Ship stations for which a radiotelephone installation is required by international agreement

These stations shall be provided with:

1 the licence prescribed by Article **S18**;

2 certificates of the operator or operators;

3 a log in which the following are recorded as they occur, together with the time of the occurrence, unless administrations have adopted other arrangements for recording all information which the log should contain:

a) a summary of all communications relating to distress, urgency and safety traffic;

b) a reference to important service incidents;

c) if the ship's rules permit, the position of the ship at least once a day;

4 a list of coast stations with which communications are likely to be conducted, showing watchkeeping hours, frequencies and charges;

5 the provisions of the Radio Regulations and of the ITU-T Resolutions and Recommendations applicable to the maritime mobile radiotelephone service, or the Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services.

Section IV – Other ship radiotelephone stations

These stations shall be provided with:

1 the documents mentioned in items 1 and 2 of Section III;

2 the documents mentioned in items 3, 4 and 5 of Section III, in accordance with the requirements of the administrations concerned.

Section V – Ship stations equipped with multiple installations

These stations shall be provided with:

1 for each installation, if necessary, the documents mentioned in items 1 to 3 of Section I, or in items 1, 2 and 3 of Section III;

2 for only one installation, the other documents mentioned in Sections I or III, as appropriate.

Section VA. – Stations on board ships for which a GMDSS installation is required by international agreement

These stations shall be provided with:

1 the licence prescribed by Article **S18**;

2 the certificates prescribed in Article **S48**;

3 a log in which the following are recorded as they occur, together with the time of their occurrence, unless administrations have adopted other arrangements for recording all information which the log should contain:

a) a summary of communications relating to distress, urgency and safety traffic;

b) a reference to important service incidents;

c) if the ship's rules permit, the position of the ship at least once a day;

4 the Alphabetical List of Call Signs and/or Numerical Table of Identities of Stations Used by the Maritime Mobile Service and Maritime Mobile-Satellite Service (Coast, Coast Earth, Ship, Ship Earth, Radiodetermination and Special Service Stations), Ship and Ship Earth Stations, Maritime Mobile Service Identities and Selective Call Numbers or Signals, and Coast and Coast Earth Stations, Maritime Mobile Service Identities and Identification Numbers or Signals (List VIIA);

5 a list of coast stations and coast earth stations with which communications are likely to be established, showing watch-keeping hours, frequencies and charges; and a list of coast stations and coast earth stations providing navigational and meteorological warnings and other urgent information for ships (see Article **S20**);

6 the List of Ship Stations (the carriage of the supplement is optional);

7 the Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services.

NOTE – Administrations may, under appropriate circumstances (for example, when ships are sailing only within range of VHF coast stations) exempt ships from the carriage of the documents mentioned in items 4 to 7 above.

Section VI – Stations on board aircraft

These stations shall be provided with:

1 the documents mentioned in items 1 and 2 of Section I;

2 a log, unless administrations have adopted other arrangements for recording all information which the log should contain;

3 the documents containing official information relating to stations which the aircraft station may use for the execution of its service.

APPENDIX S17

Frequencies and channelling arrangements in the high-frequency bands for the maritime mobile service

(See Article **S52**)

PART A – Table of subdivided bands

In the table, where appropriate[1], the assignable frequencies in a given band for each usage are:

– indicated by the lowest and highest frequency, in heavy type, assigned in that band;

– regularly spaced, the number of assignable frequencies (*f.*) and the spacing in kHz being indicated in italics.

Table of frequencies (kHz) to be used in the band between 4 000 kHz and 27 500 kHz allocated exclusively to the maritime mobile service

Band (MHz)	**4**	**6**	**8**	**12**	**16**	**18/19**	**22**	**25/26**
Limits (kHz)	4 063	6 200	8 195	12 230	16 360	18 780	22 000	25 070
Frequencies assignable to ship stations for oceanographic data transmission *c)*	**4 063.3** to **4 064.8** *6 f. 0.3 kHz*							
Limits (kHz)	4 065	6 200	8 195	12 230	16 360	18 780	22 000	25 070
Frequencies assignable to ship stations for telephony, duplex operation *a) i)*	**4 066.4** to **4 144.4** *27 f. 3 kHz*	**6 201.4** to **6 222.4** *8 f. 3 kHz*	**8 196.4** to **8 292.4** *33 f. 3 kHz*	**12 231.4** to **12 351.4** *41 f. 3 kHz*	**16 361.4** to **16 526.4** *56 f. 3 kHz*	**18 781.4** to **18 823.4** *15 f. 3 kHz*	**22 001.4** to **22 157.4** *53 f. 3 kHz*	**25 071.4** to **25 098.4** *10 f. 3 kHz*
Limits (kHz)	4 146	6 224	8 294	12 353	16 528	18 825	22 159	25 100

[1] Within the non-shaded boxes.

Table of frequencies (kHz) to be used in the band between 4 000 kHz and 27 500 kHz allocated exclusively to the maritime mobile service
(continued)

Band (MHz)	**4**	**6**	**8**	**12**	**16**	**18/19**	**22**	**25/26**
Limits (kHz)	4 146	6 224	8 294	12 353	16 528	18 825	22 159	25 100
Frequencies assignable to ship stations and coast stations for telephony, simplex operation *a)*	**4 147.4** to **4 150.4** *2 f. 3 kHz*	**6 225.4** to **6 231.4** *3 f. 3 kHz*	**8 295.4** to **8 298.4** *2 f. 3 kHz*	**12 354.4** to **12 366.4** *5 f. 3 kHz*	**16 529.4** to **16 547.4** *7 f. 3 kHz*	**18 826.4** to **18 844.4** *7 f. 3 kHz*	**22 160.4** to **22 178.4** *7 f. 3 kHz*	**25 101.4** to **25 119.4** *7 f. 3 kHz*
Limits (kHz)	4 152	6 233	8 300	12 368	16 549	18 846	22 180	25 121
Frequencies assignable to ship stations for wide-band telegraphy, facsimile and special transmission systems	**4 154** to **4 170** *5 f. 4 kHz*	**6 235** to **6 259** *7 f. 4 kHz*	**8 302** to **8 338** *10 f. 4 kHz*	**12 370** to **12 418** *13 f. 4 kHz*	**16 551** to **16 615** *17 f. 4 kHz*	**18 848** to **18 868** *6 f. 4 kHz*	**22 182** to **22 238** *15 f. 4 kHz*	**25 123** to **25 159** *10 f. 4 kHz*
Limits (kHz)	4 172	6 261	8 340	12 420	16 617	18 870	22 240	25 161.25
Frequencies assignable to ship stations for oceanographic data transmission *c)*		**6 261.3** to **6 262.5** *5 f. 0.3 kHz*	**8 340.3** to **8 341.5** *5 f. 0.3 kHz*	**12 420.3** to **12 421.5** *5 f. 0.3 kHz*	**16 617.3** to **16 618.5** *5 f. 0.3 kHz*		**22 240.3** to **22 241.5** *5 f. 0.3 kHz*	
Limits (kHz)	4 172	6 262.75	8 341.75	12 421.75	16 618.75	18 870	22 241.75	25 161.25
Frequencies (paired) assignable to ship stations for narrow-band direct-printing (NBDP) telegraphy and data transmission systems at speeds not exceeding 100 Bd for FSK and 200 Bd for PSK *d) j) m)*	**4 172.5** to **4 181.5** *18 f. 0.5 kHz*	**6 263** to **6 275.5** *25 f. 0.5 kHz*						
Limits (kHz)	4 181.75	6 275.75	8 341.75	12 421.75	16 618.75	18 870	22 241.75	25 161.25
Calling frequencies assignable to ship stations for A1A or A1B Morse telegraphy *g)*								
Limits (kHz)	4 186.75	6 280.75	8 341.75	12 421.75	16 618.75	18 870	22 241.75	25 161.25
Frequencies (paired) assignable to ship stations for NBDP telegraphy and data transmission systems at speeds not exceeding 100 Bd for FSK and 200 Bd for PSK *d) m)*		**6 281** to **6 284.5** *8 f. 0.5 kHz*						
Limits (kHz)	4 186.75	6 284.75	8 341.75	12 421.75	16 618.75	18 870	22 241.75	25 161.25

Table of frequencies (kHz) to be used in the band between 4 000 kHz and 27 500 kHz allocated exclusively to the maritime mobile service
(continued)

Band (MHz)	**4**	**6**	**8**	**12**	**16**	**18/19**	**22**	**25/26**
Limits (kHz)	4 186.75	6 284.75	8 341.75	12 421.75	16 618.75	18 870	22 241.75	25 161.25
Working frequencies assignable to ship stations for A1A or A1B Morse telegraphy *e) f) h)*	**4 187** to **4 202** *31 f. 0.5 kHz*	**6 285** to **6 300** *31 f. 0.5 kHz*	**8 342** to **8 365.5** *48 f. 0.5 kHz*	**12 422** to **12 476.5** *110 f. 0.5 kHz*	**16 619** to **16 683** *129 f. 0.5 kHz*		**22 242** to **22 279** *75 f. 0.5 kHz*	**25 161.5** to **25 171** *20 f. 0.5 kHz*
Limits (kHz)	4 202.25	6 300.25	8 365.75	12 476.75	16 683.25	18 870	22 279.25	25 171.25
Calling frequencies assignable to ship stations for A1A or A1B Morse telegraphy *g)*								
Limits (kHz)	4 202.25	6 300.25	8 370.75	12 476.75	16 683.25	18 870	22 284.25	25 172.75
Working frequencies assignable to ship stations for A1A or A1B Morse telegraphy *e) f)*			**8 371** to **8 376** *11 f. 0.5 kHz*					
Limits (kHz)	4 202.25	6 300.25	8 376.25	12 476.75	16 683.25	18 870	22 284.25	25 172.75
Frequencies (paired) assignable to ship stations for NBDP telegraphy and data transmission systems at speeds not exceeding 100 bauds for FSK and 200 bauds for PSK *d) j) m)*			**8 376.5** to **8 396** *40 f. 0.5 kHz*	**12 477** to **12 549.5** *146 f. 0.5 kHz*	**16 683.5** to **16 733.5** *101 f. 0.5 kHz*	**18 870.5** to **18 892.5** *45 f. 0.5 kHz*	**22 284.5** to **22 351.5** *135 f. 0.5 kHz*	**25 173** to **25 192.5** *40 f. 0.5 kHz*
Limits (kHz)	4 202.25	6 300.25	8 396.25	12 549.75	16 733.75	18 892.75	22 351.75	25 192.75
Calling frequencies assignable to ship stations for A1A or A1B Morse telegraphy *g)*								
Limits (kHz)	4 202.25	6 300.25	8 396.25	12 554.75	16 738.75	18 892.75	22 351.75	25 192.75
Frequencies (paired) assignable to ship stations for NBDP telegraphy and data transmission systems at speeds not exceeding 100 bauds for FSK and 200 bauds for PSK *d) m)*				**12 555** to **12 559.5** *10 f. 0.5 kHz*	**16 739** to **16 784.5** *92 f. 0.5 kHz*			
Limits (kHz)	4 202.25	6 300.25	8 396.25	12 559.75	16 784.75	18 892.75	22 351.75	25 192.75

Table of frequencies (kHz) to be used in the band between 4 000 kHz and 27 500 kHz allocated exclusively to the maritime mobile service
(continued)

Band (MHz)	**4**	**6**	**8**	**12**	**16**	**18/19**	**22**	**25/26**
Limits (kHz)	4 202.25	6 300.25	8 396.25	12 559.75	16 784.75	18 892.75	22 351.75	25 192.75
Frequencies (non paired) assignable to ship stations for NBDP telegraphy and data transmission systems at speeds not exceeding 100 Bd for FSK and 200 Bd for PSK and for A1A or A1B Morse telegraphy (working) *b)*	**4 202.5** to **4 207** *10 f. 0.5 kHz*	**6 300.5** to **6 311.5** *23 f. 0.5 kHz*	**8 396.5** to **8 414** *36 f. 0.5 kHz*	**12 560** to **12 576.5** *34 f. 0.5 kHz*	**16 785** to **16 804** *39 f. 0.5 kHz*	**18 893** to **18 898** *11 f. 0.5 kHz*	**22 352** to **22 374** *45 f. 0.5 kHz*	**25 193** to **25 208** *31 f. 0.5 kHz*
Limits (kHz)	4 207.25	6 311.75	8 414.25	12 576.75	16 804.25	18 898.25	22 374.25	25 208.25
Frequencies assignable to ship stations for digital selective calling *k) l)*	**4 207.5** to **4 209** *4 f. 0.5 kHz*	**6 312** to **6 313.5** *4 f. 0.5 kHz*	**8 414.5** to **8 416** *4 f. 0.5 kHz*	**12 577** to **12 578.5** *4 f. 0.5 kHz*	**16 804.5** to **16 806** *4 f. 0.5 kHz*	**18 898.5** to **18 899.5** *3 f. 0.5 kHz*	**22 374.5** to **22 375.5** *3 f. 0.5 kHz*	**25 208.5** to **25 209.5** *3 f. 0.5 kHz*
Limits (kHz)	4 209.25	6 313.75	8 416.25	12 578.75	16 806.25	18 899.75	22 375.75	25 210
Limits (kHz)	4 209.25	6 313.75	8 416.25	12 578.75	16 806.25	19 680.25	22 375.75	26 100.25
Frequencies (paired) assignable to coast stations for NBDP and data transmission systems, at speeds not exceeding 100 Bd for FSK and 200 Bd for PSK *d) n) o)*	**4 209.5** to **4 219** *20 f. 0.5 kHz*	**6 314** to **6 330.5** *34 f. 0.5 kHz*	**8 416.5** to **8 436** *40 f. 0.5 kHz*	**12 579** to **12 656.5** *156 f. 0.5 kHz*	**16 806.5** to **16 902.5** *193 f. 0.5 kHz*	**19 680.5** to **19 703** *46 f. 0.5 kHz*	**22 376** to **22 443.5** *136 f. 0.5 kHz*	**26 100.5** to **26 120.5** *41 f. 0.5 kHz*
Limits (kHz)	4 219.25	6 330.75	8 436.25	12 656.75	16 902.75	19 703.25	22 443.75	26 120.75
Frequencies assignable to coast stations for digital selective calling *l)*	**4 219.5** to **4 220.5** *3 f. 0.5 kHz*	**6 331** to **6 332** *3 f. 0.5 kHz*	**8 436.5** to **8 437.5** *3 f. 0.5 kHz*	**12 657** to **12 658** *3 f. 0.5 kHz*	**16 903** to **16 904** *3 f. 0.5 kHz*	**19 703.5** to **19 704.5** *3 f. 0.5 kHz*	**22 444** to **22 445** *3 f. 0.5 kHz*	**26 121** to **26 122** *3 f. 0.5 kHz*
Limits (kHz)	4 221	6 332.5	8 438	12 658.5	16 904.5	19 705	22 445.5	26 122.5

Table of frequencies (kHz) to be used in the band between 4 000 kHz and 27 500 kHz allocated exclusively to the maritime mobile service
(end)

Band (MHz)	**4**	**6**	**8**	**12**	**16**	**18/19**	**22**	**25/26**
Limits (kHz)	4 221	6 332.5	8 438	12 658.5	16 904.5	19 705	22 445.5	26 122.5
Frequencies assignable to coast stations for wide-band and A1A or A1B Morse telegraphy, facsimile, special and data transmission systems and direct-printing telegraphy systems								
Limits (kHz)	4 351	6 501	8 707	13 077	17 242	19 755	22 696	26 145
Frequencies assignable to coast stations for telephony, duplex operation *a)*	**4 352.4** to **4 436.4** *29 f. 3 kHz*	**6 502.4** to **6 523.4** *8 f. 3 kHz*	**8 708.4** to **8 813.4** *36 f. 3 kHz*	**13 078.4** to **13 198.4** *41 f. 3 kHz*	**17 243.4** to **17 408.4** *56 f. 3 kHz*	**19 756.4** to **19 798.4** *15 f. 3 kHz*	**22 697.4** to **22 853.4** *53 f. 3 kHz*	**26 146.4** to **26 173.4** *10 f. 3 kHz*
Limits (kHz)	4 438	6 525	8 815	13 200	17 410	19 800	22 855	26 175

a) See Part B, Section I.

b) See Part B, Section III.

c) The frequency bands may also be used by buoy stations for oceanographic data tranmission and by stations interrogating these buoys.

d) See Part B, Section II.

e) In the frequency bands to be used by ship stations for A1A Morse telegraphy working at speeds not exceeding 40 Bd, administrations may assign additional frequencies interleaved between the assignable frequencies. Any frequencies so assigned shall be multiples of 100 Hz. Administrations shall ensure a uniform distribution of such assignments within the bands.

f) See Part B, Section V.

g) See Part B, Section IV.

h) For the conditions of use of the frequency 8 364 kHz, see Appendix **S13**.

i) For the use of the carrier frequencies 4 125 kHz, 6 215 kHz, 8 291 kHz, 12 290 kHz and 16 420 kHz in these sub-bands by ship and coast stations for distress and safety purposes, by single-sideband radiotelephony, see Article **S31** and Appendix **S13**.

j) For the use of the frequencies 4 177.5 kHz, 6 268 kHz, 8 376.5 kHz, 12 520 kHz and 16 695 kHz in these sub-bands by ship and coast stations for distress and safety purposes, by NBDP telegraphy, see Article **S31**.

k) For the use of the frequencies 4 207.5 kHz, 6 312 kHz, 8 414.5 kHz, 12 577 kHz and 16 804.5 kHz in these sub-bands by ship and coast stations for distress and safety purposes, by digital selective calling, see Article **S31**.

l) The following paired frequencies (for ship/coast stations) 4 208/4 219.5 kHz, 6 312.5/6 331 kHz, 8 415/ 8 436.5 kHz, 12 577.5/12 657 kHz, 16 805/16 903 kHz, 18 898.5/19 703.5 kHz, 22 374.5/22 444 kHz and 25 208.5/26 121 kHz are the first choice international frequencies for digital selective calling (see Article **S54**).

m) Frequencies from these frequency bands may also be used for A1A or A1B Morse telegraphy (working) (see Part B, Section II).

n) The frequencies 4 210 kHz, 6 314 kHz, 8 416.5 kHz, 12 579 kHz, 16 806.5 kHz, 19 680.5 kHz, 22 376 kHz et 26 100.5 kHz are the exclusive international frequencies for the transmission of Maritime Safety Information (MSI) (see Articles **S31** and **S33**.

o) The frequency 4 209.5 kHz is an exclusive international frequency for the transmission of NAVTEX type information (see Articles **S31** and **S33**).

PART B – Channelling arrangements

Section I – Radiotelephony

1 Radiotelephone channelling arrangements for the frequencies to be used by coast and ship stations in the bands allocated to the maritime mobile service are indicated in the following Sub-Sections:

Sub-Section A – Table of single-sideband transmitting frequencies (kHz) for duplex (two-frequency) operation;

Sub-Section B – Table of single-sideband transmitting frequencies (kHz) for simplex (single-frequency) operation and for intership cross-band (two-frequency) operation;

Sub-Section C-1 – Table of recommended single-sideband transmitting frequencies (kHz) for ship stations in the band 4 000-4 063 kHz shared with the fixed service;

Sub-Section C-2 – Table of recommended single-sideband transmitting frequencies (kHz) for ship and coast stations in the band 8 100-8 195 kHz shared with the fixed service.

2 The technical characteristics for single-sideband transmitters are specified in ITU-R Recommendation M.1173.

3 One or more series of frequencies from Sub-Section A (with the exception of those frequencies mentioned in § 5 below) may be assigned to each coast station, which uses these frequencies associated in pairs (see No. **S52.226**); each pair consists of a transmitting and a receiving frequency. The series shall be selected with due regard to the areas served and so as to avoid, as far as possible, harmful interference between the services of different coast stations.

4 The frequencies in Sub-Section B are provided for worldwide common use by ships of all categories, according to traffic requirements, for ship transmissions to coast stations and for intership communication. They are also authorized for worldwide common use for transmissions by coast stations (simplex operation) provided the peak envelope power does not exceed 1 kW.

5 The following frequencies in Sub-Section A are allocated for calling purposes:

– Channel No. 421 in the 4 MHz band;

– Channel No. 606 in the 6 MHz band;

– Channel No. 821 in the 8 MHz band;

– Channel No. 1221 in the 12 MHz band;

– Channel No. 1621 in the 16 MHz band;

– Channel No. 1806 in the 18 MHz band;

– Channel No. 2221 in the 22 MHz band;

– Channel No. 2510 in the 25 MHz band.

The remaining frequencies in Sub-Sections A, B, C-1 and C-2 are working frequencies.

5A For the use of the carrier frequencies:

4 125 kHz (Channel No. 421)

6 215 kHz (Channel No. 606)

8 291 kHz (Channel No. 833)

12 290 kHz (Channel No. 1221)

16 420 kHz (Channel No. 1621)

in Sub-Section A, by coast and ship stations for distress and safety purposes, see Article **S31** and Appendix **S13**.

6 *a)* Maritime radiotelephone stations using single-sideband emissions in the bands between 4 000 kHz and 27 500 kHz exclusively allocated to the maritime mobile service shall operate only on the carrier frequencies shown in the Sub-Sections A and B in conformity with the technical characteristics specified in Recommendation ITU-R M.1173.

b) Ship stations, when using frequencies for single-sideband radiotelephony from the bands 4 000-4 063 kHz and ship and coast stations, when using frequencies for single-sideband radiotelephony in the band 8 100-8 195 kHz should operate on the carrier frequencies indicated in Sub-Sections C-1 and C-2 respectively. Technical characteristics of the equipment shall be those specified in Recommendation ITU-R M.1173.

c) Stations employing the single-sideband mode shall use only class J3E emissions.

7 The channelling plan established in Sub-Section C-2 does not prejudice the rights of administrations to establish, and to notify assignments to stations in the maritime mobile service other than those using radiotelephony in the band 8 100-8 195 kHz, in conformity with the relevant provisions of these Regulations.

8 For the use and notification of Channel Nos. 427, 428, 429, 607, 608, 832, 834, 835, 836, 837, 1233 up to and including 1241, 1642 up to and including 1656, 1801 up to and including 1805, 1807 up to and including 1815, 2241 up to and including 2253 and 2501 up to and including 2509, see Resolution **325 (Mob-87)**[*].

[*] This Resolution was abrogated by WRC-95.

Sub-Section A

Table of single-sideband transmitting frequencies (kHz) for duplex (two-frequency) operation

Channel No.	4 MHz band			
	Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
401	4 357	4 358.4	4 065	4 066.4
402	4 360	4 361.4	4 068	4 069.4
403	4 363	4 364.4	4 071	4 072.4
404	4 366	4 367.4	4 074	4 075.4
405	4 369	4 370.4	4 077	4 078.4
406	4 372	4 373.4	4 080	4 081.4
407	4 375	4 376.4	4 083	4 084.4
408	4 378	4 379.4	4 086	4 087.4
409	4 381	4 382.4	4 089	4 090.4
410	4 384	4 385.4	4 092	4 093.4
411	4 387	4 388.4	4 095	4 096.4
412	4 390	4 391.4	4 098	4 099.4
413	4 393	4 394.4	4 101	4 102.4
414	4 396	4 397.4	4 104	4 105.4
415	4 399	4 400.4	4 107	4 108.4
416	4 402	4 403.4	4 110	4 111.4
417	4 405	4 406.4	4 113	4 114.4
418	4 408	4 409.4	4 116	4 117.4
419	4 411	4 412.4	4 119	4 120.4
420	4 414	4 415.4	4 122	4 123.4
421	4 417 *	4 418.4 *	4 125 * [4]	4 126.4 *
422	4 420	4 421.4	4 128	4 129.4
423	4 423	4 424.4	4 131	4 132.4
424	4 426	4 427.4	4 134	4 135.4
425	4 429	4 430.4	4 137	4 138.4
426	4 432	4 433.4	4 140	4 141.4
427 [2]	4 435	4 436.4	4 143	4 144.4
428 [1, 2, 3]	4 351	4 352.4	–	–
429 [1, 2, 3]	4 354	4 355.4	–	–

Channel No.	6 MHz band			
	Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
601	6 501	6 502.4	6 200	6 201.4
602	6 504	6 505.4	6 203	6 204.4
603	6 507	6 508.4	6 206	6 207.4
604	6 510	6 511.4	6 209	6 210.4
605	6 513	6 514.4	6 212	6 213.4
606	6 516 *	6 517.4 *	6 215 * [5]	6 216.4 *
607 [2]	6 519	6 520.4	6 218	6 219.4
608 [2]	6 522	6 523.4	6 221	6 222.4

Channel No.	8 MHz band			
	Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
801	8 719	8 720.4	8 195	8 196.4
802	8 722	8 723.4	8 198	8 199.4
803	8 725	8 726.4	8 201	8 202.4
804	8 728	8 729.4	8 204	8 205.4
805	8 731	8 732.4	8 207	8 208.4
806	8 734	8 735.4	8 210	8 211.4
807	8 737	8 738.4	8 213	8 214.4
808	8 740	8 741.4	8 216	8 217.4
809	8 743	8 744.4	8 219	8 220.4
810	8 746	8 747.4	8 222	8 223.4
811	8 749	8 750.4	8 225	8 226.4
812	8 752	8 753.4	8 228	8 229.4
813	8 755	8 756.4	8 231	8 232.4
814	8 758	8 759.4	8 234	8 235.4
815	8 761	8 762.4	8 237	8 238.4
816	8 764	8 765.4	8 240	8 241.4
817	8 767	8 768.4	8 243	8 244.4
818	8 770	8 771.4	8 246	8 247.4
819	8 773	8 774.4	8 249	8 250.4
820	8 776	8 777.4	8 252	8 253.4
821	8 779 *	8 780.4 *	8 255 *	8 256.4 *
822	8 782	8 783.4	8 258	8 259.4
823	8 785	8 786.4	8 261	8 262.4
824	8 788	8 789.4	8 264	8 265.4
825	8 791	8 792.4	8 267	8 268.4
826	8 794	8 795.4	8 270	8 271.4
827	8 797	8 798.4	8 273	8 274.4
828	8 800	8 801.4	8 276	8 277.4
829	8 803	8 804.4	8 279	8 280.4
830	8 806	8 807.4	8 282	8 283.4
831	8 809	8 810.4	8 285	8 286.4
832 [2]	8 812	8 813.4	8 288	8 289.4
833	8 291 [7]	8 292.4	8 291 [7]	8 292.4
834 [2, 3, 6]	8 707	8 708.4	–	–
835 [2, 3, 6]	8 710	8 711.4	–	–
836 [2, 3, 6]	8 713	8 714.4	–	–
837 [2, 3, 6]	8 716	8 717.4	–	–

Channel No.	12 MHz band			
	Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
1201	13 077	13 078.4	12 230	12 231.4
1202	13 080	13 081.4	12 233	12 234.4
1203	13 083	13 084.4	12 236	12 237.4
1204	13 086	13 087.4	12 239	12 240.4
1205	13 089	13 090.4	12 242	12 243.4

(continued)

Channel No.	12 MHz band *(end)*			
	Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
1206	13 092	13 093.4	12 245	12 246.4
1207	13 095	13 096.4	12 248	12 249.4
1208	13 098	13 099.4	12 251	12 252.4
1209	13 101	13 102.4	12 254	12 255.4
1210	13 104	13 105.4	12 257	12 258.4
1211	13 107	13 108.4	12 260	12 261.4
1212	13 110	13 111.4	12 263	12 264.4
1213	13 113	13 114.4	12 266	12 267.4
1214	13 116	13 117.4	12 269	12 270.4
1215	13 119	13 120.4	12 272	12 273.4
1216	13 122	13 123.4	12 275	12 276.4
1217	13 125	13 126.4	12 278	12 279.4
1218	13 128	13 129.4	12 281	12 282.4
1219	13 131	13 132.4	12 284	12 285.4
1220	13 134	13 135.4	12 287	12 288.4
1221	13 137 *	13 138.4 *	12 290 * [8]	12 291.4 *
1222	13 140	13 141.4	12 293	12 294.4
1223	13 143	13 144.4	12 296	12 297.4
1224	13 146	13 147.4	12 299	12 300.4
1225	13 149	13 150.4	12 302	12 303.4
1226	13 152	13 153.4	12 305	12 306.4
1227	13 155	13 156.4	12 308	12 309.4
1228	13 158	13 159.4	12 311	12 312.4
1229	13 161	13 162.4	12 314	12 315.4
1230	13 164	13 165.4	12 317	12 318.4
1231	13 167	13 168.4	12 320	12 321.4
1232	13 170	13 171.4	12 323	12 324.4
1233 [2]	13 173	13 174.4	12 326	12 327.4
1234 [2]	13 176	13 177.4	12 329	12 330.4
1235 [2]	13 179	13 180.4	12 332	12 333.4
1236 [2]	13 182	13 183.4	12 335	12 336.4
1237 [2]	13 185	13 186.4	12 338	12 339.4
1238 [2]	13 188	13 189.4	12 341	12 342.4
1239 [2]	13 191	13 192.4	12 344	12 345.4
1240 [2]	13 194	13 195.4	12 347	12 348.4
1241 [2]	13 197	13 198.4	12 350	12 351.4

Channel No.	16 MHz band			
	Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
1601	17 242	17 243.4	16 360	16 361.4
1602	17 245	17 246.4	16 363	16 364.4
1603	17 248	17 249.4	16 366	16 367.4
1604	17 251	17 252.4	16 369	16 370.4
1605	17 254	17 255.4	16 372	16 373.4

(continued)

Channel No.	16 MHz band *(end)*			
	Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
1606	17 257	17 258.4	16 375	16 376.4
1607	17 260	17 261.4	16 378	16 379.4
1608	17 263	17 264.4	16 381	16 382.4
1609	17 266	17 267.4	16 384	16 385.4
1610	17 269	17 270.4	16 387	16 388.4
1611	17 272	17 273.4	16 390	16 391.4
1612	17 275	17 276.4	16 393	16 394.4
1613	17 278	17 279.4	16 396	16 397.4
1614	17 281	17 282.4	16 399	16 400.4
1615	17 284	17 285.4	16 402	16 403.4
1616	17 287	17 288.4	16 405	16 406.4
1617	17 290	17 291.4	16 408	16 409.4
1618	17 293	17 294.4	16 411	16 412.4
1619	17 296	17 297.4	16 414	16 415.4
1620	17 299	17 300.4	16 417	16 418.4
1621	17 302 *	17 303.4 *	16 420 * [9]	16 421.4 *
1622	17 305	17 306.4	16 423	16 424.4
1623	17 308	17 309.4	16 426	16 427.4
1624	17 311	17 312.4	16 429	16 430.4
1625	17 314	17 315.4	16 432	16 433.4
1626	17 317	17 318.4	16 435	16 436.4
1627	17 320	17 321.4	16 438	16 439.4
1628	17 323	17 324.4	16 441	16 442.4
1629	17 326	17 327.4	16 444	16 445.4
1630	17 329	17 330.4	16 447	16 448.4
1631	17 332	17 333.4	16 450	16 451.4
1632	17 335	17 336.4	16 453	16 454.4
1633	17 338	17 339.4	16 456	16 457.4
1634	17 341	17 342.4	16 459	16 460.4
1635	17 344	17 345.4	16 462	16 463.4
1636	17 347	17 348.4	16 465	16 466.4
1637	17 350	17 351.4	16 468	16 469.4
1638	17 353	17 354.4	16 471	16 472.4
1639	17 356	17 357.4	16 474	16 475.4
1640	17 359	17 360.4	16 477	16 478.4
1641	17 362	17 363.4	16 480	16 481.4
1642 [2]	17 365	17 366.4	16 483	16 484.4
1643 [2]	17 368	17 369.4	16 486	16 487.4
1644 [2]	17 371	17 372.4	16 489	16 490.4
1645 [2]	17 374	17 375.4	16 492	16 493.4
1646 [2]	17 377	17 378.4	16 495	16 496.4
1647 [2]	17 380	17 381.4	16 498	16 499.4
1648 [2]	17 383	17 384.4	16 501	16 502.4
1649 [2]	17 386	17 387.4	16 504	16 505.4
1650 [2]	17 389	17 390.4	16 507	16 508.4
1651 [2]	17 392	17 393.4	16 510	16 511.4
1652 [2]	17 395	17 396.4	16 513	16 514.4
1653 [2]	17 398	17 399.4	16 516	16 517.4
1654 [2]	17 401	17 402.4	16 519	16 520.4
1655 [2]	17 404	17 405.4	16 522	16 523.4
1656 [2]	17 407	17 408.4	16 525	16 526.4

Channel No.	18/19 MHz band			
	Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
1801 [2]	19 755	19 756.4	18 780	18 781.4
1802 [2]	19 758	19 759.4	18 783	18 784.4
1803 [2]	19 761	19 762.4	18 786	18 787.4
1804 [2]	19 764	19 765.4	18 789	18 790.4
1805 [2]	19 767	19 768.4	18 792	18 793.4
1806	19 770 *	19 771.4 *	18 795 *	18 796.4 *
1807 [2]	19 773	19 774.4	18 798	18 799.4
1808 [2]	19 776	19 777.4	18 801	18 802.4
1809 [2]	19 779	19 780.4	18 804	18 805.4
1810 [2]	19 782	19 783.4	18 807	18 808.4
1811 [2]	19 785	19 786.4	18 810	18 811.4
1812 [2]	19 788	19 789.4	18 813	18 814.4
1813 [2]	19 791	19 792.4	18 816	18 817.4
1814 [2]	19 794	19 795.4	18 819	18 820.4
1815 [2]	19 797	19 798.4	18 822	18 823.4

Channel No.	22 MHz band			
	Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
2201	22 696	22 697.4	22 000	22 001.4
2202	22 699	22 700.4	22 003	22 004.4
2203	22 702	22 703.4	22 006	22 007.4
2204	22 705	22 706.4	22 009	22 010.4
2205	22 708	22 709.4	22 012	22 013.4
2206	22 711	22 712.4	22 015	22 016.4
2207	22 714	22 715.4	22 018	22 019.4
2208	22 717	22 718.4	22 021	22 022.4
2209	22 720	22 721.4	22 024	22 025.4
2210	22 723	22 724.4	22 027	22 028.4
2211	22 726	22 727.4	22 030	22 031.4
2212	22 729	22 730.4	22 033	22 034.4
2213	22 732	22 733.4	22 036	22 037.4
2214	22 735	22 736.4	22 039	22 040.4
2215	22 738	22 739.4	22 042	22 043.4
2216	22 741	22 742.4	22 045	22 046.4
2217	22 744	22 745.4	22 048	22 049.4
2218	22 747	22 748.4	22 051	22 052.4
2219	22 750	22 751.4	22 054	22 055.4
2220	22 753	22 754.4	22 057	22 058.4
2221	22 756 *	22 757.4 *	22 060 *	22 061.4 *
2222	22 759	22 760.4	22 063	22 064.4
2223	22 762	22 763.4	22 066	22 067.4
2224	22 765	22 766.4	22 069	22 070.4
2225	22 768	22 769.4	22 072	22 073.4

(continued)

Channel No.	22 MHz band *(end)*			
	Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
2226	22 771	22 772.4	22 075	22 076.4
2227	22 774	22 775.4	22 078	22 079.4
2228	22 777	22 778.4	22 081	22 082.4
2229	22 780	22 781.4	22 084	22 085.4
2230	22 783	22 784.4	22 087	22 088.4
2231	22 786	22 787.4	22 090	22 091.4
2232	22 789	22 790.4	22 093	22 094.4
2233	22 792	22 793.4	22 096	22 097.4
2234	22 795	22 796.4	22 099	22 100.4
2235	22 798	22 799.4	22 102	22 103.4
2236	22 801	22 802.4	22 105	22 106.4
2237	22 804	22 805.4	22 108	22 109.4
2238	22 807	22 808.4	22 111	22 112.4
2239	22 810	22 811.4	22 114	22 115.4
2240	22 813	22 814.4	22 117	22 118.4
2241 [2]	22 816	22 817.4	22 120	22 121.4
2242 [2]	22 819	22 820.4	22 123	22 124.4
2243 [2]	22 822	22 823.4	22 126	22 127.4
2244 [2]	22 825	22 826.4	22 129	22 130.4
2245 [2]	22 828	22 829.4	22 132	22 133.4
2246 [2]	22 831	22 832.4	22 135	22 136.4
2247 [2]	22 834	22 835.4	22 138	22 139.4
2248 [2]	22 837	22 838.4	22 141	22 142.4
2249 [2]	22 840	22 841.4	22 144	22 145.4
2250 [2]	22 843	22 844.4	22 147	22 148.4
2251 [2]	22 846	22 847.4	22 150	22 151.4
2252 [2]	22 849	22 850.4	22 153	22 154.4
2253 [2]	22 852	22 853.4	22 156	22 157.4

Channel No.	25/26 MHz band			
	Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
2501 [2]	26 145	26 146.4	25 070	25 071.4
2502 [2]	26 148	26 149.4	25 073	25 074.4
2503 [2]	26 151	26 152.4	25 076	25 077.4
2504 [2]	26 154	26 155.4	25 079	25 080.4
2505 [2]	26 157	26 158.4	25 082	25 083.4
2506 [2]	26 160	26 161.4	25 085	25 086.4
2507 [2]	26 163	26 164.4	25 088	25 089.4
2508 [2]	26 166	26 167.4	25 091	25 092.4
2509 [2]	26 169	26 170.4	25 094	25 095.4
2510	26 172 *	26 173.4 *	25 097 *	25 098.4 *

1 These coast station frequencies may be paired with a ship station frequency from the table of simplex frequencies for ship and coast stations (see Sub-Section B) or with a frequency from the band 4 000-4 063 kHz (see Sub-Section C-1) to be selected by the administration concerned.

2 For the use and notification of these frequencies, see Resolution **325 (Mob-87)***.

3 These channels may also be used for simplex (single frequency) operation.

4 For the conditions of use of the carrier frequency 4 125 kHz, see Nos. **S52.224** and **S52.225**, and Appendix **S15**.

5 For the conditions of use of the carrier frequency 6 215 kHz, see Appendices **S13** and **S15**.

6 These coast station frequencies may be paired with a ship station frequency from the table of simplex frequencies for ship and coast stations (see Sub-Section B) or with a frequency from the band 8 100-8 195 kHz (see Sub-Section C-2) to be selected by the administration concerned.

7 For the conditions of use of the carrier frequency 8 291 kHz, see Appendix **S15**.

8 For the conditions of use of the carrier frequency 12 290 kHz, see Appendix **S15**.

9 For the conditions of use of the carrier frequency 16 420 kHz, see Appendix **S15**.

* The frequencies followed by an asterisk are calling frequencies (see Nos. **S52.221** and **S52.222**).

Sub-Section B

Table of single-sideband transmitting frequencies (kHz) for simplex (single-frequency) operation and for intership cross-band (two-frequency) operation

(See § 4 of Section I of this Appendix)

4 MHz band[1]		6 MHz band		8 MHz band[2]		12 MHz band	
Carrier frequency	**Assigned frequency**	**Carrier frequency**	**Assigned frequency**	**Carrier frequency**	**Assigned frequency**	**Carrier frequency**	**Assigned frequency**
4 146	4 147.4	6 224	6 225.4	8 294	8 295.4	12 353	12 354.4
4 149	4 150.4	6 227	6 228.4	8 297	8 298.4	12 356	12 357.4
		6 230	6 231.4			12 359	12 360.4
						12 362	12 363.4
						12 365	12 366.4

1 These frequencies may be used for duplex operation with coast stations operating on Channel Nos. 428 and 429 (see Sub-Section A).

2 These frequencies may be used for duplex operation with coast stations operating on Channel Nos. 834 up to and including 837 (see Sub-Section A).

* This Resolution was abrogated by WRC-95.

16 MHz band		18/19 MHz band		22 MHz band		25/26 MHz band	
Carrier frequency	**Assigned frequency**	**Carrier frequency**	**Assigned frequency**	**Carrier frequency**	**Assigned frequency**	**Carrier frequency**	**Assigned frequency**
16 528	16 529.4	18 825	18 826.4	22 159	22 160.4	25 100	25 101.4
16 531	16 532.4	18 828	18 829.4	22 162	22 163.4	25 103	25 104.4
16 534	16 535.4	18 831	18 832.4	22 165	22 166.4	25 106	25 107.4
16 537	16 538.4	18 834	18 835.4	22 168	22 169.4	25 109	25 110.4
16 540	16 541.4	18 837	18 838.4	22 171	22 172.4	25 112	25 113.4
16 543	16 544.4	18 840	18 841.4	22 174	22 175.4	25 115	25 116.4
16 546	16 547.4	18 843	18 844.4	22 177	22 178.4	25 118	25 119.4

Sub-Section C-1

Table of recommended single-sideband transmitting frequencies (kHz) for ship stations in the band 4 000-4 063 kHz shared with the fixed service

The frequencies in this Sub-Section may be used:

– for supplementing ship-to-shore channels for duplex operation in Sub-Section A;

– for intership simplex (single-frequency) and cross-band operation;

– for cross-band working with coast stations on channels in Sub-Section C-2;

– for duplex operation with coast stations working in the band 4 438-4 650 kHz;

– for duplex operation with Channel Nos. 428 and 429.

Channel No.	Carrier frequency	Assigned frequency	Channel No.	Carrier frequency	Assigned frequency
1	4 000*	4 001.4*	12	4 033	4 034.4
2	4 003*	4 004.4*	13	4 036	4 037.4
3	4 006	4 007.4	14	4 039	4 040.4
4	4 009	4 010.4	15	4 042	4 043.4
5	4 012	4 013.4	16	4 045	4 046.4
6	4 015	4 016.4	17	4 048	4 049.4
7	4 018	4 019.4	18	4 051	4 052.4
8	4 021	4 022.4	19	4 054	4 055.4
9	4 024	4 025.4	20	4 057	4 058.4
10	4 027	4 028.4	21	4 060	4 061.4
11	4 030	4 031.4			

* Administrations are requested to urge ship stations under their jurisdiction to refrain from using the band 4 000-4 005 kHz when navigating in Region 3 (see also No. **S5.126**).

Sub-Section C-2

Table of recommended single-sideband transmitting frequencies (kHz) for ship and coast stations in the band 8 100-8 195 kHz shared with the fixed service

(See § 7 of Section I of this Appendix)

The frequencies in this Sub-Section may be used:

– for supplementing ship-to-shore and shore-to-ship channels for duplex operation in Sub-Section A;

– for intership simplex (single frequency) and cross-band operation;

– for cross-band working with ship stations on channels in Sub-Section C-1;

– for ship-to-shore or shore-to-ship simplex operation;

– for duplex operation with Channel Nos. 834, 835, 836 and 837.

Channel No.	Carrier frequency	Assigned frequency	Channel No.	Carrier frequency	Assigned frequency
1	8 101	8 102.4	17	8 149	8 150.4
2	8 104	8 105.4	18	8 152	8 153.4
3	8 107	8 108.4	19	8 155	8 156.4
4	8 110	8 111.4	20	8 158	8 159.4
5	8 113	8 114.4	21	8 161	8 162.4
6	8 116	8 117.4	22	8 164	8 165.4
7	8 119	8 120.4	23	8 167	8 168.4
8	8 122	8 123.4	24	8 170	8 171.4
9	8 125	8 126.4	25	8 173	8 174.4
10	8 128	8 129.4	26	8 176	8 177.4
11	8 131	8 132.4	27	8 179	8 180.4
12	8 134	8 135.4	28	8 182	8 183.4
13	8 137	8 138.4	29	8 185	8 186.4
14	8 140	8 141.4	30	8 188	8 189.4
15	8 143	8 144.4	31	8 191	8 192.4
16	8 146	8 147.4			

Section II – Narrow-band direct-printing telegraphy (paired frequencies)

1 Each coast station which uses paired frequencies is assigned one or more frequency pairs from the following series; each pair consists of a transmitting and a receiving frequency.

2 The speed of the narrow-band direct-printing telegraphy and data systems shall not exceed 100 Bd for FSK and 200 Bd for PSK.

Table of frequencies for two-frequency operation by coast stations (kHz)

Channel No.	4 MHz band [1]		6 MHz band [3]		8 MHz band [4]	
	Transmit	Receive	Transmit	Receive	Transmit	Receive
1	4 210.5	4 172.5	6 314.5	6 263	8 376.5 [2]	8 376.5 [2]
2	4 211	4 173	6 315	6 263.5	8 417	8 377
3	4 211.5	4 173.5	6 315.5	6 264	8 417.5	8 377.5
4	4 212	4 174	6 316	6 264.5	8 418	8 378
5	4 212.5	4 174.5	6 316.5	6 265	8 418.5	8 378.5
6	4 213	4 175	6 317	6 265.5	8 419	8 379
7	4 213.5	4 175.5	6 317.5	6 266	8 419.5	8 379.5
8	4 214	4 176	6 318	6 266.5	8 420	8 380
9	4 214.5	4 176.5	6 318.5	6 267	8 420.5	8 380.5
10	4 215	4 177	6 319	6 267.5	8 421	8 381
11	4 177.5 [2]	4 177.5 [2]	6 268 [2]	6 268 [2]	8 421.5	8 381.5
12	4 215.5	4 178	6 319.5	6 268.5	8 422	8 382
13	4 216	4 178.5	6 320	6 269	8 422.5	8 382.5
14	4 216.5	4 179	6 320.5	6 269.5	8 423	8 383
15	4 217	4 179.5	6 321	6 270	8 423.5	8 383.5
16	4 217.5	4 180	6 321.5	6 270.5	8 424	8 384
17	4 218	4 180.5	6 322	6 271	8 424.5	8 384.5
18	4 218.5	4 181	6 322.5	6 271.5	8 425	8 385
19	4 219	4 181.5	6 323	6 272	8 425.5	8 385.5
20			6 323.5	6 272.5	8 426	8 386
21			6 324	6 273	8 426.5	8 386.5
22			6 324.5	6 273.5	8 427	8 387
23			6 325	6 274	8 427.5	8 387.5
24			6 325.5	6 274.5	8 428	8 388
25			6 326	6 275	8 428.5	8 388.5
26			6 326.5	6 275.5	8 429	8 389
27			6 327	6 281	8 429.5	8 389.5
28			6 327.5	6 281.5	8 430	8 390
29			6 328	6 282	8 430.5	8 390.5
30			6 328.5	6 282.5	8 431	8 391
31			6 329	6 283	8 431.5	8 391.5
32			6 329.5	6 283.5	8 432	8 392
33			6 330	6 284	8 432.5	8 392.5
34			6 330.5	6 284.5	8 433	8 393
35					8 433.5	8 393.5
36					8 434	8 394
37					8 434.5	8 394.5
38					8 435	8 395
39					8 435.5	8 395.5
40					8 436	8 396

1 Ship stations may use the coast station receiving frequencies for transmitting A1A or A1B Morse telegraphy (working), with the exception of channel No. 11 (see Appendix **S15**).

2 For the conditions of use of this frequency, see Article **S31**.

3 Ship stations may use the coast station receiving frequencies of channel Nos. 25 up to and including 34 for transmitting A1A or A1B Morse telegraphy (working).

4 Ship stations may use the coast station receiving frequencies of channel Nos. 29 up to and including 40 for transmitting A1A or A1B Morse telegraphy (working).

Table of frequencies for two-frequency operation by coast stations (kHz)

Channel No.	12 MHz band [5]		16 MHz band [6]		18/19 MHz band *(end)*	
	Transmit	Receive	Transmit	Receive	Transmit	Receive
1	12 579.5	12 477	16 807	16 683.5	19 681	18 870.5
2	12 580	12 477.5	16 807.5	16 684	19 681.5	18 871
3	12 580.5	12 478	16 808	16 684.5	19 682	18 871.5
4	12 581	12 478.5	16 808.5	16 685	19 682.5	18 872
5	12 581.5	12 479	16 809	16 685.5	19 683	18 872.5
6	12 582	12 479.5	16 809.5	16 686	19 683.5	18 873
7	12 582.5	12 480	16 810	16 686.5	19 684	18 873.5
8	12 583	12 480.5	16 810.5	16 687	19 684.5	18 874
9	12 583.5	12 481	16 811	16 687.5	19 685	18 874.5
10	12 584	12 481.5	16 811.5	16 688	19 685.5	18 875
11	12 584.5	12 482	16 812	16 688.5	19 686	18 875.5
12	12 585	12 482.5	16 812.5	16 689	19 686.5	18 876
13	12 585.5	12 483	16 813	16 689.5	19 687	18 876.5
14	12 586	12 483.5	16 813.5	16 690	19 687.5	18 877
15	12 586.5	12 484	16 814	16 690.5	19 688	18 877.5
16	12 587	12 484.5	16 814.5	16 691	19 688.5	18 878
17	12 587.5	12 485	16 815	16 691.5	19 689	18 878.5
18	12 588	12 485.5	16 815.5	16 692	19 689.5	18 879
19	12 588.5	12 486	16 816	16 692.5	19 690	18 879.5
20	12 589	12 486.5	16 816.5	16 693	19 690.5	18 880
21	12 589.5	12 487	16 817	16 693.5	19 691	18 880.5
22	12 590	12 487.5	16 817.5	16 694	19 691.5	18 881
23	12 590.5	12 488	16 818	16 694.5	19 692	18 881.5
24	12 591	12 488.5	16 695 [2]	16 695 [2]	19 692.5	18 882
25	12 591.5	12 489	16 818.5	16 695.5	19 693	18 882.5
26	12 592	12 489.5	16 819	16 696	19 693.5	18 883
27	12 592.5	12 490	16 819.5	16 696.5	19 694	18 883.5
28	12 593	12 490.5	16 820	16 697	19 694.5	18 884
29	12 593.5	12 491	16 820.5	16 697.5	19 695	18 884.5
30	12 594	12 491.5	16 821	16 698	19 695.5	18 885
31	12 594.5	12 492	16 821.5	16 698.5	19 696	18 885.5
32	12 595	12 492.5	16 822	16 699	19 696.5	18 886
33	12 595.5	12 493	16 822.5	16 699.5	19 697	18 886.5
34	12 596	12 493.5	16 823	16 700	19 697.5	18 887
35	12 596.5	12 494	16 823.5	16 700.5	19 698	18 887.5
36	12 597	12 494.5	16 824	16 701	19 698.5	18 888
37	12 597.5	12 495	16 824.5	16 701.5	19 699	18 888.5
38	12 598	12 495.5	16 825	16 702	19 699.5	18 889
39	12 598.5	12 496	16 825.5	16 702.5	19 700	18 889.5
40	12 599	12 496.5	16 826	16 703	19 700.5	18 890
41	12 599.5	12 497	16 826.5	16 703.5	19 701	18 890.5
42	12 600	12 497.5	16 827	16 704	19 701.5	18 891
43	12 600.5	12 498	16 827.5	16 704.5	19 702	18 891.5
44	12 601	12 498.5	16 828	16 705	19 702.5	18 892
45	12 601.5	12 499	16 828.5	16 705.5	19 703	18 892.5

[5] Ship stations may use the coast station receiving frequencies of channel Nos. 58 up to and including 156 for transmitting A1A or A1B Morse telegraphy (working), with the exception of channel No. 87 (see Appendix **S15**).

[6] Ship stations may use the coast station receiving frequencies of channel Nos. 71 up to and including 193 for transmitting A1A or A1B Morse telegraphy (working).

Table of frequencies for two-frequency operation by coast stations (kHz)

Channel No.	12 MHz band [5] *(cont.)*		16 MHz band [6] *(cont.)*	
	Transmit	**Receive**	**Transmit**	**Receive**
46	12 602	12 499.5	16 829	16 706
47	12 602.5	12 500	16 829.5	16 706.5
48	12 603	12 500.5	16 830	16 707
49	12 603.5	12 501	16 830.5	16 707.5
50	12 604	12 501.5	16 831	16 708
51	12 604.5	12 502	16 831.5	16 708.5
52	12 605	12 502.5	16 832	16 709
53	12 605.5	12 503	16 832.5	16 709.5
54	12 606	12 503.5	16 833	16 710
55	12 606.5	12 504	16 833.5	16 710.5
56	12 607	12 504.5	16 834	16 711
57	12 607.5	12 505	16 834.5	16 711.5
58	12 608	12 505.5	16 835	16 712
59	12 608.5	12 506	16 835.5	16 712.5
60	12 609	12 506.5	16 836	16 713
61	12 609.5	12 507	16 836.5	16 713.5
62	12 610	12 507.5	16 837	16 714
63	12 610.5	12 508	16 837.5	16 714.5
64	12 611	12 508.5	16 838	16 715
65	12 611.5	12 509	16 838.5	16 715.5
66	12 612	12 509.5	16 839	16 716
67	12 612.5	12 510	16 839.5	16 716.5
68	12 613	12 510.5	16 840	16 717
69	12 613.5	12 511	16 840.5	16 717.5
70	12 614	12 511.5	16 841	16 718
71	12 614.5	12 512	16 841.5	16 718.5
72	12 615	12 512.5	16 842	16 719
73	12 615.5	12 513	16 842.5	16 719.5
74	12 616	12 513.5	16 843	16 720
75	12 616.5	12 514	16 843.5	16 720.5
76	12 617	12 514.5	16 844	16 721
77	12 617.5	12 515	16 844.5	16 721.5
78	12 618	12 515.5	16 845	16 722
79	12 618.5	12 516	16 845.5	16 722.5
80	12 619	12 516.5	16 846	16 723
81	12 619.5	12 517	16 846.5	16 723.5
82	12 620	12 517.5	16 847	16 724
83	12 620.5	12 518	16 847.5	16 724.5
84	12 621	12 518.5	16 848	16 725
85	12 621.5	12 519	16 848.5	16 725.5
86	12 622	12 519.5	16 849	16 726
87	12 520 [2]	12 520 [2]	16 849.5	16 726.5
88	12 622.5	12 520.5	16 850	16 727
89	12 623	12 521	16 850.5	16 727.5
90	12 623.5	12 521.5	16 851	16 728
91	12 624	12 522	16 851.5	16 728.5
92	12 624.5	12 522.5	16 852	16 729
93	12 625	12 523	16 852.5	16 729.5
94	12 625.5	12 523.5	16 853	16 730
95	12 626	12 524	16 853.5	16 730.5

Table of frequencies for two-frequency operation by coast stations (kHz)

Channel No.	12 MHz band [5] *(cont.)*		16 MHz band [6] *(cont.)*	
	Transmit	**Receive**	**Transmit**	**Receive**
96	12 626.5	12 524.5	16 854	16 731
97	12 627	12 525	16 854.5	16 731.5
98	12 627.5	12 525.5	16 855	16 732
99	12 628	12 526	16 855.5	16 732.5
100	12 628.5	12 526.5	16 856	16 733
101	12 629	12 527	16 856.5	16 733.5
102	12 629.5	12 527.5	16 857	16 739
103	12 630	12 528	16 857.5	16 739.5
104	12 630.5	12 528.5	16 858	16 740
105	12 631	12 529	16 858.5	16 740.5
106	12 631.5	12 529.5	16 859	16 741
107	12 632	12 530	16 859.5	16 741.5
108	12 632.5	12 530.5	16 860	16 742
109	12 633	12 531	16 860.5	16 742.5
110	12 633.5	12 531.5	16 861	16 743
111	12 634	12 532	16 861.5	16 743.5
112	12 634.5	12 532.5	16 862	16 744
113	12 635	12 533	16 862.5	16 744.5
114	12 635.5	12 533.5	16 863	16 745
115	12 636	12 534	16 863.5	16 745.5
116	12 636.5	12 534.5	16 864	16 746
117	12 637	12 535	16 864.5	16 746.5
118	12 637.5	12 535.5	16 865	16 747
119	12 638	12 536	16 865.5	16 747.5
120	12 638.5	12 536.5	16 866	16 748
121	12 639	12 537	16 866.5	16 748.5
122	12 639.5	12 537.5	16 867	16 749
123	12 640	12 538	16 867.5	16 749.5
124	12 640.5	12 538.5	16 868	16 750
125	12 641	12 539	16 868.5	16 750.5
126	12 641.5	12 539.5	16 869	16 751
127	12 642	12 540	16 869.5	16 751.5
128	12 642.5	12 540.5	16 870	16 752
129	12 643	12 541	16 870.5	16 752.5
130	12 643.5	12 541.5	16 871	16 753
131	12 644	12 542	16 871.5	16 753.5
132	12 644.5	12 542.5	16 872	16 754
133	12 645	12 543	16 872.5	16 754.5
134	12 645.5	12 543.5	16 873	16 755
135	12 646	12 544	16 873.5	16 755.5
136	12 646.5	12 544.5	16 874	16 756
137	12 647	12 545	16 874.5	16 756.5
138	12 647.5	12 545.5	16 875	16 757
139	12 648	12 546	16 875.5	16 757.5
140	12 648.5	12 546.5	16 876	16 758
141	12 649	12 547	16 876.5	16 758.5
142	12 649.5	12 547.5	16 877	16 759
143	12 650	12 548	16 877.5	16 759.5
144	12 650.5	12 548.5	16 878	16 760
145	12 651	12 549	16 878.5	16 760.5

Table of frequencies for two-frequency operation by coast stations (kHz)

Channel No.	12 MHz band [5] *(end)*		16 MHz band [6] *(end)*	
	Transmit	Receive	Transmit	Receive
146	12 651.5	12 549.5	16 879	16 761
147	12 652	12 555	16 879.5	16 761.5
148	12 652.5	12 555.5	16 880	16 762
149	12 653	12 556	16 880.5	16 762.5
150	12 653.5	12 556.5	16 881	16 763
151	12 654	12 557	16 881.5	16 763.5
152	12 654.5	12 557.5	16 882	16 764
153	12 655	12 558	16 882.5	16 764.5
154	12 655.5	12 558.5	16 883	16 765
155	12 656	12 559	16 883.5	16 765.5
156	12 656.5	12 559.5	16 884	16 766
157			16 884.5	16 766.5
158			16 885	16 767
159			16 885.5	16 767.5
160			16 886	16 768
161			16 886.5	16 768.5
162			16 887	16 769
163			16 887.5	16 769.5
164			16 888	16 770
165			16 888.5	16 770.5
166			16 889	16 771
167			16 889.5	16 771.5
168			16 890	16 772
169			16 890.5	16 772.5
170			16 891	16 773
171			16 891.5	16 773.5
172			16 892	16 774
173			16 892.5	16 774.5
174			16 893	16 775
175			16 893.5	16 775.5
176			16 894	16 776
177			16 894.5	16 776.5
178			16 895	16 777
179			16 895.5	16 777.5
180			16 896	16 778
181			16 896.5	16 778.5
182			16 897	16 779
183			16 897.5	16 779.5
184			16 898	16 780
185			16 898.5	16 780.5
186			16 899	16 781
187			16 899.5	16 781.5
188			16 900	16 782
189			16 900.5	16 782.5
190			16 901	16 783
191			16 901.5	16 783.5
192			16 902	16 784
193			16 902.5	16 784.5

Table of frequencies for two-frequency operation by coast stations (kHz)

Channel No.	22 MHz band [7]		25/26 MHz band *(end)*	
	Transmit	Receive	Transmit	Receive
1	22 376.5	22 284.5	26 101	25 173
2	22 377	22 285	26 101.5	25 173.5
3	22 377.5	22 285.5	26 102	25 174
4	22 378	22 286	26 102.5	25 174.5
5	22 378.5	22 286.5	26 103	25 175
6	22 379	22 287	26 103.5	25 175.5
7	22 379.5	22 287.5	26 104	25 176
8	22 380	22 288	26 104.5	25 176.5
9	22 380.5	22 288.5	26 105	25 177
10	22 381	22 289	26 105.5	25 177.5
11	22 381.5	22 289.5	26 106	25 178
12	22 382	22 290	26 106.5	25 178.5
13	22 382.5	22 290.5	26 107	25 179
14	22 383	22 291	26 107.5	25 179.5
15	22 383.5	22 291.5	26 108	25 180
16	22 384	22 292	26 108.5	25 180.5
17	22 384.5	22 292.5	26 109	25 181
18	22 385	22 293	26 109.5	25 181.5
19	22 385.5	22 293.5	26 110	25 182
20	22 386	22 294	26 110.5	25 182.5
21	22 386.5	22 294.5	26 111	25 183
22	22 387	22 295	26 111.5	25 183.5
23	22 387.5	22 295.5	26 112	25 184
24	22 388	22 296	26 112.5	25 184.5
25	22 388.5	22 296.5	26 113	25 185
26	22 389	22 297	26 113.5	25 185.5
27	22 389.5	22 297.5	26 114	25 186
28	22 390	22 298	26 114.5	25 186.5
29	22 390.5	22 298.5	26 115	25 187
30	22 391	22 299	26 115.5	25 187.5
31	22 391.5	22 299.5	26 116	25 188
32	22 392	22 300	26 116.5	25 188.5
33	22 392.5	22 300.5	26 117	25 189
34	22 393	22 301	26 117.5	25 189.5
35	22 393.5	22 301.5	26 118	25 190
36	22 394	22 302	26 118.5	25 190.5
37	22 394.5	22 302.5	26 119	25 191
38	22 395	22 303	26 119.5	25 191.5
39	22 395.5	22 303.5	26 120	25 192
40	22 396	22 304	26 120.5	25 192.5
41	22 396.5	22 304.5		
42	22 397	22 305		
43	22 397.5	22 305.5		
44	22 398	22 306		
45	22 398.5	22 306.5		
46	22 399	22 307		
47	22 399.5	22 307.5		
48	22 400	22 308		
49	22 400.5	22 308.5		
50	22 401	22 309		

[7] Ship stations may use the coast station receiving frequencies of channels No. 68 up to and including 135 for transmitting A1A or A1B Morse telegraphy (working)

Table of frequencies for two-frequency operation by coast stations (kHz)

Channel No.	22 MHz band [7] *(cont.)*	
	Transmit	**Receive**
51	22 401.5	22 309.5
52	22 402	22 310
53	22 402.5	22 310.5
54	22 403	22 311
55	22 403.5	22 311.5
56	22 404	22 312
57	22 404.5	22 312.5
58	22 405	22 313
59	22 405.5	22 313.5
60	22 406	22 314
61	22 406.5	22 314.5
62	22 407	22 315
63	22 407.5	22 315.5
64	22 408	22 316
65	22 408.5	22 316.5
66	22 409	22 317
67	22 409.5	22 317.5
68	22 410	22 318
69	22 410.5	22 318.5
70	22 411	22 319
71	22 411.5	22 319.5
72	22 412	22 320
73	22 412.5	22 320.5
74	22 413	22 321
75	22 413.5	22 321.5
76	22 414	22 322
77	22 414.5	22 322.5
78	22 415	22 323
79	22 415.5	22 323.5
80	22 416	22 324
81	22 416.5	22 324.5
82	22 417	22 325
83	22 417.5	22 325.5
84	22 418	22 326
85	22 418.5	22 326.5
86	22 419	22 327
87	22 419.5	22 327.5
88	22 420	22 328
89	22 420.5	22 328.5
90	22 421	22 329
91	22 421.5	22 329.5
92	22 422	22 330
93	22 422.5	22 330.5
94	22 423	22 331
95	22 423.5	22 331.5
96	22 424	22 332
97	22 424.5	22 332.5
98	22 425	22 333
99	22 425.5	22 333.5
100	22 426	22 334
101	22 426.5	22 334.5
102	22 427	22 335
103	22 427.5	22 335.5
104	22 428	22 336
105	22 428.5	22 336.5

Table of frequencies for two-frequency operation by coast stations (kHz)

Channel No.	22 MHz band [7] *(end)*	
	Transmit	**Receive**
106	22 429	22 337
107	22 429.5	22 337.5
108	22 430	22 338
109	22 430.5	22 338.5
110	22 431	22 339
111	22 431.5	22 339.5
112	22 432	22 340
113	22 432.5	22 340.5
114	22 433	22 341
115	22 433.5	22 341.5
116	22 434	22 342
117	22 434.5	22 342.5
118	22 435	22 343
119	22 435.5	22 343.5
120	22 436	22 344
121	22 436.5	22 344.5
122	22 437	22 345
123	22 437.5	22 345.5
124	22 438	22 346
125	22 438.5	22 346.5
126	22 439	22 347
127	22 439.5	22 347.5
128	22 440	22 348
129	22 440.5	22 348.5
130	22 441	22 349
131	22 441.5	22 349.5
132	22 442	22 350
133	22 442.5	22 350.5
134	22 443	22 351
135	22 443.5	22 351.5

Section III – Narrow-band direct-printing telegraphy (non-paired frequencies)

1 One or more frequencies are assigned to each ship station as transmitting frequencies.

2 All frequencies in this Appendix may also be used by ship stations for transmitting A1A or A1B Morse telegraphy (working).

3 All frequencies appearing in this Appendix may be used for NBDP duplex operation.

The corresponding coast station frequencies should be selected by the administration concerned from the sub-bands for coast station wideband telegraphy, A1A or A1B Morse telegraphy, facsimile, special and data transmission systems and direct-printing telegraphy systems.

4 The speed of the narrow-band direct-printing telegraphy and data systems shall not exceed 100 Bd for FSK and 200 Bd for PSK.

Table of ship station transmitting frequencies (kHz)

Frequency bands								
Channel No.	**4 MHz**	**6 MHz**	**8 MHz**	**12 MHz**	**16 MHz**	**18/19 MHz**	**22 MHz**	**25/26 MHz**
1	4 202.5	6 300.5	8 396.5	12 560	16 785	18 893	22 352	25 193
2	4 203	6 301	8 397	12 560.5	16 785.5	18 893.5	22 352.5	25 193.5
3	4 203.5	6 301.5	8 397.5	12 561	16 786	18 894	22 353	25 194
4	4 204	6 302	8 398	12 561.5	16 786.5	18 894.5	22 353.5	25 194.5
5	4 204.5	6 302.5	8 398.5	12 562	16 787	18 895	22 354	25 195
6	4 205	6 303	8 399	12 562.5	16 787.5	18 895.5	22 354.5	25 195.5
7	4 205.5	6 303.5	8 399.5	12 563	16 788	18 896	22 355	25 196
8	4 206	6 304	8 400	12 563.5	16 788.5	18 896.5	22 355.5	25 196.5
9	4 206.5	6 304.5	8 400.5	12 564	16 789	18 897	22 356	25 197
10	4 207	6 305	8 401	12 564.5	16 789.5	18 897.5	22 356.5	25 197.5
11		6 305.5	8 401.5	12 565	16 790	18 898	22 357	25 198
12		6 306	8 402	12 565.5	16 790.5		22 357.5	25 198.5
13		6 306.5	8 402.5	12 566	16 791		22 358	25 199
14		6 307	8 403	12 566.5	16 791.5		22 358.5	25 199.5
15		6 307.5	8 403.5	12 567	16 792		22 359	25 200
16		6 308	8 404	12 567.5	16 792.5		22 359.5	25 200.5
17		6 308.5	8 404.5	12 568	16 793		22 360	25 201
18		6 309	8 405	12 568.5	16 793.5		22 360.5	25 201.5
19		6 309.5	8 405.5	12 569	16 794		22 361	25 202
20		6 310	8 406	12 569.5	16 794.5		22 361.5	25 202.5
21		6 310.5	8 406.5	12 570	16 795		22 362	25 203
22		6 311	8 407	12 570.5	16 795.5		22 362.5	25 203.5
23		6 311.5	8 407.5	12 571	16 796		22 363	25 204
24			8 408	12 571.5	16 796.5		22 363.5	25 204.5
25			8 408.5	12 572	16 797		22 364	25 205
26			8 409	12 572.5	16 797.5		22 364.5	25 205.5
27			8 409.5	12 573	16 798		22 365	25 206
28			8 410	12 573.5	16 798.5		22 365.5	25 206.5
29			8 410.5	12 574	16 799		22 366	25 207
30			8 411	12 574.5	16 799.5		22 366.5	25 207.5
31			8 411.5	12 575	16 800		22 367	25 208
32			8 412	12 575.5	16 800.5		22 367.5	
33			8 412.5	12 576	16 801		22 368	
34			8 413	12 576.5	16 801.5		22 368.5	
35			8 413.5		16 802		22 369	
36			8 414		16 802.5		22 369.5	
37					16 803		22 370	
38					16 803.5		22 370.5	
39					16 804		22 371	
40							22 371.5	
41							22 372	
42							22 372.5	
43							22 373	
44							22 373.5	
45							22 374	

Section IV – Morse telegraphy (calling)

**Table of calling frequencies assignable to ship stations for A1A or A1B Morse telegraphy at speeds not exceeding 40 Bd*
(kHz)**

Group	Channel series	4 MHz band	6 MHz band	8 MHz band	12 MHz band	16 MHz band	22 MHz band	25/26 MHz band
I	1 2	4 182 4 182.5	6 277 6 277.5	8 366 8 366.5	12 550 12 550.5	16 734 16 734.5	22 279.5 22 280	Channel A 25 171.5 Groups I and II
Common channel Common channel	3 4	4 184 4 184.5	6 276 6 276.5	8 368 8 369	12 552 12 533.5	16 736 16 738	22 280.5 22 281	Common channel C 25 172
II	5 6	4 183 4 183.5	6 278 6 278.5	8 367 8 367.5	12 551 12 551.5	16 735 16 735.5	22 281.5 22 282	Channel A 25 171.5 Groups I and II
III	7 8	4 185 4 185.5	6 279 6 279.5	8 368.5 8 369.5	12 552.5 12 553	16 736.5 16 737	22 282.5 22 283	Channel B 25 172.5
IV	9 10	4 186 4 186.5	6 280 6 280.5	8 370 8 370.5	12 554 12 554.5	16 737.5 16 738.5	22 283.5 22 284	Groups III and IV

* Channel width in every band: 0.5 kHz.

NOTES

1 Only the common channels in the 4, 6, 8, 12 and 16 MHz for A1A Morse telegraphy are harmonically related.

2 Administrations should assign the frequencies as they appear in this Appendix only to ship stations equipped with cristal controlled oscillators.

3 However, administrations may subdivide each appropriate group channel and common channel into specific calling frequencies on every full 100 Hz in the channel and assign these discrete frequencies to ships with synthetized transmitters.

Examples of subdivision of channels (centre frequencies are underlined)

4 181.8	6 276.8	8 365.8	12 549.8	16 733.8	22 279.3	25 171.3
4 181.9	6 276.9	8 365.9	12 549.9	16 733.9	22 279.4	25 171.4
4 182	6 277	8 366	12 550	16 734	22 279.5	25 171.5
4 182.1	6 277.1	8 366.1	12 550.1	16 734.1	22 279.6	25 171.6
4 182.2	6 277.2	8 366.2	12 550.2	16 734.2	22 279.7	25 171.7

4 Administrations should avoid as far as possible, assigning the two frequencies at ±100 Hz from the harmonically related common channel.

5 In the 22 MHz bands and 25/26 MHz bands the channels are not harmonically related to those in the 4 to 16 MHz bands. However, the principle of subdivision of channels into specific calling frequencies on 100 Hz applies.

Section V – Morse telegraphy (working)

Table of working frequencies, in kHz, assignable to ship stations for A1A or A1B Morse telegraphy at speeds not exceeding 40 Bd

(See also Part A, Note *e)*)

Frequency bands							
Channel No.	**4 MHz**	**6 MHz**	**8 MHz**	**12 MHz**	**16 MHz**	**22 MHz**	**25/26 MHz**
1	4 187	6 285	8 342	12 422	16 619	22 242	25 161,5
2	4 187,5	6 285,5	8 342,5	12 422,5	16 619,5	22 242,5	25 162
3	4 188	6 286	8 343	12 423	16 620	22 243	25 162,5
4	4 188,5	6 286,5	8 343,5	12 423,5	16 620,5	22 243,5	25 163
5	4 189	6 287	8 344	12 424	16 621	22 244	25 163,5
6	4 189,5	6 287,5	8 344,5	12 424,5	16 621,5	22 244,5	25 164
7	4 190	6 288	8 345	12 425	16 622	22 245	25 164,5
8	4 190,5	6 288,5	8 345,5	12 425,5	16 622,5	22 245,5	25 165
9	4 191	6 289	8 346	12 426	16 623	22 246	25 165,5
10	4 191,5	6 289,5	8 346,5	12 426,5	16 623,5	22 246,5	25 166
11	4 192	6 290	8 347	12 427	16 624	22 247	25 166,5
12	4 192,5	6 290,5	8 347,5	12 427,5	16 624,5	22 247,5	25 167
13	4 193	6 291	8 348	12 428	16 625	22 248	25 167,5
14	4 193,5	6 291,5	8 348,5	12 428,5	16 625,5	22 248,5	25 168
15	4 194	6 292	8 349	12 429	16 626	22 249	25 168,5
16	4 194,5	6 292,5	8 349,5	12 429,5	16 626,5	22 249,5	25 169
17	4 195	6 293	8 350	12 430	16 627	22 250	25 169,5
18	4 195,5	6 293,5	8 350,5	12 430,5	16 627,5	22 250,5	25 170
19	4 196	6 294	8 351	12 431	16 628	22 251	25 170,5
20	4 196,5	6 294,5	8 351,5	12 431,5	16 628,5	22 251,5	25 171
21	4 197	6 295	8 352	12 432	16 629	22 252	
22	4 197,5	6 295,5	8 352,5	12 432,5	16 629,5	22 252,5	
23	4 198	6 296	8 353	12 433	16 630	22 253	
24	4 198,5	6 296,5	8 353,5	12 433,5	16 630,5	22 253,5	
25	4 199	6 297	8 354	12 434	16 631	22 254	
26	4 199,5	6 297,5	8 354,5	12 434,5	16 631,5	22 254,5	
27	4 200	6 298	8 355	12 435	16 632	22 255	
28	4 200,5	6 298,5	8 355,5	12 435,5	16 632,5	22 255,5	
29	4 201	6 299	8 356	12 436	16 633	22 256	
30	4 201,5	6 299,5	8 356,5	12 436,5	16 633,5	22 256,5	
31	4 202	6 300	8 357	12 437	16 634	22 257	
32			8 357,5	12 437,5	16 634,5	22 257,5	
33			8 358	12 438	16 635	22 258	
34			8 358,5	12 438,5	16 635,5	22 258,5	
35			8 359	12 439	16 636	22 259	
36			8 359,5	12 439,5	16 636,5	22 259,5	
37			8 360	12 440	16 637	22 260	
38			8 360,5	12 440,5	16 637,5	22 260,5	
39			8 361	12 441	16 638	22 261	
40			8 361,5	12 441,5	16 638,5	22 261,5	
41			8 362	12 442	16 639	22 262	
42			8 362,5	12 442,5	16 639,5	22 262,5	
43			8 363	12 443	16 640	22 263	
44			8 363,5	12 443,5	16 640,5	22 263,5	
45			8 364	12 444	16 641	22 264	

Frequency bands *(cont.)*							
Channel No.	**4 MHz**	**6 MHz**	**8 MHz**	**12 MHz**	**16 MHz**	**22 MHz**	**25/26 MHz**
46			8 364,5	12 444,5	16 641,5	22 264,5	
47			8 365	12 445	16 642	22 265	
48			8 365,5	12 445,5	16 642,5	22 265,5	
49			8 371	12 446	16 643	22 266	
50			8 371,5	12 446,5	16 643,5	22 266,5	
51			8 372	12 447	16 644	22 267	
52			8 372,5	12 447,5	16 644,5	22 267,5	
53			8 373	12 448	16 645	22 268	
54			8 373,5	12 448,5	16 645,5	22 268,5	
55			8 374	12 449	16 646	22 269	
56			8 374,5	12 449,5	16 646,5	22 269,5	
57			8 375	12 450	16 647	22 270	
58			8 375,5	12 450,5	16 647,5	22 270,5	
59			8 376	12 451	16 648	22 271	
60				12 451,5	16 648,5	22 271,5	
61				12 452	16 649	22 272	
62				12 452,5	16 649,5	22 272,5	
63				12 453	16 650	22 273	
64				12 453,5	16 650,5	22 273,5	
65				12 454	16 651	22 274	
66				12 454,5	16 651,5	22 274,5	
67				12 455	16 652	22 275	
68				12 455,5	16 652,5	22 275,5	
69				12 456	16 653	22 276	
70				12 456,5	16 653,5	22 276,5	
71				12 457	16 654	22 277	
72				12 457,5	16 654,5	22 277,5	
73				12 458	16 655	22 278	
74				12 458,5	16 655,5	22 278,5	
75				12 459	16 656	22 279	
76				12 459,5	16 656,5		
77				12 460	16 657		
78				12 460,5	16 657,5		
79				12 461	16 658		
80				12 461,5	16 658,5		
81				12 462	16 659		
82				12 462,5	16 659,5		
83				12 463	16 660		
84				12 463,5	16 660,5		
85				12 464	16 661		
86				12 464,5	16 661,5		
87				12 465	16 662		
88				12 465,5	16 662,5		
89				12 466	16 663		
90				12 466,5	16 663,5		
91				12 467	16 664		
92				12 467,5	16 664,5		
93				12 468	16 665		
94				12 468,5	16 665,5		
95				12 469	16 666		

Frequency Bands *(end)*							
Channel No.	**4 MHz**	**6 MHz**	**8 MHz**	**12 MHz**	**16 MHz**	**22 MHz**	**25/26 MHz**
96				12 469,5	16 666,5		
97				12 470	16 667		
98				12 470,5	16 667,5		
99				12 471	16 668		
100				12 471,5	16 668,5		
101				12 472	16 669		
102				12 472,5	16 669,5		
103				12 473	16 670		
104				12 473,5	16 670,5		
105				12 474	16 671		
106				12 474,5	16 671,5		
107				12 475	16 672		
108				12 475,5	16 672,5		
109				12 476	16 673		
110				12 476,5	16 673,5		
111					16 674		
112					16 674,5		
113					16 675		
114					16 675,5		
115					16 676		
116					16 676,5		
117					16 677		
118					16 677,5		
119					16 678		
120					16 678,5		
121					16 679		
122					16 679,5		
123					16 680		
124					16 680,5		
125					16 681		
126					16 681,5		
127					16 682		
128					16 682,5		
129					16 683		

APPENDIX S18

Table of transmitting frequencies in the VHF maritime mobile band

(See Article **S52**)

NOTE – For assistance in understanding the Table, see notes *a)* to *n)* below.

Channel designator	Notes	Transmitting frequencies (MHz)		Inter-ship	Port operations and ship movement		Public corres-pondence
		Ship stations	Coast stations		Single frequency	Two frequency	
60		156.025	160.625			x	x
01		156.050	160.650			x	x
61		156.075	160.675			x	x
02		156.100	160.700			x	x
62		156.125	160.725			x	x
03		156.150	160.750			x	x
63		156.175	160.775			x	x
04		156.200	160.800			x	x
64		156.225	160.825			x	x
05		156.250	160.850			x	x
65		156.275	160.875			x	x
06	*f)*	156.300		x			
66		156.325	160.925			x	x
07		156.350	160.950			x	x
67	*h)*	156.375	156.375	x	x		
08		156.400		x			
68		156.425	156.425		x		
09	*i)*	156.450	156.450	x	x		
69		156.475	156.475	x	x		
10	*h)*	156.500	156.500	x	x		
70	*j)*	156.525	156.525	Digital selective calling for distress, safety and calling			
11		156.550	156.550		x		
71		156.575	156.575		x		
12		156.600	156.600		x		
72	*i)*	156.625		x			
13	*k)*	156.650	156.650	x	x		
73	*h), i)*	156.675	156.675	x	x		
14		156.700	156.700		x		
74		156.725	156.725		x		
15	*g)*	156.750	156.750	x	x		
75	*n)*	156.775			x		

Channel designator	Notes	Transmitting frequencies (MHz)		Inter-ship	Port operations and ship movement		Public corres-pondence
		Ship stations	Coast stations		Single frequency	Two frequency	
16		156.800	156.800	DISTRESS, SAFETY AND CALLING			
76	*n)*	156.825			x		
17	*g)*	156.850	156.850	x	x		
77		156.875		x			
18	*m)*	156.900	161.500		x	x	x
78		156.925	161.525			x	x
19		156.950	161.550			x	x
79		156.975	161.575			x	x
20		157.000	161.600			x	x
80		157.025	161.625			x	x
21		157.050	161.650			x	x
81		157.075	161.675			x	x
22		157.100	161.700			x	x
82	*m)*	157.125	161.725		x	x	x
23		157.150	161.750			x	x
83	*m)*	157.175	161.775		x	x	x
24		157.200	161.800			x	x
84	*m)*	157.225	161.825		x	x	x
25		157.250	161.850			x	x
85	*m)*	157.275	161.875		x	x	x
26		157.300	161.900			x	x
86	*m)*	157.325	161.925		x	x	x
27		157.350	161.950			x	x
87		157.375			x		
28		157.400	162.000			x	x
88		157.425			x		
AIS 1	*l)*	161.975	161.975				
AIS 2	*l)*	162.025	162.025				

Notes referring to the Table

General notes

a) Administrations may designate frequencies in the intership, port operations and ship movement services for use by light aircraft and helicopters to communicate with ships or participating coast stations in predominantly maritime support operations under the conditions specified in Nos. **S51.69**, **S51.73**, **S51.74**, **S51.75**, **S51.76**, **S51.77** and **S51.78**. However, the use of the channels which are shared with public correspondence shall be subject to prior agreement between interested and affected administrations.

b) The channels of the present Appendix, with the exception of channels 06, 13, 15, 16, 17, 70, 75 and 76, may also be used for high-speed data and facsimile transmissions, subject to special arrangement between interested and affected administrations.

c) The channels of the present Appendix, but preferably channel 28 and with the exception of channels 06, 13, 15, 16, 17, 70, 75 and 76, may be used for direct-printing telegraphy and data transmission, subject to special arrangement between interested and affected administrations.

d) The frequencies in this table may also be used for radiocommunications on inland waterways in accordance with the conditions specified in No. **S5.226**.

e) Administrations having an urgent need to reduce local congestion may apply 12.5 kHz channel interleaving on a non-interference basis to 25 kHz channels, provided:

– Recommendation ITU-R M.1084-2 shall be taken into account when changing to 12.5 kHz channels;

– it shall not affect the 25 kHz channels of the Appendix **S18** maritime mobile distress and safety frequencies, especially the channels 06, 13, 15, 16, 17, and 70, nor the technical characteristics mentioned in Recommendation ITU-R M.489-2 for those channels;

– implementation of 12.5 kHz channel interleaving and consequential national requirements shall be subject to prior agreement between the implementing administrations and administrations whose ship stations or services may be affected.

Specific notes

f) The frequency 156.300 MHz (channel 06) (see No. **S51.79** and Appendices **S13** and **S15**) may also be used for communication between ship stations and aircraft stations engaged in coordinated search and rescue operations. Ship stations shall avoid harmful interference to such communications on channel 06 as well as to communications between aircraft stations, ice-breakers and assisted ships during ice seasons.

g) Channels 15 and 17 may also be used for on-board communications provided the effective radiated power does not exceed 1 W, and subject to the national regulations of the administration concerned when these channels are used in its territorial waters.

h) Within the European Maritime Area and in Canada, these frequencies (channels 10, 67, 73) may also be used, if so required, by the individual administrations concerned, for communication between ship stations, aircraft stations and participating land stations engaged in coordinated search and rescue and anti-pollution operations in local areas, under the conditions specified in Nos. **S51.69**, **S51.73**, **S51.74**, **S51.75**, **S51.76**, **S51.77** and **S51.78**.

i) The preferred first three frequencies for the purpose indicated in note *a)* are 156.450 MHz (channel 09), 156.625 MHz (channel 72) and 156.675 MHz (channel 73).

j) Channel 70 is to be used exclusively for digital selective calling for distress, safety and calling.

k) Channel 13 is designated for use on a worldwide basis as a navigation safety communication channel, primarily for intership navigation safety communications. It may also be used for the ship movement and port operations service subject to the national regulations of the administrations concerned.

l) These channels (AIS 1 and AIS 2) will be used for an automatic ship identification and surveillance system capable of providing worldwide operation on high seas, unless other frequencies are designated on a regional basis for this purpose.

m) These channels (18 and 82 to 86) may be operated as single frequency channels, subject to special arrangement between interested or affected administrations.

n) The use of these channels (75 and 76) should be restricted to navigation-related communications only and all precautions should be taken to avoid harmful interference to channel 16, e.g. by limiting the output power to 1 W or by means of geographical separation.

APPENDIX S19

Technical characteristics of emergency position-indicating radiobeacons operating on the carrier frequency 2 182 kHz

(See Appendix **S13** Part A5)

Emergency position-indicating radiobeacons operating on the carrier frequency 2 182 kHz shall fulfil the following conditions:

a) the emergency position-indicating radiobeacons shall be capable of class A2A (or A2B) or H2A (or H2B) emissions, with a depth of modulation between 30 and 90 %;

b) the audio-frequency tolerance of emissions used for emergency position-indicating radiobeacons (see Appendix **S13**, Part A5, § 1 *a)* to 1 *a*) 2)) are:

±20 Hz for the frequency on 1 300 Hz

±35 Hz for the frequency on 2 200 Hz;

c) equipment shall be designed to comply with relevant ITU-R Recommendations.

APPENDIX S25

Provisions and associated frequency allotment Plan for coast radiotelephone stations operating in the exclusive maritime mobile bands between 4000 kHz and 27500 kHz

The provisions of this Appendix shall apply to the maritime mobile radiotelephone bands reserved for duplex operation (two-frequency channels) between 4000 kHz and 27500 kHz (see Appendix **S17**). Section I contains the procedure for bringing up to date the frequency allotment Plan for coast stations. The allotment Plan is contained in Section II of this Appendix.

S25/1 Section I – Procedure for bringing up to date the frequency allotment plan

S25/1.1 1 Before notifying to the Radiocommunication Bureau or bringing into use at any coast radiotelephone station a frequency assignment not covered by an allotment in the Frequency Allotment Plan contained in Section II of this Appendix, an administration which

S25/1.1.1 intends to establish a coast radiotelephone station and has no allotment in the Plan, *or*

S25/1.1.2 intends to expand its coast radiotelephone service and requires an additional allotment,

shall send the information listed in Appendix **S4** to the Bureau not earlier than two years in the case of No. **S25**/1.1.1, or not earlier than six months in the case of No. **S25**/1.1.2, before the projected date of bringing into service of the planned coast radiotelephone service but in any case not later than three months before that date.

S25/1.2 The Bureau shall publish the information sent under No. **S25**/1.1 in a special section of the weekly circular together with such apparent incompatibilities between the proposed allotment which is the subject of the publication and any other existing or proposed allotments which the Bureau can identify. The Bureau shall also indicate any information of a technical nature and make such suggestions as it may be able to offer with a view to avoiding these incompatibilities.

S25/1.3 If it is requested by any administration, particularly by an administration of a country in need of special assistance, and if the circumstances appear to warrant, the Bureau, using such means at its disposal as are appropriate in the circumstances, shall render the following assistance:

S25/1.3.1 indication of a suitable channel or channels for the service projected by the administration before that administration submits the information for publication;

S25/1.3.2 carry out the procedure for which provision is made in No. **S25**/1.4;

S25/1.3.3 any other assistance of a technical nature for completion of the procedure in this section.

S25/1.4 2 At the same time as sending the information listed in Appendix **S4** to the Bureau for publication, an administration shall seek the agreement of the administrations having an allotment in the same channel as the proposed allotment. A copy of the relevant correspondence shall be sent to the Bureau.

S25/1.5 Any administration which, upon examining the information published by the Bureau, considers that its existing services or services planned within the time-limits mentioned in No. **S25**/1.1 would be affected shall have the right to be brought into the procedure undertaken pursuant to No. **S25**/1.4.

S25/1.6 3 An administration which receives a request under No. **S25**/1.4 shall acknowledge receipt thereof immediately by telegram. If no acknowledgement is received within thirty days after the date of the Weekly Circular containing the information published under No. **S25**/1.2, the administration seeking agreement shall dispatch a telegram requesting acknowledgement, to which the receiving administration shall reply within a further period of fifteen days.

S25/1.7 Upon receipt of the request under No. **S25**/1.4, an administration shall, having regard to the proposed date of bringing into use of the assignment(s) corresponding to the allotment for which agreement was requested, promptly examine the matter with regard to harmful interference which would be caused to the services rendered by its coast station(s):

S25/1.7.1 using a frequency assignment corresponding to an allotment appearing in the Plan; or

S25/1.7.2 to be brought into service in conformity with an allotment appearing in the Plan within the time-limit prescribed in No. **S25**/1.25; *or*

S25/1.7.3 to be brought into service within the time-limit prescribed in No. **S25**/1.25, in conformity with a proposed allotment for which the information has been submitted to the Bureau under No. **S25**/1.1 for publication under No. **S25**/1.2.

S25/1.8 Any administration which receives a request under No. **S25**/1.4 and which considers that the proposed use of a channel will not cause harmful interference to the services rendered by its coast stations as outlined in No. **S25**/1.7 shall, as soon as possible and not later than two months from the date of the relevant Weekly Circular, notify its agreement to the administration seeking agreement.

S25/1.9 Any administration which receives a request under No. **S25**/1.4 and which considers that the proposed use of a channel may cause harmful interference to the services rendered by its coast stations as outlined in No. **S25**/1.7 shall inform the administration concerned of the reasons for its disagreement as soon as possible and not later than two months from the date of the relevant Weekly Circular and shall furnish any information and suggestions with a view to reaching a satisfactory solution of the problem. The administration seeking agreement shall try, as far as possible, to adjust its requirements according to the comments received.

S25/1.10 In a case where the administration seeking agreement has no allotment in the band concerned, the administration(s) with which agreement is sought shall, in consultation with the requesting administration, explore all means of meeting the requirement of the requesting administration.

S25/1.11 4 An administration seeking agreement may request the Bureau to endeavour to obtain such agreement in those cases where:

S25/1.11.1 an administration to which a request has been sent under No. **S25**/1.4 fails to acknowledge receipt of the request within forty-five days from the date of the Weekly Circular containing the pertinent information;

S25/1.11.2 an administration has acknowledged receipt under No. **S25**/1.6 but fails to give a decision within two months from the date of the Weekly Circular containing the pertinent information;

S25/1.11.3 there is disagreement between the administration seeking agreement and an administration with which agreement is sought as to the sharing possibilities;

S25/1.11.4 it is not possible to reach agreement for any other reason.

S25/1.12 Either the administration seeking agreement or an administration with which agreement is sought, or the Bureau, may request additional information which it may require in studying any problem relating to this agreement.

S25/1.13 Where the Bureau receives a request under No. **S25**/1.11.1, it shall forthwith send a telegram to the administration concerned requesting immediate acknowledgement.

S25/1.14 Where the Bureau receives an acknowledgement following its action under No. **S25**/1.13, or where the Bureau receives a request under No. **S25**/1.11.2, it shall forthwith send a telegram to the administration concerned requesting an early decision in the matter.

S25/1.15 Where the Bureau receives a request under No. **S25**/1.11.4, it shall endeavour to obtain agreement to which reference is made in No. **S25**/1.4. Where the Bureau receives from an administration no acknowledgement to the request it made under the terms of No. **S25**/1.4 for agreement within the period specified in No. **S25**/1.6, it shall act, in so far as this administration is concerned, in accordance with No. **S25**/1.13.

S25/1.16 Where an administration fails to reply within fifteen days of the Bureau's telegram requesting an acknowledgement sent under No. **S25**/1.13, or fails to give a decision in the matter within thirty days of dispatch of the Bureau's telegram of request under No. **S25**/1.14, it shall be deemed that the administration with which agreement was sought has undertaken, once the projected allotment is included in the Plan:

S25/1.16.1 that no complaint will be made in respect of any harmful interference which may be caused to the services rendered by its coast radiotelephone stations by the use of assignments in accordance with the allotment for which agreement was requested; and

S25/1.16.2 that its existing or projected coast radiotelephone stations will not cause harmful interference to the use of assignments in conformity with the allotment for which agreement was requested.

S25/1.17 The Bureau shall examine the proposed allotment with respect to the probability of harmful interference which it may receive from an allotment in the Plan of the administration which failed to reply or which indicated disagreement without supplying the reasons; if the finding is favourable and where the application of the present procedure with respect to the other administrations concerned permits, the Bureau shall enter the proposed allotment in the Plan.

S25/1.18 In the event of an unfavourable finding, the Bureau shall inform the administration concerned of the result of the examination; if the administration insists, and where the application of the present procedure with respect to the other administrations concerned permits, the Bureau shall enter the proposed allotment in the Plan.

S25/1.19 Where the Bureau receives a request under No. **S25**/1.11.3, it shall assess the sharing possibilities and it shall inform the administrations concerned of the results obtained.

S25/1.20 In the case of continuing disagreement, the Bureau shall examine the proposed allotment from the point of view of harmful interference which may be caused to the services rendered by the stations of the administration having declared its disagreement. In the case where the Bureau's finding is favourable and where the application of the present procedure with respect to the other administrations concerned permits, it shall enter the proposed allotment in the Plan.

S25/1.21 If, after the examination under No. **S25**/1.20, the Bureau reaches an unfavourable finding, it shall then examine the proposed allotment from the point of view of harmful interference which may be caused to the services on all the various channels in the band. Should the Bureau reach an unfavourable finding in each case, it shall determine the channel which is the least affected and, if so requested by the administration seeking agreement, it shall enter the proposed allotment in this channel in the Plan.

S25/1.22 5 An administration seeking agreement for a proposed allotment shall inform the Bureau of the results of its consultations with the administrations concerned. When the Bureau finds that the procedure prescribed in this section has been applied with respect to each administration concerned, the Bureau shall publish its finding in a special section of the Weekly Circular and, as the case may be, bring the Plan up to date.

S25/1.23 6 Notwithstanding the above provisions and if the circumstances justify, an administration may, in exceptional circumstances, notify to the Bureau for provisional entry in the Master International Frequency Register an assignment which is not covered by an allotment in the Plan. That administration shall, however, begin forthwith the procedure prescribed in this section.

S25/1.24 7 When, within twelve months from the date of the inclusion of the allotment in the Plan, the Bureau does not receive a notice of a first frequency assignment corresponding to this allotment, or where the first notified frequency assignment has not been brought into use within the time-limits prescribed in these Regulations, before proceeding with the deletion of the allotment from the Plan, it shall consult with the administration concerned on the appro-

priateness of such a deletion and of publishing this information in connection with bringing the Plan up to date. However, in the case where the Bureau, in the light of a request from the administration concerned, finds that exceptional circumstances warrant an extension of this period, the extension shall in no case exceed six months, except in the case of an administration which has no coast station in service in which case the period may be extended to eighteen months.

S25/1.25 8 Any administration in whose name an allotment is shown in the Plan, and which has a need to replace this allotment by another allotment in the same frequency band with a view to improving its service, shall apply the procedure described in this section. When that administration arrives at a positive result in applying this procedure, the Bureau, at its request, shall replace the existing allotment in the Plan by the proposed allotment.

S25/1.26 9 The Bureau shall maintain an up-to-date master copy of the Plan resulting from the application of this procedure. It shall prepare in a suitable form, for publication by the Secretary-General, the whole or part of the revised version of the Plan as and when the circumstances justify and in any case once annually.

S25/2 Section II – Allotment Plan for coast radiotelephone stations operating in the exclusive maritime mobile bands between 4 000 kHz and 27 500 kHz[1]

S25/2.1 The frequencies in Column 1 are assigned frequencies (see No. **S1.148**) as listed in Section I of Part B of Appendix **S17**. Each frequency is followed, in parentheses, by the carrier frequency and the channel number (see Section I of Part B of Appendix **S17**).

S25/2.2 The coast radiotelephone stations operating in the bands allocated exclusively to the maritime mobile service between 4 000 kHz and 27 500 kHz must use the minimum power required to cover their service area. They may in no case use a peak envelope power above 10 kW per channel (see No. **S52.219**).

S25/2.3 The Plan contained in this Appendix will be updated in accordance with the procedure defined in Section I of this Appendix.

S25/2.4

Column 1	Column 2	Column 3
Assigned frequency (carrier frequency) (channel number)	Allotment area[2]	Observations[3, 4]

[1] The Plan includes additions, modifications and deletions of allotments in the channels of the Frequency Allotment Plan adopted by the WMARC-74, resulting from the application of the relevant plan updating procedures up to and including 01.10.1998.

[2] The meaning of the symbols is given in Tables B1 and 4E1 of the Preface to the International Frequency List and the Weekly Circular.

[3] ADD This allotment has been entered in the Plan as a result of the application of the procedure of Section I of this Appendix.

[4] RES325 This allotment has been entered in the Plan on 1 July 1991 according to the procedure of Resolution **325 (Mob-87)***.

* This Resolution was abrogated by WRC-95.

1	2	3
4 358.4 **(4 357)** (401)	AFS AUS CHL CKH CUB D1 DNK E GEO GRC HRV INS J KOR LVA NIU PNR PRG RUS EO RUS NW S SMO SOM TKM TUR UKR URG USA CL USA E USA SO USA W YEM YUG	ADD ADD
4 361.4 **(4 360)** (402)	ALB ALS ARG AZE CHN G GUM HWA I IRN J KAZ MDG PNG PNR POL PTR RUS AS RUS NW THA TKM TUN USA CL USA E USA SO USA W	

1	2	3
4 364.4 **(4 363)** (403)	AFS ARG CAN CL CAN E CAN NO CAN W DNK E GRC HWA IND E IRQ MAC MCO NOR PNR PTR RUS EO S UKR USA CL USA E USA SO USA W	 ADD ADD
4 367.4 **(4 366)** (404)	ALS AUS B CHL SO CHN COG F IRN ISR J NCL OMA PAQ POL SEN THA USA CL USA E USA W	
4 370.4 **(4 369)** (405)	AFS ALS AUS E AZE B CHL CHN CME CNR D2 F GMB GRC HOL HWA >> >>	

1	2	3
(405)	<< << IRN LTU LVA ROU RUS AS RUS EO RUS SW SNG URG USA CL USA E USA SO USA W	 ADD
4 373.4 **(4 372)** (406)	ALB ALS ARG ARS CHN CLM COG CYP E FJI FIN G GUM HWA ISL MDG PNR POL PTR TUN USA CL USA E USA SO USA W	
4 376.4 **(4 375)** (407)	AFS ALS ARG AUS BRB CAN CL CME D2 E GUM HOL HWA I IND E IRN J NOR PTR RUS AN RUS NW >> >>	 ADD ADD

1	2	3
(407)	<< <<	
	SNG	
	TUR	
	USA E	
	USA W	
4 379.4	ALS	
(4 378)	ARG	
	ATN	
(408)	B	ADD
	BEL	
	CAN E	
	CAN W	
	CHN	RES325
	GUM	
	HRV	
	HWA	
	I	
	INS	
	IRN	
	J	
	MLD	ADD
	MOZ	
	NZL	
	POL	
	SMA	ADD
	SUI	
	USA E	
	USA W	
4 382.4	ARS	
(4 381)	B	
	CHN	
(409)	CUB	
	DNK	
	GHA	ADD
	I	
	IND W	
	NOR	
	PNG	
	QAT	ADD
	S	
	THA	
	TUR	
	USA CL	
	USA E	
	USA SO	
	USA W	
4 385.4	ALG	
(4 384)	ARG SO	
	CAN W	
(410)	CHN	
	CNR	
	D2	
	G	
	GRC	
	GUM	
	HNG	
	HOL	
	>> >>	

1	2	3
(410)	<< <<	
	IRN	
	ISR	
	MLT	
	MTN	
	NZL	
	ROU	
	SEY	
	USA E	
4 388.4	AMS	ADD
(4 387)	ARG NO	
	BEL	
(411)	E	
	EQA	ADD
	FLK	
	HKG	
	I	ADD
	INS	
	IRN	
	J	
	KIR	ADD
	RUS NW	
	TUR	
	UKR	
	USA CL	
	USA E	
	USA W	
4 391.4	AUS	
(4 390)	D1	
	EST	
(412)	GEO	
	I	
	IND W	
	IRQ	
	J	
	LTU	
	LVA	
	RUS EO	
	RUS NW	
	RUS SW	
	RUS W	
	UKR	
	USA E	
	USA SO	
	USA W	
	YEM	
4 394.4	AGL	
(4 393)	ALG	
	ALS	
(413)	ARG	
	AZR	
	BHR	
	CAN E	
	CAN W	
	CPV	
	D1	
	FIN	
	>> >>	

1	2	3
(413)	<< <<	
	GNB	
	GRC	
	GUM	
	HWA	
	J	
	MCO	
	MDR	
	PNR	
	POR	
	PTR	
	RUS EO	
	TMP	
	UKR	
	USA CL	
	USA E	
	USA SO	
	USA W	
4 397.4	ALS	
(4 396)	CYP	
	D1	
(414)	E	
	FIN	
	INS	
	ISL	
	J	
	KEN	
	PTR	
	RUS EO	
	RUS SW	
	RUS W	
	SHN	
	USA E	
	USA SO	
4 400.4	ALS	
(4 399)	ARG	
	AUS	
(415)	CHN	
	DNK	
	EST	
	F	
	GRC	
	GUM	
	HWA	
	IRN	
	LTU	
	LVA	
	MDG	
	MLA	
	PNR	
	PTR	
	ROU	
	RUS NW	
	RUS SW	
	RUS W	
	USA E	
	USA SO	
	USA W	

1	2	3
4 403.4 **(4 402)** (416)	ALS ARG CL B EST F G GRC HNG INS IRN ISL J LTU LVA MAU OCE RUS SW USA CL USA E USA W	RES325
4 406.4 **(4 405)** (417)	ARG AUS BEL CZE FIN G HKG HRV IND W J MLA MRC PNG RUS EO SVK TUR TZA USA CL USA E USA SO USA W YEM YUG	ADD
4 409.4 **(4 408)** (418)	ARG AZE B BUL CAN E CAN W CUB DJI DNK E EGY HWA I INS ISR >> >>	ADD ADD

1	2	3
(418)	<< << J KAZ MTN ROU RUS AS S TKM USA CL	
4 412.4 **(4 411)** (419)	AUS B CHL CHN CZE D2 F GUM HOL HRV HWA ISL J KOR LBY PTR RUS NW SVN TZA USA SO USA W	ADD
4 415.4 **(4 414)** (420)	ALS AZE BUL CME DNK GUM HWA I IND E IRN J JOR KAZ MLA MRC PNR PTR RUS AN RUS AS S TKM TUR USA E USA W	
4 421.4 **(4 420)** (422)	ALS BEL CAN W CHN >> >>	

1	2	3
(422)	<< << CNR CUB EST FIN G GRC HNG INS IRQ J LBY LTU LVA MRC RUS NW RUS SW RUS W SUI USA E USA W	ADD
4 424.4 **(4 423)** (423)	ALS B CHN D1 I INS ISR J MLT PNG PNR POL QAT USA CL USA E USA SO USA W	ADD ADD ADD
4 427.4 **(4 426)** (424)	ALG ALS ARG AUS E AUS W CHN DNK GRC GUM HWA MRC PNR PTR S SUI THA USA CL USA E USA SO USA W	ADD ADD

1	2	3
4 430.4	ALS	
(4 429)	B	ADD
	BEL	
(425)	CHL	
	DNK	
	E	
	GRC	
	GUM	
	HNG	
	HOL	
	HWA	
	J	
	JOR	ADD
	LBY	
	MLA	
	NZL	
	PNR	
	PTR	
	USA CL	
	USA E	
	USA SO	
	USA W	
4 433.4	AGL	
(4 432)	ALG	
	ALS	
(426)	ARG	
	AZR	
	BUL	
	CHN	
	CPV	
	CYP	
	DNK	
	G	
	GNB	
	GUM	
	HWA	
	J	
	MDR	
	MOZ	
	NOR	
	PNR	
	POR	
	PTR	
	THA	
	TMP	
	USA E	
	USA SO	
	USA W	
4 436.4	ALS	RES325
(4 435)	AUS	RES325
	BUL	RES325
(427)	CHL	RES325
	CHN	RES325
	DGA	RES325
	E	RES325
	G	RES325
	HWA	RES325
	I	RES325
	>> >>	

1	2	3
(427)	<< <<	
	J	RES325
	MDG	RES325
	PAQ	RES325
	POR	RES325
	RUS AN	RES325
	RUS EO	RES325
	RUS NW	RES325
	UAE	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	VIR	RES325
	VTN	RES325
	YUG	RES325
4 352.4	ARG CL	RES325
(4 351)	ARG SO	RES325
	AZE	RES325
(428)	CHN	RES325
	GRC	RES325
	I	RES325
	J	RES325
	OMA	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	TKM	RES325
	UKR	RES325
	USA SO	RES325
4 355.4	ALS	RES325
(4 354)	ARG SO	RES325
	AUS	RES325
(429)	AZE	RES325
	B	RES325
	BLR	RES325
	CLM	RES325
	DGA	RES325
	E	RES325
	G	RES325
	GRC	RES325
	GUM	RES325
	HKG	RES325
	HWA	RES325
	I	RES325
	J	RES325
	KAZ	RES325
	MDG	RES325
	MDW	RES325
	PTR	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	>> >>	

1	2	3
(429)	<< <<	
	TKM	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
6 502.4	ALG	
(6 501)	ALS	
	ARG CL	
(601)	ARG SO	
	ARS	
	AZE	
	CAN W	
	CHL CL	
	CHL NO	
	CHN	
	COG	
	CZE	
	D1	
	EST	
	GEO	
	GRC	
	GUM	
	HNG	
	HRV	
	HWA	
	I	ADD
	INS	
	IRN	
	IRQ	
	ISL	
	J	
	KAZ	
	LBY	
	LTU	
	LVA	
	MLA	
	MLD	ADD
	NCL	ADD
	NZL	
	PTR	
	ROU	
	RUS AS	
	RUS SW	
	RUS W	
	SVK	
	TKM	
	UKR	
	USA CL	
	USA E	
	USA SO	
	USA W	
	YUG	
6 505.4	AFS	
(6 504)	ALS	
	AZE	
(602)	B	ADD
	BEL	
	>> >>	

1	2	3
(602)	<< <<	
	BUL	
	CAN E	
	CAN W	
	EQA	ADD
	EST	
	FJI	ADD
	GEO	
	GHA	ADD
	GUM	
	HOL	
	HRV	
	HWA	
	I	
	INS	
	IRN	
	KAZ	
	KOR	
	LTU	
	LVA	
	MCO	
	MDG	
	POL	
	POR	
	PTR	
	RUS AN	
	RUS AS	
	RUS EO	
	RUS NW	
	RUS SW	
	RUS W	
	SNG	
	TKM	
	TUN	
	TUR	
	USA CL	
	USA E	
	USA SO	
	USA W	
6 508.4	ALB	
(6 507)	ALG	
	ALS	
(603)	ARG	
	ARS	
	AUS	ADD
	CAN NO	
	CAN W	
	CYP	
	DNK	
	E	
	GRC	
	GUM	
	HNG	
	HWA	
	IND E	
	INS	
	IRN	
	IRQ	
	>> >>	

1	2	3
(603)	<< <<	
	ISL	
	ISR	
	J	
	LBY	
	MLT	ADD
	MTN	
	PTR	
	ROU	
	RUS EO	
	RUS NW	
	S	
	SMO	
	UKR	
	USA CL	
	USA E	
	USA SO	
	USA W	
6 511.4	ALS	
(6 510)	ATN	ADD
	AUS	
(604)	B	ADD
	BUL	
	CAN W	
	CHL	
	CHN	
	CME	
	E	
	GUM	
	HKG	
	HRV	
	HWA	
	I	
	INS	
	IRN	
	ISR	
	MDG	
	MTN	
	PNG	
	POL	
	PTR	
	RUS NW	
	TUN	
	TUR	
	TUV	ADD
	USA CL	
	USA E	
	USA SO	
	USA W	
6 514.4	ALG	
(6 513)	ALS	
	B	ADD
(605)	BUL	
	CAN E	
	CAN W	
	CNR	
	COG	
	DNK	
	>> >>	

1	2	3
(605)	<< <<	
	EGY	
	F	ADD
	GUM	
	HNG	
	HOL	
	HRV	
	HWA	
	IND W	
	INS	
	IRN	
	IRQ	
	J	
	KOR	
	LBY	
	MDG	
	NZL	ADD
	PTR	
	RUS EO	
	S	
	SVN	
	UKR	
	URG	
	USA CL	
	USA E	
	USA SO	
	USA W	
6 520.4	ARG	RES325
(6 519)	AUS	RES325
	CHN	RES325
(607)	CLM	RES325
	CUB	RES325
	DGA	RES325
	F	RES325
	GRC	RES325
	HKG	RES325
	J	RES325
	MDG	RES325
	OMA	RES325
	RUS AN	RES325
	RUS EO	RES325
	RUS NW	RES325
	UAE	RES325
	USA SO	RES325
	VTN	RES325
6 523.4	ALS	RES325
(6 522)	ARG CL	RES325
	ARG SO	RES325
(608)	AUS	RES325
	B	RES325
	BLR	RES325
	CHN	RES325
	DGA	RES325
	E	RES325
	EST	RES325
	G	RES325
	GRC	RES325
	GUM	RES325
	>> >>	

1	2	3
(608)	<< <<	
	HWA	RES325
	J	RES325
	KOR	RES325
	LVA	RES325
	MDW	RES325
	MOZ	RES325
	PTR	RES325
	RUS AS	RES325
	RUS AN	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
8 720.4	AFS	
(8 719)	ALS	
	BHR	
(801)	CHL	
	DNK	
	E	
	GUM	
	HWA	
	ISR	
	J	
	MLA	
	PNR	
	PTR	
	ROU	
	RUS AN	
	S	
	USA E	
	USA SO	
	USA W	
8 723.4	AGL	
(8 722)	ALG	
	ALS	
(802)	ARG	
	AUS	
	AZR	
	CHN	
	CLN	
	CPV	
	D2	
	FIN	
	G	
	GNB	
	GRC	
	HOL	
	HWA	
	IND E	
	IRQ	
	MDR	
	>> >>	

1	2	3
(802)	<< <<	
	MOZ	
	POR	
	USA E	
	USA SO	
8 726.4	AFS	
(8 725)	ATN	
	BEL	
(803)	CAN E	
	CUB	
	E	
	KOR	
	LTU	
	LVA	
	PNG	
	RUS EO	
	RUS NW	
	RUS SW	
	S	
	SEN	
	SUI	ADD
	TUR	
	USA CL	
8 729.4	ARG	
(8 728)	E	
	FIN	
(804)	GRC	
	IRQ	
	J	
	JOR	ADD
	MCO	
	POL	
	QAT	ADD
	RUS AS	
	RUS EO	
	SNG	
	USA E	
	USA SO	
	USA W	
8 732.4	AFS	
(8 731)	ALB	
	BEL	
(805)	E	
	EQA	ADD
	FIN	
	HOL	
	IRN	
	ISL	
	ISR	
	J	
	LVA	
	NCL	
	PNG	
	RUS EO	
	RUS SW	
	USA E	
	USA SO	
	USA W	

1	2	3
8 735.4	ALS	
(8 734)	ARG	
	AUS	ADD
(806)	BEL	
	BHR	
	E	
	GRC	
	GUM	
	HOL	
	HWA	
	I	
	J	
	PNR	
	POL	
	PTR	
	SMA	ADD
	UKR	
	USA E	
	USA W	
8 738.4	AZE	
(8 737)	CAN W	
	CHL	
(807)	COG	
	CUB	
	CYP	
	CZE	
	I	ADD
	ISL	
	J	
	MDG	
	MTN	
	NZL	
	RUS AN	
	RUS AS	
	RUS SW	
	RUS W	
	SHN	
	TKM	
	USA CL	
8 741.4	AFS	
(8 740)	ALS	
	ARG	
(808)	ARS	
	DNK	
	E	
	GRC	
	GUM	
	HWA	
	I	ADD
	J	
	ROU	
	S	
	USA E	
	USA W	
8 744.4	ALG	
(8 743)	AUS W	
	CHL	
(809)	CNR	
	>> >>	

1	2	3
(809)	<< <<	
	CUB	
	CZE	
	D2	
	FIN	
	GRC	
	ISL	
	J	
	MCO	
	NOR	
	SVK	
	THA	
	USA E	
	USA W	
8 747.4	ARG	
(8 746)	BUL	
	CAN E	
(810)	CHN	
	E	
	FJI	
	HRV	
	INS	
	IRN	
	J	
	MOZ	
	NOR	
	POL	
	TUR	
	USA E	
	USA SO	
	USA W	
8 750.4	ARG	
(8 749)	ARS	
	AUS	
(811)	DNK	
	F	
	HKG	
	HNG	
	HRV	
	J	
	NOR	
	S	
	TUR	
	USA E	
	USA SO	
	USA W	
	YUG	
8 753.4	ALS	
(8 752)	ARG SO	
	BEL	
(812)	CAN NO	
	CHN	
	E	
	GEO	
	HWA	
	I	ADD
	INS	
	ISR	
	>> >>	

1	2	3
(812)	<< <<	
	J	
	LTU	
	LVA	
	NZL	
	POL	
	RUS NW	
	USA CL	
	USA E	
	USA SO	
	USA W	
8 756.4	AGL	
(8 755)	ALG	
	ALS	
(813)	AUS	
	AZR	
	BEL	
	CHL NO	
	CHN	
	CPV	
	DNK	
	GNB	
	GRC	
	GUM	
	HNG	
	HWA	
	IND W	
	MDR	
	MOZ	
	NOR	
	PNR	
	POR	
	PTR	
	USA CL	
	USA E	
	USA SO	
	USA W	
8 759.4	ALS	
(8 758)	ARG	
	AZE	
(814)	CAN W	
	CUB	
	EST	
	GEO	
	GRC	
	HWA	
	I	
	INS	
	J	
	KIR	ADD
	LTU	
	LVA	
	RUS AN	
	RUS AS	
	RUS EO	
	RUS SW	
	RUS W	
	USA CL	
	>> >>	

1	2	3
(814)	<< <<	
	USA E	
	USA SO	
	USA W	
8 762.4	AUS W	
(8 761)	BEL	
	CHL	
(815)	CHN	
	D1	
	EST	
	GRC	
	IRQ	
	J	
	JOR	ADD
	MRC	
	RUS NW	
	RUS SW	
	SNG	
	USA E	
	USA SO	
	USA W	
8 765.4	ALS	
(8 764)	ARG	
	BRB	
(816)	CHN	
	COG	
	E	
	G	
	GRC	
	GUM	
	HWA	
	INS	
	LTU	
	LVA	
	PTR	
	RUS NW	
	RUS SW	
	RUS W	
	TUN	
	USA E	
	USA SO	
	USA W	
8 768.4	ALS	
(8 767)	AUS	
	CAN E	
(817)	CHL	
	D1	
	EGY	
	F	
	GUM	
	HWA	
	IRN	
	PNR	ADD
	PTR	
	ROU	
	RUS EO	
	RUS SW	
	THA	
	>> >>	

1	2	3
(817)	<< << USA CL USA E USA SO USA W YEM	
8 771.4 **(8 770)** (818)	ALS ARG BUL CHN CME CYP DNK GUM HWA LBY MLA PNR PTR S SEY UKR USA E USA W	
8 774.4 **(8 773)** (819)	ALS AZE B CAN W EST G GEO GRC GUM HWA I INS J KAZ LVA PAQ PNR RUS AN RUS AS RUS NW RUS SW THA TKM USA CL USA E USA SO USA W YEM	ADD
8 777.4 **(8 776)** (820)	ALS ARG CYP D1 D2 GRC >> >>	ADD

1	2	3
(820)	<< << GUM HWA I IND E IRN J PNR PTR RUS NW SMO TZA USA E USA W	ADD
8 783.4 **(8 782)** (822)	AUS B CHN G HNG HRV IRN KEN MRC SUI UKR USA E USA SO USA W	ADD
8 786.4 **(8 785)** (823)	ARG CAN E DNK GRC I IND W IRQ J ROU RUS EO RUS NW S TMP TZA USA W	ADD ADD
8 789.4 **(8 788)** (824)	B CHN D1 GRC IRN MRC OMA POL RUS NW SNG SUI TUN USA E USA SO USA W	

1	2	3
8 792.4 **(8 791)** (825)	ALG ALS AMS ARG BRB CAN CL CKH DNK F GHA HNG IND E IRN KAZ KGZ RUS EO S TKM UKR USA E USA SO USA W	ADD ADD ADD
8 795.4 **(8 794)** (826)	CAN W CHN CLM CME D2 G GUM HOL I INS J QAT UKR USA CL USA E	ADD
8 798.4 **(8 797)** (827)	ALS ARG DJI DNK E GUM HRV HWA IRN ISR KOR MAC NIU PNR PTR S SVN USA E USA W YUG	

1	2	3
8 801.4	ALB	
(8 800)	ALS	
	B	
(828)	D1	
	F	
	GUM	
	HNG	
	HWA	
	INS	
	J	
	MAU	
	MRC	
	MTN	
	NOR	
	PNR	
	PTR	
	UKR	
	USA E	
	USA W	
8 804.4	AUS	
(8 803)	BEL	
	BRM	ADD
(829)	CHN	
	CYP	
	DNK	
	FIN	
	GMB	
	IRN	
	LBY	
	MLD	ADD
	NOR	
	OCE	
	PRG	
	S	
	UKR	
	USA E	
	USA SO	
	USA W	
8 807.4	AZE	
(8 806)	B	
	BUL	
(830)	CHN	RES325
	F	
	HRV	
	IND W	
	INS	
	IRN	
	KAZ	
	PNG	
	POL	
	PTR	
	RUS AS	
	RUS EO	
	USA SO	
	YEM	

1	2	3
8 810.4	CHN	
(8 809)	COG	
	D2	
(831)	FLK	
	G	
	I	
	IRN	
	ISL	
	J	
	MDG	
	MLA	
	MRC	
	PTR	
	SUI	
	TUR	
	USA SO	
	USA W	
8 813.4	ALS	RES325
(8 812)	B	RES325
	BUL	RES325
(832)	CHN	RES325
	CLM	RES325
	GUM	RES325
	HKG	RES325
	HWA	RES325
	KOR	RES325
	MDG	RES325
	MLT	RES325
	PTR	RES325
	QAT	RES325
	RUS AN	RES325
	RUS EO	RES325
	TUR	RES325
	UAE	RES325
	URG	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	VTN	RES325
8 708.4	AUS	RES325
(8 707)	CHL	RES325
	CHN	RES325
(834)	CLM	RES325
	DGA	RES325
	GRC	RES325
	GUM	RES325
	HWA	RES325
	J	RES325
	KOR	RES325
	MDW	RES325
	POR	RES325
	PTR	RES325
	RUS AS	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325

1	2	3
8 711.4	ALS	RES325
(8 710)	ARG CL	RES325
	ARG SO	RES325
(835)	AZE	RES325
	DGA	RES325
	E	RES325
	F	RES325
	GRC	RES325
	GUM	RES325
	HWA	RES325
	J	RES325
	KOR	RES325
	MDW	RES325
	OMA	RES325
	PTR	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	SUI	RES325
	THA	RES325
	TKM	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	YUG	RES325
8 714.4	AUS	RES325
(8 713)	AZE	RES325
	CHL	RES325
(836)	CHN	RES325
	E	RES325
	I	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	TKM	RES325
	UKR	RES325
	URG	RES325
	USA SO	RES325
8 717.4	ARG CL	RES325
(8 716)	ARG SO	RES325
	AZE	RES325
(837)	BLR	RES325
	CHN	RES325
	CUB	RES325
	G	RES325
	GRC	RES325
	J	RES325
	KAZ	RES325
	MDG	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	>> >>	

1	2	3
(837)	<< <<	
	RUS W	RES325
	TKM	RES325
	UKR	RES325
	USA SO	RES325
13 078.4 **(13 077)** (1201)	ARG CAN NO CHN CYP E G INS QAT RUS EO RUS NW RUS SW UKR USA E USA SO USA W	 ADD
13 081.4 **(13 080)** (1202)	ARS CHL D2 FJI G GRC HNG J MRC RUS AN SUI TUN USA CL USA E USA SO USA W	
13 084.4 **(13 083)** (1203)	AGL ALS AUS E AZR CHN CLM CPV DNK GNB GRC HWA IRQ LBY MDR MOZ POR RUS EO S TMP USA CL USA E USA SO USA W	

1	2	3
13 087.4 **(13 086)** (1204)	ALS D2 F GRC GUM HWA ISR J LVA MAC NOR PNR PTR RUS SW RUS W USA E USA SO USA W	
13 090.4 **(13 089)** (1205)	ALS ARG D1 E GEO GUM HWA I J LTU LVA MOZ NCL NOR PTR TMP UKR USA E USA SO USA W YEM	
13 093.4 **(13 092)** (1206)	ALB AUS W CHN D2 E FIN G I IRN ISL J MDG MRC TUR USA E USA SO USA W	

1	2	3
13 096.4 **(13 095)** (1207)	AGL ALG ATN AZR BEL CAN W CHN CPV EQA GRC HOL IRN ISR J MDR MOZ POR RUS NW TMP YUG	 ADD
13 099.4 **(13 098)** (1208)	ARG CHN CYP D1 EST GRC HNG I ISL J LTU LVA RUS SW RUS W USA E USA SO	 ADD
13 102.4 **(13 101)** (1209)	AFS ALS B BHR CAN W E EST FIN I INS J NZL POL RUS NW RUS SW TUR USA E USA SO USA W	

1	2	3
13 105.4 **(13 104)** (1210)	CHL DJI DNK E GRC GUM IND W INS ROU RUS AN RUS EO S SUI URG USA E USA SO USA W	ADD
13 108.4 **(13 107)** (1211)	ALS B CHN CUB DNK E I IRQ J KAZ MLA NOR PAQ RUS AN RUS AS S TKM USA CL USA E USA SO USA W	
13 111.4 **(13 110)** (1212)	ALS D1 GRC HWA INS J MAU PTR RUS EO RUS SW RUS W USA E USA SO	
13 114.4 **(13 113)** (1213)	ARG BEL BRB CAN E CHN CNR FIN >> >>	

1	2	3
(1213)	<< << GRC HOL I IND E IRN IRQ ISR KOR NOR RUS AN SMO USA W	ADD
13 117.4 **(13 116)** (1214)	ALS AUS B CAN W CUB DNK GRC GUM HNG IRN PTR RUS EO S USA CL USA E USA SO USA W	
13 120.4 **(13 119)** (1215)	ALG BEL CME DNK E GRC HOL IND W ISL ISR J PNR PTR ROU S SEY USA SO USA W	
13 123.4 **(13 122)** (1216)	ALB ALS ARG CHN EGY FIN GUM HWA IRN MRC >> >>	

1	2	3
(1216)	<< << PNR POL PTR SNG TUR USA E USA SO USA W	
13 126.4 **(13 125)** (1217)	ALG AZE BUL CUB DNK GRC GUM IND E IRQ J KAZ NOR RUS AS RUS EO S SHN USA CL USA E USA SO USA W	
13 129.4 **(13 128)** (1218)	ALS BEL CHL CME CNR D1 GUM HWA I IRN J NIU NOR PNR PTR RUS SW TUR USA E USA SO USA W	
13 132.4 **(13 131)** (1219)	ALS B BEL BUL DNK HOL J LTU LVA >> >>	

1	2	3
(1219)	<< <<	
	MRC	
	RUS EO	
	RUS NW	
	RUS SW	
	RUS W	
	S	
	SNG	
	UKR	
	USA E	
	USA SO	
	USA W	
13 135.4	ALS	
(13 134)	ARG	
	D2	ADD
(1220)	FJI	
	GRC	
	GUM	
	HWA	
	IRN	
	ISL	
	J	
	JOR	ADD
	PNR	
	POL	
	PTR	
	TUN	
	USA E	
	USA SO	
	USA W	
13 141.4	ALS	ADD
(13 140)	ARG	
	CAN E	
(1222)	CKH	
	F	
	HWA	
	IND W	
	IRN	
	J	
	NOR	
	ROU	
	RUS EO	
	TUR	
	USA W	ADD
13 144.4	ARS	
(13 143)	B	
	CZE	
(1223)	DNK	
	GRC	
	GUM	
	J	
	MRC	
	S	
	SVK	
	UKR	
	USA E	
	USA SO	
	USA W	

1	2	3
13 147.4	AFS	
(13 146)	ALS	
	CHL	
(1224)	D1	
	FIN	
	G	
	GHA	ADD
	GUM	
	HRV	
	HWA	
	J	
	MCO	
	NZL	
	PNR	
	PTR	
	USA E	
	USA W	
13 150.4	CHN	
(13 149)	E	
	GRC	
(1225)	IRN	
	JOR	ADD
	MDG	
	NOR	
	PNG	
	ROU	
	RUS NW	
	USA E	
	USA SO	
13 153.4	AUS	
(13 152)	CHL	
	CZE	
(1226)	DNK	
	F	
	IRN	
	J	
	RUS NW	
	S	ADD
	TUR	
	USA E	
	USA SO	
	USA W	
13 156.4	ALS	
(13 155)	AUS	
	E	
(1227)	FIN	
	GUM	
	HRV	
	HWA	
	IND E	
	PNR	
	POL	
	PTR	
	RUS EO	
	SUI	
	TZA	ADD
	USA E	
	USA W	

1	2	3
13 159.4	B	
(13 158)	CHL	
	CHN	
(1228)	CUB	
	EST	
	G	
	GEO	
	HNG	
	I	ADD
	LVA	
	MLD	ADD
	NOR	
	RUS SW	
	RUS W	
	UKR	
	USA CL	
	USA E	
	USA W	
13 162.4	ARG	
(13 161)	AUS	
	AZE	
(1229)	BUL	
	CAN E	
	F	
	HRV	
	J	
	KAZ	
	KGZ	
	KOR	
	LTU	
	LVA	
	POL	
	QAT	ADD
	RUS AN	
	RUS AS	
	RUS NW	
	RUS SW	
	RUS W	
	USA W	
13 165.4	ARG	
(13 164)	CYP	
	FIN	
(1230)	G	
	HWA	
	I	
	J	
	MTN	
	SUI	
	UKR	
	USA E	
	USA SO	
	USA W	
13 168.4	ALS	
(13 167)	AUS	
	F	
(1231)	GRC	
	GUM	
	HKG	
	>> >>	

1	2	3
(1231)	<< <<	
	HWA	
	IRN	
	LBY	
	NOR	
	PNR	
	POL	
	PRG	
	PTR	
	USA E	
	USA W	
13 171.4	ALG	
(13 170)	ALS	
	ARG	
(1232)	AZE	
	D2	
	G	
	GRC	
	GUM	
	HWA	
	J	
	KAZ	
	MTN	
	PNR	ADD
	SMA	ADD
	TKM	
	USA E	
	USA W	
13 174.4	AZE	RES325
(13 173)	B	RES325
	CHN	RES325
(1233)	CLM	RES325
	E	RES325
	G	RES325
	GEO	RES325
	GRC	RES325
	J	RES325
	LVA	RES325
	MLT	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	TKM	RES325
	TUR	RES325
	UKR	RES325
	USA SO	RES325
	VTN	RES325
13 177.4	ALS	RES325
(13 176)	AUS	RES325
	CHN	RES325
(1234)	CLM	RES325
	E	RES325
	HWA	RES325
	KOR	RES325
	MDG	RES325
	>> >>	

1	2	3
(1234)	<< <<	
	OMA	RES325
	RUS EO	RES325
	USA SO	RES325
	USA W	RES325
13 180.4	ARG	RES325
(13 179)	CHN	RES325
	F	RES325
(1235)	G	RES325
	HOL	RES325
	J	RES325
	KOR	RES325
	LVA	RES325
	RUS AN	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	THA	RES325
	TUR	RES325
	UKR	RES325
	USA SO	RES325
	UZB	RES325
13 183.4	BRM	ADD
(13 182)	CHN	RES325
	I	RES325
(1236)	RUS EO	RES325
	UAE	RES325
	UKR	RES325
	USA SO	RES325
13 186.4	CHN	RES325
(13 185)	F	RES325
	ISR	RES325
(1237)	J	RES325
	LVA	RES325
	PTR	RES325
	RUS AS	RES325
	RUS SW	RES325
	SUI	RES325
	TUR	RES325
	UAE	RES325
	UKR	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	VIR	RES325
13 189.4	ALS	RES325
(13 188)	B	RES325
	BLR	RES325
(1238)	CHL	RES325
	CHN	RES325
	EST	RES325
	GUM	RES325
	HWA	RES325
	KOR	RES325
	PAQ	RES325
	PTR	RES325
	RUS AN	RES325
	RUS AS	RES325
	>> >>	

1	2	3
(1238)	<< <<	
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	TKM	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
13 192.4	ALS	RES325
(13 191)	AZE	RES325
	B	RES325
(1239)	BUL	RES325
	CAN E	RES325
	CHN	RES325
	E	RES325
	F	RES325
	GUM	RES325
	HWA	RES325
	J	RES325
	KAZ	RES325
	MDG	RES325
	PTR	RES325
	QAT	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS SW	RES325
	RUS W	RES325
	TKM	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	YUG	RES325
13 195.4	ARG CL	RES325
(13 194)	ARG SO	RES325
	AUS	RES325
(1240)	CHN	RES325
	DGA	RES325
	GRC	RES325
	GUM	RES325
	HKG	RES325
	HWA	RES325
	KGZ	RES325
	MDW	RES325
	POR	RES325
	PTR	RES325
	RUS AN	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325

1	2	3
13 198.4 **(13 197)** (1241)	ALS CHN D2 DGA GUM HWA IND E IND W J MDW PTR UKR USA E USA W	RES325 RES325 RES325 RES325 RES325 RES325 RES325 RES325 RES325 RES325 RES325 RES325 RES325 RES325
17 243.4 **(17 242)** (1601)	ALS ARG DNK HWA J LTU NOR RUS NW RUS SW RUS W S SEY TUN UKR USA E USA SO	
17 246.4 **(17 245)** (1602)	ARS AUS E CME G GRC MRC RUS AN RUS EO RUS SW USA E USA SO USA W	
17 249.4 **(17 248)** (1603)	ALS ARG NO CHN CYP DNK HNG I MLT NOR S USA E USA SO USA W	ADD

1	2	3
17 252.4 **(17 251)** (1604)	AUS CAN E F GRC J NOR ROU	
17 255.4 **(17 254)** (1605)	DNK F IND W IRN J OCE RUS SW S UKR USA E USA W	
17 258.4 **(17 257)** (1606)	B CUB FIN G I ISL J NZL PTR RUS SW TUR USA SO USA W	
17 261.4 **(17 260)** (1607)	ALS ATN CAN E GRC IND E IRN MCO NOR POL RUS EO RUS NW USA E USA SO USA W	
17 264.4 **(17 263)** (1608)	AFS CAN W CHN CZE DNK EQA I MTN S SVK TUR	ADD

1	2	3
17 267.4 **(17 266)** (1609)	ARS BEL CKH E GRC IND E ISR J RUS NW USA E USA SO USA W	
17 270.4 **(17 269)** (1610)	AUS CHN D1 EGY INS IRN MTN NOR RUS NW TUN UKR URG USA E USA SO USA W	
17 273.4 **(17 272)** (1611)	B FIN G HRV J LBY MLA SUI TUR USA E USA SO USA W	
17 276.4 **(17 275)** (1612)	ALS AUS CUB GEO GUM HWA JOR MRC PTR RUS EO RUS NW RUS SW UKR USA E USA SO USA W	ADD

1	2	3
17 279.4 **(17 278)** (1613)	ALS B BEL E GRC GUM HWA IRN ISR NOR PNR PTR ROU RUS EO SNG USA E USA SO USA W	
17 282.4 **(17 281)** (1614)	CAN W CHN DNK FIN I MLD NIU RUS AN S	 ADD
17 285.4 **(17 284)** (1615)	AGL AZR CPV FIN G GNB IRN ISL MDR MOZ POR RUS EO SUI TMP	
17 288.4 **(17 287)** (1616)	ALS D1 HWA I IRN J MRC RUS NW TUR USA E USA SO USA W	
17 291.4 **(17 290)** (1617)	B CNR DNK F GRC >> >>	

1	2	3
(1617)	<< << HNG IRN ISR RUS EO S	
17 294.4 **(17 293)** (1618)	ARG BHR DNK G HRV IND W J MRC S TUR	
17 297.4 **(17 296)** (1619)	ALS D2 F GRC GUM HWA MAU NOR PNR PTR RUS EO USA E USA W	
17 300.4 **(17 299)** (1620)	J LBY LTU LVA NOR RUS SW RUS W TUR UKR USA CL USA E	
17 306.4 **(17 305)** (1622)	ALS AUS DNK F GHA GRC HWA J PNR ROU S SUI	ADD ADD ADD ADD ADD
17 309.4 **(17 308)** (1623)	ALS CHN E FIN G GUM >> >>	

1	2	3
(1623)	<< << HOL HWA PNR PRG PTR UKR USA E USA SO USA W	
17 312.4 **(17 311)** (1624)	D1 E I J LTU LVA RUS SW RUS W SMO USA E USA SO USA W	
17 315.4 **(17 314)** (1625)	ALS BEL GRC GUM HWA IRN ISL J POL PTR USA E USA SO USA W	
17 318.4 **(17 317)** (1626)	CAN W CUB GRC HOL IRQ J QAT RUS AN RUS EO RUS NW USA E	 RES325 ADD
17 321.4 **(17 320)** (1627)	ALS BEL E EST GRC HNG HRV J LTU LVA NOR RUS SW RUS W	ADD

1	2	3
17 324.4 **(17 323)** (1628)	CUB EQA F GRC IRQ ISR ROU RUS EO RUS NW	ADD
17 327.4 **(17 326)** (1629)	ALG AUS BRM CAN E D2 GRC IRN J NOR SEN	ADD
17 330.4 **(17 329)** (1630)	ALS BEL E GEO GUM HWA IND W ISL J LTU LVA PNR PTR RUS SW USA E USA SO USA W	 RES325
17 333.4 **(17 332)** (1631)	ALG BUL CHL CHN GRC IRQ POL SUI USA E	
17 336.4 **(17 335)** (1632)	ALS ARG AZR CYP G HNG J MDG MDR POR USA E USA SO USA W	

1	2	3
17 339.4 **(17 338)** (1633)	AFS ALS AZE B CHN D2 F GRC GUM HWA KAZ KGZ PNR POL PTR RUS AS TKM USA E USA W	
17 342.4 **17 341** (1634)	CAN NO CHN D1 E GRC J KOR ROU	 RES325
17 345.4 **(17 344)** (1635)	AGL AUS AZR BUL CPV DNK GNB I J MAC MDR MOZ PNR POR S TMP	 ADD ADD
17 348.4 **(17 347)** (1636)	ALG ALS FIN GRC GUM HOL HWA IND E J PNR PTR USA E USA W	

1	2	3
17 351.4 **(17 350)** (1637)	AZE CHN E G HKG KAZ KOR MDG NZL RUS AS	 RES325
17 354.4 **(17 353)** (1638)	ALS BUL D2 FIN GUM HWA MRC POL SMA USA E USA W YUG	 ADD ADD
17 357.4 **(17 356)** (1639)	ALB ALS CHN D1 E GUM HOL HWA PNR PTR USA E USA W	 RES325
17 360.4 **(17 359)** (1640)	BRB CHL D2 EST G GRC J LVA PNR	 ADD
17 363.4 **(17 362)** (1641)	ALG DNK IRQ J S SNG UKR USA E USA SO USA W	
17 366.4 **(17 365)** (1642)	ALS AUS CLM F HWA >> >>	RES325 RES325 RES325 RES325 RES325

1	2	3
(1642)	<< <<	
	J	RES325
	PTR	RES325
	RUS EO	RES325
	UAE	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	VIR	RES325
17 369.4	AZE	RES325
(17 368)	CHN	RES325
	CLM	RES325
(1643)	F	RES325
	KAZ	RES325
	QAT	RES325
	RUS AN	RES325
	RUS EO	RES325
	RUS NW	RES325
	TKM	RES325
	UKR	RES325
	USA SO	RES325
17 372.4	ALS	RES325
(17 371)	B	RES325
	HWA	RES325
(1644)	I	RES325
	RUS EO	RES325
	RUS NW	RES325
	UAE	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
(17 375.4)	ARG	RES325
(17 374)	CHN	RES325
	ISR	RES325
(1645)	KGZ	RES325
	KOR	RES325
	LVA	RES325
	OMA	RES325
	RUS AN	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	TUR	RES325
	UKR	RES325
	USA SO	RES325
	UZB	RES325
17 378.4	CHN	RES325
(17 377)	I	RES325
	RUS EO	RES325
(1646)	RUS SW	RES325
	RUS W	RES325
	USA W	RES325

1	2	3
17 381.4	ALS	RES325
(17 380)	CAN E	RES325
	CHN	RES325
(1647)	EST	RES325
	HWA	RES325
	KOR	RES325
	LTU	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	TUR	RES325
	UKR	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
17 384.4	ALS	RES325
(17 383)	BLR	RES325
	CHN	RES325
(1648)	HWA	RES325
	KOR	RES325
	PTR	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	UKR	RES325
	USA CL	RES325
	USA W	RES325
	VIR	RES325
17 387.4	ALS	RES325
(17 386)	B	RES325
	BUL	RES325
(1649)	GUM	RES325
	HWA	RES325
	J	RES325
	MDG	RES325
	PTR	RES325
	RUS AN	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
17 390.4	ALS	RES325
(17 389)	ARG CL	RES325
	ARG SO	RES325
(1650)	AZE	RES325
	CHN	RES325
	E	RES325
	GRC	RES325
	HKG	RES325
	HWA	RES325
	J	RES325
	PTR	RES325
	RUS AN	RES325
	RUS NW	RES325
	RUS SW	RES325
	UKR	RES325
	>> >>	

1	2	3
(1650)	<< <<	
	USA E	RES325
	USA SO	RES325
	USA W	RES325
17 393.4	ALS	RES325
(17 392)	BLR	RES325
	CHN	RES325
(1651)	DGA	RES325
	E	RES325
	GUM	RES325
	HWA	RES325
	J	RES325
	MDW	RES325
	PTR	RES325
	RUS AN	RES325
	RUS EO	RES325
	RUS SW	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
17 396.4	CHN	RES325
(17 395)	GUM	RES325
	HOL	RES325
(1652)	J	RES325
	MDG	RES325
	MDW	RES325
	PTR	RES325
	RUS AN	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	TKM	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	YUG	RES325
17 399.4	B	RES325
(17 398)	CHN	RES325
	E	RES325
(1653)	PTR	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	VTN	RES325
17 402.4	CHN	RES325
(17 401)	G	RES325
	HWA	RES325
(1654)	J	RES325
	PTR	RES325
	RUS SW	RES325
	UKR	RES325
	>> >>	

1	2	3
(1654)	<< <<	
	USA E	RES325
	USA SO	RES325
	USA W	RES325
17 405.4	ALS	RES325
(17 404)	CHL	RES325
	CHN	RES325
(1655)	DGA	RES325
	E	RES325
	G	RES325
	GRC	RES325
	GUM	RES325
	HWA	RES325
	KGZ	RES325
	MDW	RES325
	PTR	RES325
	RUS AN	RES325
	RUS NW	RES325
	RUS SW	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
17 408.4	AUS	RES325
(17 407)	CHN	RES325
	GUM	RES325
(1656)	HWA	RES325
	LVA	RES325
	MDW	RES325
	PTR	RES325
	RUS AN	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	SUI	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
19 756.4	ALS	RES325
(19 755)	AUS	RES325
	CHN	RES325
(1801)	E	RES325
	G	RES325
	HWA	RES325
	J	RES325
	JOR	RES325
	PTR	RES325
	RUS AN	RES325
	RUS EO	RES325
	RUS NW	RES325
	TUR	RES325
	UAE	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	VIR	RES325

1	2	3
19 759.4	CHN	RES325
(19 758)	G	RES325
	HOL	RES325
(1802)	ISL	RES325
	J	RES325
	MOZ	RES325
	PTR	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	UKR	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	VIR	RES325
19 762.4	ALS	RES325
(19 761)	AZE	RES325
	B	RES325
(1803)	CHN	RES325
	G	RES325
	HWA	RES325
	J	RES325
	JOR	RES325
	KOR	RES325
	LTU	RES325
	POR	RES325
	PTR	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	TKM	RES325
	UAE	RES325
	UKR	RES325
	USA CL	RES325
	USA E	RES325
	USA W	RES325
	VIR	RES325
19 765.4	ALS	RES325
(19 764)	CAN W	RES325
	CHN	RES325
(1804)	D2	RES325
	HWA	RES325
	J	RES325
	RUS EO	RES325
	TUR	RES325
	USA SO	RES325
	USA W	RES325
19 768.4	ALS	RES325
(19 767)	CHN	RES325
	HWA	RES325
(1805)	I	RES325
	J	RES325
	LVA	RES325
	RUS EO	RES325
	RUS SW	RES325
	RUS W	RES325
	TUR	RES325
	USA W	RES325

1	2	3
19 774.4	ARG CL	RES325
(19 773)	ARG SO	RES325
	CHN	RES325
(1807)	D2	RES325
	GEO	RES325
	ISL	RES325
	J	RES325
	LVA	RES325
	RUS AN	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	TKM	RES325
	TUR	RES325
	USA SO	RES325
19 777.4	ALS	RES325
(19 776)	BLR	RES325
	CHN	RES325
(1808)	CUB	RES325
	HWA	RES325
	ISR	RES325
	MDG	RES325
	PTR	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	TUR	RES325
	UKR	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	VIR	RES325
19 780.4	ALS	RES325
(19 779)	B	RES325
	CHN	RES325
(1809)	E	RES325
	GRC	RES325
	GUM	RES325
	HWA	RES325
	POL	ADD
	RUS NW	RES325
	RUS W	RES325
	SUI	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
19 783.4	ALS	RES325
(19 782)	ARG	RES325
	BUL	RES325
(1810)	CHN	RES325
	EST	RES325
	HKG	RES325
	HWA	RES325
	J	RES325
	>> >>	

1	2	3
(1810)	<< <<	
	LTU	RES325
	PTR	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS SW	RES325
	UKR	RES325
	USA W	RES325
19 786.4	ALS	RES325
(19 785)	B	RES325
	CAN E	RES325
(1811)	CHN	RES325
	DGA	RES325
	GRC	RES325
	GUM	RES325
	HWA	RES325
	J	RES325
	KOR	RES325
	MDG	RES325
	MDW	RES325
	PTR	RES325
	RUS EO	RES325
	RUS NW	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
19 789.4	ALS	RES325
(19 788)	ARG	RES325
	AZE	RES325
(1812)	CAN E	RES325
	CHN	RES325
	HWA	RES325
	J	RES325
	PTR	RES325
	RUS EO	RES325
	RUS NW	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	YUG	RES325
19 792.4	ALS	RES325
(19 791)	CHN	RES325
	E	RES325
(1813)	F	RES325
	HWA	RES325
	IND E	RES325
	IND W	RES325
	J	RES325
	PTR	RES325
	TUR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325

1	2	3
19 795.4	ALS	RES325
(19 794)	AUS	RES325
	AZE	RES325
(1814)	B	RES325
	CHN	RES325
	DGA	RES325
	E	RES325
	GUM	RES325
	HWA	RES325
	ISL	RES325
	MDW	RES325
	PTR	RES325
	RUS EO	RES325
	RUS NW	RES325
	TUR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	YUG	RES325
19 798.4	ARG CL	RES325
(19 797)	ARG SO	RES325
	AZE	RES325
(1815)	BLR	RES325
	CHN	RES325
	GUM	RES325
	J	RES325
	KAZ	RES325
	PTR	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	TKM	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
22 697.4	AUS	
(22 696)	CHN	
	CME	
(2201)	E	
	GRC	
	GUM	
	HNG	
	RUS NW	
	USA E	
	USA SO	
	USA W	
22 700.4	ARG	
(22 699)	BRM	ADD
	CAN E	
(2202)	HNG	
	I	
	IRN	
	MTN	
	NOR	
	RUS EO	
	UKR	

1	2	3
22 703.4	AUS E	
(22 702)	BUL	
	DNK	
(2203)	IRN	
	J	
	MRC	
	PNR	ADD
	S	
22 706.4	AFS	
(22 705)	ARG	
	CAN NO	
(2204)	F	
	FIN	
	HRV	
	ISR	
	RUS EO	
	RUS NW	
22 709.4	ALG	
(22 708)	AUS	
	EST	
(2205)	GRC	
	HOL	
	IRN	
	LTU	
	LVA	
	RUS EO	
	RUS NW	
	RUS W	
	USA E	
	USA SO	
	USA W	
22 712.4	AFS	
(22 711)	ALS	
	BHR	ADD
(2206)	G	
	GUM	
	HRV	
	HWA	
	IND W	
	J	
	MRC	
	POL	
	PTR	
	USA E	
	USA SO	
	USA W	
22 715.4	AZR	
(22 714)	CHN	
	CPV	
(2207)	D1	
	ISR	
	LVA	
	MDR	
	POR	
	RUS SW	
	TMP	
	TUN	

1	2	3
22 718.4 **(22 717)** (2208)	ARG NO BUL DNK I IND E J MRC NOR PNR S	 ADD ADD
22 721.4 **(22 720)** (2209)	ALS BEL CHN GRC GUM HWA KOR MRC PNR POL PTR RUS NW USA E USA W	 RES325
22 724.4 **(22 723)** (2210)	E FIN GRC HOL J UKR USA E	
22 727.4 **(22 726)** (2211)	CHN CUB DNK I J S UKR	RES325
22 730.4 **(22 729)** (2212)	ALS AUS CYP G GUM HNG HWA PNR PTR SNG USA E USA W	
22 733.4 **(22 732)** (2213)	BUL CAN E DNK E GEO IRQ LBY LTU >> >>	

1	2	3
(2213)	<< << NZL RUS EO RUS SW RUS W S TUR	
22 736.4 **(22 735)** (2214)	BEL CHN E FIN IRN RUS NW SUI TUR URG USA E USA SO USA W	
22 739.4 **(22 738)** (2215)	CHN F GHA GRC IRQ J NOR POL USA E USA SO USA W	RES325 ADD
22 742.4 **(22 741)** (2216)	CAN W DNK GRC GUM I J MTN USA E USA SO	
22 745.4 **(22 744)** (2217)	ALS D1 E GRC GUM HKG HWA IRN ISR PNR PTR USA E USA W	
22 748.4 **(22 747)** (2218)	ALS CHN CYP DNK F GUM >> >>	RES325

1	2	3
(2218)	<< << HWA PTR S UKR USA E USA SO USA W	
22 751.4 **(22 750)** (2219)	BEL CHN CUB GRC MCO POL SMO	
22 754.4 **(22 753)** (2220)	CAN W CHN CZE D2 G GRC SEN SUI SVK	 RES325 ADD
22 760.4 **(22 759)** (2222)	ARS AZR CPV D1 FIN GRC KOR MDR MLD POR TMP USA E USA SO USA W	 ADD
22 763.4 **(22 762)** (2223)	ALS AUS D1 HWA I J MLT PTR TUR USA E USA W	 ADD
22 766.4 **(22 765)** (2224)	ALS D2 E GRC GUM HWA IRQ MAU PNR >> >>	

1	2	3
(2224)	<< <<	
	PTR	
	USA E	
	USA W	
22 769.4	ALG	
(22 768)	BEL	
	CHL	
(2225)	GRC	
	IND W	
	ISL	
	J	
22 772.4	ALB	
(22 771)	ALS	ADD
	CHN	
(2226)	D2	
	EGY	
	F	
	HWA	ADD
	ISL	
	JOR	ADD
	ROU	
	USA W	ADD
22 775.4	ALG	
(22 774)	G	
	GRC	
(2227)	IND E	
	J	
	UKR	
	USA E	
	USA SO	
	USA W	
22 778.4	AUS	
(22 777)	DNK	
	GRC	
(2228)	MRC	
	QAT	ADD
	RUS EO	
	S	
	USA E	
	USA W	
22 781.4	CAN E	
(22 780)	E	
	G	
(2229)	IND W	
	J	
	UKR	
22 784.4	ALS	
(22 783)	AUS	
	AZE	
(2230)	D2	
	E	
	GUM	
	HWA	
	KAZ	
	KGZ	
	PNR	
	PTR	
	RUS AS	
	>> >>	

1	2	3
(2230)	<< <<	
	S	
	TUR	
	USA E	
	USA W	
22 787.4	ALS	
(22 786)	ARS	
	CAN W	
(2231)	EST	
	F	
	FIN	
	GRC	
	J	
	LVA	
	MLA	
	NIU	
	RUS SW	
	USA E	
	USA SO	
	USA W	
22 790.4	CUB	
(22 789)	GEO	
	GRC	
(2232)	HOL	
	IRQ	
	LTU	
	LVA	
	POL	
	RUS EO	
	RUS SW	
	RUS W	
	SUI	
22 793.4	ALS	
(22 792)	CKH	
	GRC	ADD
(2233)	GUM	
	HWA	
	IRN	
	NOR	
	PNR	
	PTR	
	ROU	
	USA E	
	USA SO	
	USA W	
22 796.4	ARG	
(22 795)	DNK	
	INS	
(2234)	J	
	LBY	
	NOR	
	ROU	
	S	
22 799.4	ALS	
(22 798)	F	
	GRC	
(2235)	GUM	
	HWA	
	>> >>	

1	2	3
(2235)	<< <<	
	IRN	
	J	
	PTR	
	QAT	ADD
	RUS NW	
	USA E	
	USA SO	
	USA W	
22 802.4	DNK	
(22 801)	E	
	GRC	
(2236)	IRQ	
	J	
	NZL	
	UKR	
	USA E	
	USA W	
22 805.4	AZR	
(22 804)	CHN	RES325
	I	
(2237)	IRN	
	J	
	MDR	
	NOR	
	POR	
	ROU	
	USA E	
	USA SO	
	USA W	
22 808.4	ALG	
(22 807)	AUS	
	B	
(2238)	D1	
	GRC	
	HNG	
	IRQ	
	J	
	LTU	
	LVA	
	RUS SW	
	RUS W	
22 811.4	ALS	
(22 810)	BEL	
	CHN	RES325
(2239)	E	
	GUM	
	HRV	
	HWA	
	IND E	
	IRN	
	NOR	
	PNR	
	PTR	
	USA E	
	USA W	

1	2	3
22 814.4	CHL	
(22 813)	GRC	
	J	
(2240)	MDG	
	NOR	
	TUN	
22 817.4	ALS	RES325
(22 816)	AZE	RES325
	CHN	RES325
(2241)	CLM	RES325
	GEO	RES325
	HKG	RES325
	HWA	RES325
	J	RES325
	PTR	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	TUR	RES325
	UKR	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	VIR	RES325
	VTN	RES325
22 820.4	BLR	RES325
(22 819)	CLM	RES325
	RUS AN	RES325
(2242)	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	UKR	RES325
	USA SO	RES325
22 823.4	ALS	RES325
(22 822)	AUS	RES325
	B	RES325
(2243)	BUL	RES325
	HWA	RES325
	J	RES325
	KOR	RES325
	PTR	RES325
	RUS EO	RES325
	RUS W	RES325
	UAE	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	VIR	RES325
22 826.4	ALS	RES325
(22 825)	HWA	RES325
	I	RES325
(2244)	J	RES325
	RUS AN	RES325
	>> >>	

1	2	3
(2244)	<< <<	
	RUS EO	RES325
	UKR	RES325
	USA W	RES325
22 829.4	ALS	RES325
(22 828)	ARG CL	RES325
	ARG SO	RES325
(2245)	CHN	RES325
	E	RES325
	HWA	RES325
	J	RES325
	RUS EO	RES325
	UAE	RES325
	USA SO	RES325
	USA W	RES325
22 832.4	B	RES325
(22 831)	J	RES325
	KGZ	RES325
(2246)	KOR	RES325
	LVA	RES325
	RUS EO	RES325
	RUS SW	RES325
	RUS W	RES325
	SUI	RES325
	TUR	RES325
	USA SO	RES325
22 835.4	ALS	RES325
(22 834)	CAN E	RES325
	HWA	RES325
(2247)	J	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	UKR	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	VIR	RES325
22 838.4	ALS	RES325
(22 837)	CHN	RES325
	E	RES325
(2248)	HWA	RES325
	PTR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
22 841.4	ALS	RES325
(22 840)	CHN	RES325
	HWA	RES325
(2249)	I	RES325
	J	RES325
	PTR	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS W	RES325
	>> >>	

1	2	3
(2249)	<< <<	
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
22 844.4	ALS	RES325
(22 843)	AZE	RES325
	B	RES325
(2250)	DGA	RES325
	E	RES325
	GRC	RES325
	GUM	RES325
	HWA	RES325
	KAZ	RES325
	KOR	RES325
	MDW	RES325
	PTR	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	TKM	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	YUG	RES325
22 847.4	ALS	RES325
(22 846)	B	RES325
	BLR	RES325
(2251)	CHN	RES325
	GUM	RES325
	HWA	RES325
	J	RES325
	MDW	RES325
	PTR	RES325
	RUS AN	RES325
	RUS NW	RES325
	RUS SW	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
22 850.4	ALS	RES325
(22 849)	G	RES325
	GUM	RES325
(2252)	HWA	RES325
	J	RES325
	LVA	RES325
	PTR	RES325
	RUS NW	RES325
	RUS SW	RES325
	TKM	RES325
	UAE	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325

1	2	3
22 853.4	ALS	RES325
(22 852)	AUS	RES325
	AZE	RES325
(2253)	CHN	RES325
	DGA	RES325
	E	RES325
	G	RES325
	GEO	RES325
	GRC	RES325
	GUM	RES325
	HWA	RES325
	J	RES325
	KAZ	RES325
	MDW	RES325
	PTR	RES325
	RUS NW	RES325
	RUS W	RES325
	TKM	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
26 146.4	ALS	RES325
(26 145)	AZE	RES325
	B	RES325
(2501)	CAN E	RES325
	CHN	RES325
	D1	RES325
	HNG	RES325
	HWA	RES325
	JOR	RES325
	RUS EO	RES325
	TUR	RES325
	UKR	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	YUG	RES325
26 149.4	ALS	RES325
(26 148)	AUS	RES325
	BLR	RES325
(2502)	CHN	RES325
	G	RES325
	HWA	RES325
	J	RES325
	MOZ	RES325
	PTR	RES325
	RUS EO	RES325
	RUS SW	RES325
	UKR	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	VIR	RES325

1	2	3
26 152.4	ARG CL	RES325
(26 151)	BUL	RES325
	CHN	RES325
(2503)	J	RES325
	RUS EO	RES325
	SUI	RES325
	UAE	RES325
	USA SO	RES325
26 155.4	ALS	RES325
(26 154)	ARG SO	RES325
	B	RES325
(2504)	BLR	RES325
	CHN	RES325
	HWA	RES325
	J	RES325
	PTR	RES325
	RUS AN	RES325
	RUS AS	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	TKM	RES325
	UKR	RES325
	USA CL	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
	VIR	RES325
26 158.4	ALS	RES325
(26 157)	B	RES325
	CHN	RES325
(2505)	E	RES325
	GUM	RES325
	HWA	RES325
	IND E	RES325
	IND W	RES325
	ISR	RES325
	PTR	RES325
	RUS EO	RES325
	RUS NW	RES325
	RUS SW	RES325
	RUS W	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
26 161.4	ALS	RES325
(26 160)	ARG	RES325
	CHN	RES325
(2506)	HWA	RES325
	I	RES325
	J	RES325
	TUR	RES325
	USA SO	RES325
	USA W	RES325

1	2	3
26 164.4	ALS	RES325
(26 163)	ARG	RES325
	AZE	RES325
(2507)	CAN E	RES325
	CHN	RES325
	DGA	RES325
	E	RES325
	GRC	RES325
	GUM	RES325
	HKG	RES325
	HWA	RES325
	J	RES325
	KAZ	RES325
	MDW	RES325
	PTR	RES325
	RUS EO	RES325
	TKM	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
26 167.4	ALS	RES325
(26 166)	AUS	RES325
	B	RES325
(2508)	CAN W	RES325
	CHN	RES325
	DGA	RES325
	GRC	RES325
	GUM	RES325
	HNG	RES325
	JOR	RES325
	MDW	RES325
	POR	RES325
	PTR	RES325
	RUS EO	RES325
	RUS SW	RES325
	TUR	RES325
	UKR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325
26 170.4	ALS	RES325
(26 169)	ARG CL	RES325
	ARG SO	RES325
(2509)	CHN	RES325
	D2	RES325
	GUM	RES325
	HWA	RES325
	J	RES325
	MDW	RES325
	PTR	RES325
	RUS EO	RES325
	TUR	RES325
	USA E	RES325
	USA SO	RES325
	USA W	RES325

TABLE OF ALLOTMENTS ADDED TO THE PLAN

adopted by the WMARC-74

Column headings

1 Channel number (the corresponding carrier and assigned frequencies are indicated in Sub-Section A of Section I of Part B Appendix **S17** and in the present Appendix).

2 Country or area of allotment.

3 Service area description.

3.1 Main service area.

A number between 1 and 22 refers to a Zone defined on the Map of Maritime Zones appearing in the Preface to the International Frequency List and the Weekly Circular.

3.2 Maximum length of circuit in kilometres.

4 Nature of service.

5 Class of emission.

6 Peak envelope power in dBW.

7 Transmitting antenna characteristics.

7.1 In the case of a non-directional antenna, the symbol ND is entered in this column and columns 7.2a), b) and c) are left blank. In the case of a directional antenna, the symbol D is entered in this column and the characteristics are given in columns 7.2a), b) and c).

7.2a) Azimuth of maximum radiation. The symbol ROT entered in this column means that a rotatable antenna is used.

7.2b) Angular width of main lobe.

7.2c) Relative gain of the antenna in dB.

8 Planned scheduled hours of operation in the channel (UTC).

9 Traffic data.

9a) Estimated peak hours of traffic.

9b) Estimated daily volume of traffic in minutes.

10 Special section No./Weekly Circular No./Date (e.g. MAR/10/1305/280278) or Resolution **325 (Mob-87)**[*].

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[*] This Resolution was abrogated by WRC-95.

1	2	3		4	5	6	7				8	9		10
		3.1	3.2				7.1	7.2 a)	7.2 b)	7.2 c)		9a)	9b)	
401	AUS	12	800	CV	J3E	20.0	ND				2200-1000	2200-1000	30	MAR/54/1640/021084
401	PNR	9, 18	500	CP	J3E	30.0	ND				0000-1200		25	AR16/84/1838/160888
403	CAN CL	2, 16	1 000	CV	J3E	30.0	ND				0000-2359	0800-2000	360	AR16/120/2318/100398
403	PNR	9, 18	500	CP	J3E	30.0	ND				0800-1200		25	AR16/84/1838/160888
405	USA CL	16	800	CP	J3E	30.0	ND				1100-2300	1200-1800	180	MAR/50/1609/280284
						15.0					2300-1100			
407	AUS	11, 12	800	CO/CP	J3E	37.0	ND				0000-2400			MAR/48/1602/100184
407	I	17	1 200	CO	J3E	31.8	ND				0500-2200	0700-1100	60	MAR/58/1682/300785
408	B	18, 20	800	CV	J3E	21.8	ND				0000-2400		120	MAR/69/1712/040386
408	CHN	5	200	OT	J3E	26.0	D	340	60	3	1100-1900	1200-1300	190	RES.325(MOB-87)
408	MLD	6	–	CO	J3E	30.0	D	300	120	5	0000-2400			AR16/79/1816/150388
408	SMA	8, 12, 13	1 000	CP	J3E	30.0	ND				1800-0400		30	MAR/10/1305/280278
409	GHA	19	500	CP	J3E	30.0	ND				0000-2359			AR16/114/2237/230796
							D	110	30	10				
							D	330	30	10				
409	QAT	6	2 500	CP	J3E	30.0	ND				0000-2400			AR16/89/1886/250789
411	AMS	10	–	CP	J3E	24.8	ND				0430-0445		25	MAR/15/1347/191278
											0830-0845			
											1230-1245			
411	EQA	9	800	CP	J3E	24.0	ND				0030-0530		30	AR16/90/1895/260989
411	I	17	–	CO	J3E	31.8	ND				0500-2200	0700-1100	60	AR16/75/1747/041186
411	KIR	7, 8	500	CP	J3E	27.0	ND				0800-1800			MAR/59/1686/270885
416	ARG CL	14, 20	1 000	CP	J3E	30.0	D	90	60	2	0000-2400	1100-1700	490	RES.325(MOB-87)
417	TZA	6, 10, 19, 21	3 200	CO/CP	J3E	37.0	ND				0700-1800	0800-1000	240	MAR/66/1707/280186
												1500-1700		
418	B	18, 20	800	CV	J3E	21.8	ND				0000-2400	0700-1100	240	MAR/69/1712/040386
418	I	17	–	CO	J3E	31.8	ND				0500-2200	0700-1100	60	AR16/75/1747/041186
419	TZA	6, 10, 19, 21	3 200	CO/CP	J3E	37.0	ND				0700-1800	0800-1000	240	MAR/57/1680/160785
												1500-1700		
422	SUI	15, 17	4 000	CP	J3E	37.0	D	ROT	30	8	1900-0200	2000-2200	20	MAR/62/1694/221085
423	B	18, 20	800	CV	J3E	27.0	ND				0000-2400			MAR/16/1350/160179
423	MLT	6, 15, 17	3 000	CP	J3E	31.8	ND				1700-0500	2000-2100	60	MAR/41/1565/190483
423	QAT	6	800	CP	J3E	37.0	ND				0000-2400		200	MAR/23/1412/010480
		6	1 500	CP	J3E	37.0	D	130	60	9	0000-2400		200	
		6	1 500	CP	J3E	37.0	D	200	60	9	0000-2400		200	
		6	1 500	CP	J3E	37.0	D	310	60	9	0000-2400		200	
424	AUS E	12	800	CO/CP	J3E	30.0	ND				0000-2400			MAR/48/1602/100184
424	PNR	9, 18	500	CP	J3E	30.0	ND				0800-1200		25	AR16/73/1742/300986
425	B	18, 20	800	CV	J3E	27.0	ND				1000-2300	1900-2200	100	MAR/16/1350/160179
425	JOR	6, 15, 17	5 000	CP	J3E	37.0	ND				1700-0500			MAR/49/1604/240184
601	I	17	–	CO	J3E	31.8	ND				0400-2200	0600-1400	60	AR16/75/1747/041186
601	MLD	6	–	CO	J3E	30.0	D	300	120	5	0000-2400			AR16/79/1816/150388
601	NCL	7, 8, 12	2 500	CP	J3E	27.0	ND				0000-2400			AR16/71/1737/260886
602	GHA	19	500	CP	J3E	30.0	ND				0000-2359			AR16/114/2237/230796
							D	110	30	10				
							D	330	30	10				
602	B	18, 20	800	CP	J3E	30.0	ND				0000-2400			MAR/69/1712/040386
602	EQA	9	800	CP	J3E	24.0	ND				0630-1000		30	AR16/90/1895/260989
602	FJI	12	1 000	CP	J3E	30.0	ND				1800-0600	2000-0500	120	MAR/37/1519/180582
603	AUS	11, 12	4 000	CP	J3E	30.0	ND				0000-2400	2100-0900	30	MAR/55/1651/181284
603	MLT	6, 15, 17	3 000	CP	J3E	31.8	ND				0500-1700	0900-1100	60	MAR/41/1565/190483
604	ATN	18	1 500	CP	J3E	30.0	ND				0000-0200		120	MAR/35/1495/171181
											0600-1000			

1	2	3		4	5	6	7				8	9		10
		3.1	3.2				7.1	7.2 a)	7.2 b)	7.2 c)		9a)	9b)	
604	B	18, 20	800	CP	J3E	30.0	ND				1000-1300 1700-2000			MAR/69/1712/040386
604	TUV	8, 12	450	CP	J3E	30.0	ND				1800-1200	2000-0400	30	AR16/91/1897/101089
605	B	18, 20	800	CP	J3E	30.0	ND				1000-1300 1700-2000			MAR/69/1712/040386
605	F	15, 17	2 500	CP	J3E	40.0	ND				0600-0900 1700-2200	1800-2200	300	MAR/56/1679/090785
605	NZL	7, 8, 11, 12, 13	6 000	CP	J3E	37.0	ND				0000-2400	0400-0900	90	MAR/63/1695/291085
803	SUI	15, 16, 17, 18, 19	6 000	CP	J3E	40.0	D	ROT	30	8	0600-0200	0600-1000 1700-2200	50	MAR/62/1694/221085
804	JOR	6, 15, 17	5 000	CP	J3E	37.0	ND				0500-1700			MAR/49/1604/240184
804	QAT	6	1 500	CP	J3E	37.0	ND				0000-2400		200	MAR/23/1412/010480
		6	2 500	CP	J3E	37.0	D	130	60	10	0000-2400		200	
		6	2 500	CP	J3E	37.0	D	200	60	10	0000-2400		200	
		6, 17	2 500	CP	J3E	37.0	D	310	60	10	0000-2400		200	
805	EQA	9	800	CP	J3E	24.0	ND				1130-1730		30	AR16/90/1895/260989
806	AUS	11	2 000	CP	J3E	30.0	ND				2100-0500	2100-0500	90	MAR/52/1631/310784
806	SMA	8, 12, 13	3 000	CP	J3E	30.0	ND				1800-0400		30	MAR/11/1310/040478
807	I	15, 17	–	CO	J3E	31.8	ND				0000-2400	0500-1300	60	AR16/75/1747/041186
808	I	15, 17	–	CO	J3E	31.8	ND				0000-2400	1300-2100	60	AR16/75/1747/041186
812	I	15, 17	–	CO	J3E	31.8	ND				0000-2400	2100-0500	60	AR16/75/1747/041186
814	KIR	7, 8	500	CP	J3E	27.0	ND				1800-0800			MAR/65/1702/171285
815	JOR	6, 17	3 000	CP	J3E	37.0	ND				0700-2000	0800-1200	60	AR16/100/2084/060793
817	PNR	9, 18	2 000	CP	J3E	30.0	ND				1200-2300		25	AR16/84/1838/160888
819	PNR	9, 18	2 000	CP	J3E	30.0	ND				1200-2300		25	AR16/84/1838/160888
820	D2	6, 15, 16, 17, 18, 19	6 000	CP	J3E	40.0	ND				0400-2000		30	AR16/82/1827/310588
820	TZA	6, 10, 19, 21	3 200	CO/CP	J3E	37.0	ND				0700-1800	0800-1000 1500-1700	240	MAR/66/1707/280186
822	AUS	11, 12	3 000	CP	J3E	30.0	ND				2100-0900	2100-0900	90	MAR/64/1696/051185
823	TZA	6, 10, 19, 21	3 200	CO/CP	J3E	30.0	ND				0700-1800	0800-1000 1500-1700	240	MAR/66/1707/280186
823	USA W	9	1 200	CO	J3E	30.0	ND				1600-0400	1600-1800 0000-0200	180	AR16/92/1910/230190
825	AMS	10	–	CP	J3E	24.8	ND				0445-0500 0845-0900 1245-1300		25	MAR/15/1347/191278
825	GHA	19	500	CP	J3E	30.0	ND				0000-2359			AR16/114/2237/230796
							D	110	30	10				
							D	330	30	10				
825	S	5, 15	–	CP	J3E	40.0	D	10	60	11	0000-2400	0800-1000	90	AR16/70/1730/080786
		5, 15				40.0	D	50	60	11	0000-2400	0800-1000	90	
		6, 10, 17				40.0	D	130	60	11	0000-2400	0800-1000	90	
		6, 10, 17, 19, 21				40.0	D	170	60	11	0000-2400	0800-1000	90	
		15, 16, 17, 18, 19, 21				40.0	D	210	60	11	0000-2400	0800-1000	90	
		15, 16, 18, 19				40.0	D	250	60	11	0000-2400	0800-1000	90	
		15, 16				40.0	D	310	60	11	0000-2400	0800-1000	90	
826	QAT	6	2 500	CP	J3E	30.0	ND				0000-2400			AR16/89/1886/250789
829	BRM	5, 6, 7	3 300	CP	J3E	24.0	ND				2330-1130	0330-0430	30	AR16/112/2223/160496
829	MLD	6	–	CO	J3E	30.0	D	300	120	5	0000-2400			AR16/79/1816/150388
830	CHN	5, 6, 7, 8	8 000	CP	J3E	38.5	ND				0000-2400	0000-0800	400	RES.325(MOB-87)

1	2	3		4	5	6	7				8	9		10
		3.1	3.2				7.1	7.2 a)	7.2 b)	7.2 c)		9a)	9b)	
1 201	QAT	6	2 500	CP	J3E	30.0	ND				0400-0600 1400-1600			AR16/89/1886/250789
1 207	EQA	9	800	CP	J3E	24.0	ND				1830-2330		30	AR16/90/1895/260989
1 208	I	6, 15, 16, 17, 18	–	CO	J3E	31.8	ND				0300-2200	0600-1100	30	AR16/75/1747/041186
1 210	SUI	6, 10, 15, 16, 17, 18, 19, 20, 21	9 000	CP	J3E	40.0	D	ROT	30	8	0600-0200	0800-1200 1600-2100	60	MAR/62/1694/221085
1 213	USA W	9	1 600	CO	J3E	30.0	ND				1800-2300	2100-2200	180	AR16/95/1996/011091
1 220	D2	6, 15, 16, 17, 18, 19	6 000	CP	J3E	40.0	ND				0400-2000		30	AR16/82/1827/310588
1 220	JOR	6, 15, 17	5 000	CP	J3E	37.0	ND				0500-1700			MAR/49/1604/240184
1 222	ALS	4	1 600	CO	J3E	30.0	ND				2000-0100	2300-2400	180	AR16/95/1996/011091
1 222	USA W	9	1 600	CO	J3E	30.0	ND				1800-2300	2100-2200	180	AR16/95/1996/011091
1 224	GHA	19	500	CP	J3E	30.0	ND				0000-2359			AR16/114/2237/230796
							D	110	30	10				
							D	330	30	10				
1 225	JOR	6, 10	5 000	CP	J3E	37.0	D	144	60	9	0900-1700	1300-1500	30	AR16/100/2084/060793
1 226	S	5, 15	–	CP	J3E	40.0	D	10	60	11	0000-2400	0800-1000	90	AR16/70/1730/080786
		5, 15				40.0	D	50	60	11	0000-2400	0800-1000	90	
		6, 10, 17				40.0	D	130	60	11	0000-2400	0800-1000	90	
		6, 10, 17, 19, 21				40.0	D	170	60	11	0000-2400	0800-1000	90	
		15, 16, 17, 18, 19, 21				40.0	D	210	60	11	0000-2400	0800-1000	90	
		15, 16, 18, 19				40.0	D	250	60	11	0000-2400	0800-1000	90	
		15, 16				40.0	D	310	60	11	0000-2400	0800-1000	90	
1 227	TZA	6, 10, 19, 21	3 200	CO/CP	J3E	37.0	ND				0700-1800	0800-1000 1500-1700	240	MAR/66/1707/280186
1 228	I	6, 15, 16, 17, 18	–	CO	J3E	31.8	ND				2200-0500	2300-0200	30	AR16/75/1747/041186
1 228	MLD	6	–	CO	J3E	30.0	D	300	120	5	0000-2400			AR16/79/1816/150388
1 229	QAT	6, 17	2 000	CP	J3E	37.0	ND				0400-0600 1400-1600		200	MAR/23/1412/010480
		6	3 000	CP	J3E	37.0	D	130	60	11	0400-0600 1400-1600			
		6, 17	3 000	CP	J3E	37.0	D	200	60	11	0400-0600 1400-1600			
		6, 17	3 000	CP	J3E	37.0	D	310	60	11	0400-0600 1400-1600			
1 232	PNR	9, 14, 16, 18	4 000	CP	J3E	30.0	ND				1200-2400		25	AR16/84/1838/160888
1 232	SMA	8, 12, 13	3 000	CP	J3E	30.0	ND				1800-0400		30	MAR/11/1310/040478
1 236	BRM	5, 6, 7	3 300	CP	J3E	24.0	ND				2330-1130	0330-0430	30	AR16/112/2223/160496
1 603	MLT	15, 17	3 000	CP	J3E	31.8	ND				0000-1159			MAR/21/1379/070879
1 608	EQA	9, 14	800	CP	J3E	27.0	ND				1800-2300	2000-2300	40	AR16/111/2221/020496
1 612	JOR	6, 10	6 000	CP	J3E	37.0	D	144	60	9	1000-1600	1300-1500	20	AR16/100/2084/060793
1 614	MLD	6	–	CO	J3E	30.0	D	300	120	5	0000-2400			AR16/79/1816/150388
1 622	ALS	4	2 400	CO	J3E	30.0	ND				2000-0600	0200-0300	180	AR16/95/1996/011091
1 622	GHA	19	500	CP	J3E	30.0	ND				0000-2359			AR16/114/2237/230796
							D	110	30	10				
							D	330	30	10				
1 622	HWA	8	2 400	CO	J3E	30.0	ND				2000-0600	0200-0300	180	AR16/95/1996/011091
1 622	PNR	9, 14, 16, 18	4 000	CP	J3E	30.0	ND				1200-2400		25	AR16/84/1838/160888
1 622	SUI	3, 4, 5, 6, 7, 9, 10, 15, 16, 17, 18, 19, 20, 21	10 000	CP	J3E	40.0	D	ROT	30	8	0600-0200	0800-1700	60	MAR/62/1694/221085
1 626	J	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	–	CR	J3E	37.0	ND				0000-2400	0800-1000	500	RES.325(MOB-87)

1	2	3		4	5	6	7				8	9		10
		3.1	3.2				7.1	7.2 a)	7.2 b)	7.2 c)		9a)	9b)	
1626	QAT	6,17	4000	CP	J3E	40.0	ND				0600-0800 1200-1400		200	MAR/23/1412/010480
		6	6000	CP	J3E	40.0	D	130	60	11	0600-0800 1200-1400			
		6, 10, 17	6000	CP	J3E	40.0	D	200	60	11	0600-0800 1200-1400			
		6, 15, 17	6000	CP	J3E	40.0	D	310	60	11	0600-0800 1200-1400			
1627	ALS	4	2400	CO	J3E	30.0	ND				2000-0600	0200-0300	180	AR16/95/1996/011091
1628	EQA	9, 14	800	CP	J3E	27.0	ND				1800-2300	2000-2300	40	AR16/111/2221/020496
1629	BRM	5, 6, 7	3300	CP	J3E	24.0	ND				2330-1130	0330-0430	30	AR16/112/2223/160496
1630	J	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	–	CR	J3E	37.0	ND				0000-2400	0300-0700	650	RES.325(MOB-87)
1634	CHN	8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21	19000	CP	J3E	40. 0	ND				0000-1000	0200-0600	200	RES.325(MOB-87)
1635	I	5, 6, 7, 9, 10, 14, 15, 16, 18, 20, 21	–	CO	J3E	31.8	ND				0400-2400	0600-1600	30	AR16/75/1747/041186
1635	PNR	9, 14, 16, 18	4000	CP	J3E	30.0	ND				1500-2400		25	AR16/84/1838/160888
1637	CHN	8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21	19000	CP	J3E	40.0	ND				0000-1000	0200-0600	200	RES.325(MOB-87)
1638	SMA	8, 12, 13	4000	CP	J3E	30.0	ND				1800-0400		30	MAR/10/1305/280278
1638	D2	6, 15, 16, 17, 18, 19	6000	CP	J3E	40.0	ND				0400-2000		30	AR16/82/1827/310588
1639	CHN	5	800	OT	J3E	31.8	D	90	60	3	0000-1200	0100-0230	300	RES.325(MOB-87)
1640	PNR	9, 14, 16, 18	4000	CP	J3E	30.0	ND				1500-2400		25	AR16/84/1838/160888
1809	POL	5, 11, 21	20000	CP	J3E	40.0	ND				0000-2230	1730-2230	90	AR16/119/2310/130198
2202	BRM	5, 6, 7	3300	CP	J3E	24.0	ND				2330-1130	0330-0430	30	AR16/112/2223/160496
2203	PNR	9, 14, 16, 18	4000	CP	J3E	30.0	ND				1500-2400		25	AR16/84/1838/160888
2206	BHR	6, 10, 15, 17, 19, 21	–	CP	J3E	34.8	ND				0000-2359			AR16/100/2084/060793
2208	I	5, 6, 7, 9, 10, 14, 15, 16, 18, 20, 21	–	CO	J3E	31.8	ND				0500-2400	0700-2200	30	AR16/75/1747/041186
2208	PNR	9, 14, 16, 18	4000	CP	J3E	30.0	ND				1200-2400		25	AR16/84/1838/160888
2209	CHN	4, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21	19000	CP	J3E	40.0	ND				0000-1000	0200-0600	200	RES.325(MOB-87)
2211	CHN	4, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21	18000	CP	J3E	40.0	ND				0000-1000	0200-0600	240	RES.325(MOB-87)
2215	CHN	4, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21	19000	CP	J3E	40.0	ND				0000-1000	0200-0600	200	RES.325(MOB-87)
2215	GHA	19	500	CP	J3E	30.0	ND D D	 110 330	 30 30	 10 10	0000-2359			AR16/114/2237/230796
2218	CHN	4, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21	19000	CP	J3E	40.0	ND				0000-1000	0200-0600	200	RES.325(MOB-87)
2220	CHN	4, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21	19000	CP	J3E	40.0	ND				0000-1000	0200-0600	240	RES.325(MOB-87)
2220	SUI	6, 10, 18, 20, 21	14000	CP	J3E	40.0	D	ROT	70	8.5	0600-1800	0900-1600	60	MAR/27/1431/120880
2222	MLD	6	–	CO	J3E	30.0	D	300	120	5	0000-2400			AR16/79/1816/150388
2223	MLT	15, 17	3000	CP	J3E	31.8	ND				0000-1159			MAR/20/1372/190679
2226	ALS	4	2400	CO	J3E	30.0	ND				2000-0400	0100-0200	180	AR16/95/1996/011091

1	2	3		4	5	6	7				8	9		10
		3.1	3.2				7.1	7.2 a)	7.2 b)	7.2 c)		9a)	9b)	
2 226	HWA	8	2 400	CO	J3E	30.0	ND				2000-0400	0100-0200	180	AR16/95/1996/011091
2 226	JOR	6, 10, 11	8 000	CP	J3E	37.0	D	144	60	9	1100-1400			AR16/100/2084/060793
2 226	USA W	9	2 400	CO	J3E	30.0	ND				1800-0200	2300-2400	180	AR16/95/1996/011091
2 228	QAT	6, 10, 11	2 500	CP	J3E	33.0	D	140	60	10	0000-1800	0400-1100		AR16/96/1997/081091
2 233	GRC	17	2 600	CO	J3E	30.0	ND				0500-2200	0600, 1000, 2200	30	MAR/51/1621/220584
2 235	QAT	6, 17	5 000	CP	J3E	40.0	ND				0800-1200		200	MAR/23/1412/010480
		6, 10, 11	8 000	CP	J3E	40.0	D	130	60	11	0800-1200		200	
		6, 10, 17, 21	8 000	CP	J3E	40.0	D	200	60	11	0800-1200		200	
		17, 15	8 000	CP	J3E	40.0	D	310	60	11	0800-1200		200	
2 237	CHN	4, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21	19 000	CP	J3E	40.0	ND				0000-1000	0200-0600	200	RES.325(MOB-87)
2 239	CHN	7	2 700	CP	J3E	20.0	ND				0100-0930	0200-0400	280	RES.325(MOB-87)

APPENDIX S26

(Rev. 1998)*

Provisions and associated Frequency Allotment Plan for the aeronautical mobile (OR) service in the bands allocated exclusively to that service between 3 025 kHz and 18 030 kHz

(See Article **S43**)

PART I – General provisions, definitions

S26/1 The provisions of this Appendix shall apply to the aeronautical mobile (OR) service in the following frequency bands:

3 025-3 155 kHz	8 965- 9 040 kHz
3 900-3 950 kHz (Region 1 only)	11 175-11 275 kHz
4 700-4 750 kHz	13 200-13 260 kHz
5 680-5 730 kHz	15 010-15 100 kHz
6 685-6 765 kHz	17 970-18 030 kHz

S26/2 For the purpose of this Appendix, the terms used comprise the following:

S26/2.1 **Frequency Allotment Plan**

The Plan for the aeronautical mobile (OR) service contained in Part III of this Appendix.

S26/2.2 **Allotment in the aeronautical mobile (OR) service**

A frequency allotment in the aeronautical mobile (OR) service which comprises:

– a frequency channel from the channels appearing in the channelling arrangement in No. **S26/**3;

– a bandwidth of up to 2.8 kHz, situated wholly within the frequency channel concerned;

– a power within the limits laid down in No. **S26/**4.4 or specified against the allotted frequency channel;

– an allotment area which is the area in which the aeronautical station can be situated and which coincides with all or part of the territory of the country, or of the geographical area, as indicated against the frequency channel concerned in the Frequency Allotment Plan.

* This revision contains an up-to-date version of Part III, reflecting all amendments to Part III resulting from the application of the procedures of Part V, up to and including 1 October 1998.

PART II – Technical bases used for the establishment of the Frequency Allotment Plan for the aeronautical mobile (OR) service in the bands allocated exclusively to that service between 3 025 kHz and 18 030 kHz

S26/3 Channelling arrangement

S26/3.1 The channelling arrangement for the frequencies to be used by aeronautical stations in the aeronautical mobile (OR) service in the bands allocated exclusively to that service between 3 025 kHz and 18 030 kHz is indicated in Table 1.

TABLE 1

Frequency band 3 025-3 155 kHz: 43 + 1 channel									
3 023 [1]	3 026	3 029	3 032	3 035	3 038	3 041	3 044	3 047	3 050
3 053	3 056	3 059	3 062	3 065	3 068	3 071	3 074	3 077	3 080
3 083	3 086	3 089	3 092	3 095	3 098	3 101	3 104	3 107	3 110
3 113	3 116	3 119	3 122	3 125	3 128	3 131	3 134	3 137	3 140
3 143	3 146	3 149	3 152						
Frequency band 3 900-3 950 kHz (Region 1 only): 16 channels									
3 900	3 903	3 906	3 909	3 912	3 915	3 918	3 921	3 924	3 927
3 930	3 933	3 936	3 939	3 942	3 945				
Frequency band 4 700-4 750 kHz: 16 channels									
4 700	4 703	4 706	4 709	4 712	4 715	4 718	4 721	4 724	4 727
4 730	4 733	4 736	4 739	4 742	4 745				
Frequency band 5 680-5 730 kHz: 15 + 1 channel									
5 680 [1]	5 684	5 687	5 690	5 693	5 696	5 699	5 702	5 705	5 708
5 711	5 714	5 717	5 720	5 723	5 726				
Frequency band 6 685-6 765 kHz: 26 channels									
6 685	6 688	6 691	6 694	6 697	6 700	6 703	6 706	6 709	6 712
6 715	6 718	6 721	6 724	6 727	6 730	6 733	6 736	6 739	6 742
6 745	6 748	6 751	6 754	6 757	6 760				
Frequency band 8 965-9 040 kHz: 25 channels									
8 965	8 968	8 971	8 974	8 977	8 980	8 983	8 986	8 989	8 992
8 995	8 998	9 001	9 004	9 007	9 010	9 013	9 016	9 019	9 022
9 025	9 028	9 031	9 034	9 037					
Frequency band 11 175-11 275 kHz: 33 channels									
11 175	11 178	11 181	11 184	11 187	11 190	11 193	11 196	11 199	11 202
11 205	11 208	11 211	11 214	11 217	11 220	11 223	11 226	11 229	11 232
11 235	11 238	11 241	11 244	11 247	11 250	11 253	11 256	11 259	11 262
11 265	11 268	11 271							
Frequency band 13 200-13 260 kHz: 20 channels									
13 200	13 203	13 206	13 209	13 212	13 215	13 218	13 221	13 224	13 227
13 230	13 233	13 236	13 239	13 242	13 245	13 248	13 251	13 254	13 257
Frequency band 15 010-15 100 kHz: 30 channels									
15 010	15 013	15 016	15 019	15 022	15 025	15 028	15 031	15 034	15 037
15 040	15 043	15 046	15 049	15 052	15 055	15 058	15 061	15 064	15 067
15 070	15 073	15 076	15 079	15 082	15 085	15 088	15 091	15 094	15 097
Frequency band 17 970-18 030 kHz: 20 channels									
17 970	17 973	17 976	17 979	17 982	17 985	17 988	17 991	17 994	17 997
18 000	18 003	18 006	18 009	18 012	18 015	18 018	18 021	18 024	18 027

[1] For use of the carrier (reference) frequencies 3 023 kHz and 5 680 kHz, see No. **S26**/3.4.

S26/3.2 The frequencies indicated in No. **S26/**3.1 are the carrier (reference) frequencies.

S26/3.3 With the exception of the carrier (reference) frequencies 3 023 kHz and 5 680 kHz (see **S26/**3.4 below), one or more frequencies from Table 1 may be assigned to any aeronautical station and/or aircraft station, in accordance with the Frequency Allotment Plan, as contained in Part III of this Appendix.

S26/3.4 The carrier (reference) frequencies 3 023 kHz and 5 680 kHz are intended for worldwide common use (see also Appendix **S27**, Nos. **S27/**232 to **S27/**238).

S26/3.5 The aeronautical radiotelephone stations shall use only single-sideband emissions (J3E). The upper sideband shall be employed, and the assigned frequency (see No. **S1.148**) shall be 1 400 Hz higher than the carrier (reference) frequency.

S26/3.6 The channelling arrangement specified in No. **S26/**3.1 does not prejudice the rights of administrations to establish, and to notify assignments to stations in the aeronautical mobile (OR) service other than those using radiotelephony, provided that:

– the occupied bandwidth does not exceed 2 800 Hz and is situated wholly within one frequency channel (see also Resolution **411 (WARC-92)**);

– the limits of unwanted emission are met (see Appendix **S27**, No. **S27/**74).

S26/4 Classes of emission and power

S26/4.1 In the aeronautical mobile (OR) service, in the bands governed by this Appendix, the use of the emissions listed below is permissible; additionally, the use of other emissions is also permissible, subject to compliance with No. **S26/**3.6.

S26/4.2 Telephony

– J3E (single-sideband, suppressed carrier).

S26/4.3 Telegraphy (including automatic data transmission)

– A1A, A1B, F1B;

– (A,H)2(A,B);

– (R,J)2(A,B,D);

– J(7,9)(B,D,X).

S26/4.4 Unless otherwise specified in Part III of this Appendix, the following transmitter power limits (i.e., power supplied to the antenna), shall be applied:

Class of emission	Power limit values (peak envelope power supplied to the antenna)	
	Aeronautical station	Aircraft station
J3E	36 dBW (PX)	23 dBW (PX)
A1A, A1B	30 dBW (PX)	17 dBW (PX)
F1B	30 dBW (PX)	17 dBW (PX)
A2A, A2B	32 dBW (PX)	19 dBW (PX)
H2A, H2B	33 dBW (PX)	20 dBW (PX)
(R,J)2(A,B,D)	36 dBW (PX)	23 dBW (PX)
J(7,9)(B,D,X)	36 dBW (PX)	23 dBW (PX)

S26/4.5 On the assumption that no antenna gain is involved, the transmitter powers specified in No. **S26**/4.4 above will result in a mean effective radiated power of 1 kW (for the aeronautical stations) and 50 W (for the aircraft stations), used as the basis for the establishment of the Plan contained in Part III of this Appendix.

PART III – Arrangement for the allotment of frequencies for the aeronautical mobile (OR) service in the exclusive bands between 3 025 and 18 030 kHz

S26/5.1 Column headings

Column 1: Carrier (reference) frequency, in kHz.

Column 2: Allotment area (See Notes *a) b),* and *c)* below).

S26/5.2 Whenever the allotment area is followed by another administration's code, indicated in parentheses, the notifications are receivable from the latter administration on the basis of an agreement in accordance with Resolution **1(Rev.WRC-97**).

NOTE *a)*: The allotment area is designated by the symbol of the country or the geographical area, the meaning of which is given in the Preface to the IFL. The meaning of the following symbol, which does not appear in the Preface to the IFL, is given below:

CG7 CUB(Guantanamo) (7), as defined in Appendix **26** to the Radio Regulations, Geneva, 1959; (7) means "USA stations"

NOTE *b)*: For ease of reference, the allotment arrangement is presented by ITU Region. The symbols REG1, REG2 and REG3 correspond to the definitions of Regions 1, 2 and 3 respectively; the symbol REGY is used for the allotment area ATA (Antarctica), whose parts lie in all three Regions.

NOTE c*)*: The allotment which is followed by an asterisk (*) is subject to coordination with another administration (see Notes on the concluded operational agreements which follow the Arrangement).

1	2	
3 026	REG1	ARS BEN G KAZ KGZ LIE MCO RUS
	REG2	ATG DMA GRD JMC LCA SCN VCT
	REG3	BRU KOR TON
3 029	REGY	ATA(ARG)
	REG1	ARS AZR BLR COG E F G I IRQ KAZ MDA NOR POL RUS SEN TUN UKR UZB
	REG2	ALS ARG B BER(USA) CLM HWA USA
	REG3	AUS CHN GUM IND J KOR MHL(USA) NZL PNG VTN
3 032	REGY	ATA(ARG)
	REG1	ALG AZR BLR COG CTI E EGY F HNG IRQ KAZ MDA MDG MLT MRC NOR OMA POL RUS SEN TUN UKR UZB
	REG2	ALS ARG B BER(USA) CAN CLM DOM GRL HWA SLV USA
	REG3	AUS CBG CHN GUM IND J J(USA) LAO MHL(USA) NZL PNG VTN VUT
3 035	REGY	ATA(ARG)
	REG1	ARM ARS BFA BHR(USA) BLR COG F G G(USA) GEO HRV I(USA) ISL KAZ KGZ LVA MLT MRC NOR RUS SEN TCD TJK TKM TUN TUR
	REG2	ALS ARG B BER(USA) BRB(USA) CG7 HWA MDW PNR PTR TRD(USA) USA
	REG3	AUS CHN GUM IND INS J(USA) NZL PNG
3 038	REGY	ATA(ARG)
	REG1	ARM ARS BFA BHR(USA) BLR COG CTI CYP(G) EGY F G G(USA) GEO GRC HRV I(USA) ISL KAZ KGZ LVA MDG MRC MTN* NOR OMA REU RUS SEN SVN TCD TJK TKM TUN YUG
	REG2	ALS ARG ATG(USA) B BAH(USA) BER(USA) BRB(USA) CAN CG7 GRL HWA MDW MRT NCG PNR PTR TCA(USA) TRD(USA) USA
	REG3	AUS CBG CHN GUM IND INS J(USA) LAO MHL(USA) NCL NZL OCE PNG VTN VUT
3 041	REG1	ALG G I ISL KWT NMB RUS TJK
	REG3	HKG IRN KRE PHL TUV
3 044	REGY	ATA(ARG)
	REG1	AFS ALG CME COG CZE DJI(F) F G GAB I ISR KAZ LTU MDA MDG MLI* MTN POR ROU RUS SEN* TCD TJK TKM UKR
	REG2	ARG CAN CLM JON MEX
	REG3	AUS BGD CHN GUM IRN J NCL NZL OCE PAK PNG
3 047	REGY	ATA(ARG)
	REG1	AFS ALG AZE BLR CME COG CTI CZE DJI(F) E F GAB IRL ISL ISR KAZ LTU MDA MDG MLI* MLT MTN NIG POR RUS SEN* TCD TKM TUR UKR
	REG2	ARG CAN CLM CTR HTI HWA JON MEX
	REG3	AUS BGD CBG CHN FJI GUM INS J(USA) LAO NCL NZL OCE PNG VTN VUT
3 050	REGY	ATA(ARG)
	REG1	AZE AZR BLR CME COG DNK F G GIB I KAZ MDG MLI MLT MRC POR REU RUS SEN* TCD TJK UKR UZB
	REG2	ALS ARG B BER(USA) CAN CUB HWA MDW PNR PTR USA
	REG3	AUS CHN DGA(USA) FJI GUM IND IRN J(USA) MHL(USA) NZL PAK PNG
3 053	REGY	ATA(ARG)
	REG1	ALB AZR CME COG CTI DNK F G GIB HNG KAZ MDG MLI MRC POR RUS SEN* TCD TJK UKR UZB
	REG2	ALS ARG ATN B BER(USA) CAN CUB GTM HWA MDW PNR PTR USA
	REG3	AUS CHN FJI GUM IND INS IRN J(USA) MHL(USA) NZL PNG VTN
3 056	REG1	BLR COG D EST F G GAB GIB KAZ MDG MLI ROU RUS SEN* TCD TJK UAE UKR UZB
	REG2	ATN B CAN HWA JON MEX MRT USA
	REG3	AUS GUM IND INS J(USA) KOR PNG

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3 059	REG1	AZR BLR COG CTI D E F G GAB GRC I KAZ MDG MLI REU ROU RUS SEN* SYR TCD TKM UKR UZB
	REG2	B CAN CHL HWA JON MEX MRT USA
	REG3	AUS IND INS J J(USA) KOR NZL PNG VTN
3 062	REG1	G GUI I ROU RUS SWZ TKM
	REG3	IRN J
3 065	REGY	ATA(ARG)
	REG1	ARM AZE AZR D F G JOR LVA POR ROU RUS S TJK TKM UKR
	REG2	ALS ARG B BER(USA) CUB GRL HWA JON PNR USA
	REG3	AUS GUM IND IRN J MHL(USA) PNG
3 068	REGY	ATA(ARG)
	REG1	ARM AZE AZR ERI ETH F G HOL LTU LVA POR RUS S SYR TJK TKM UAE UKR YUG
	REG2	ALS ARG B BER(USA) CAN CG7 CUB HWA JON PNR PRU USA
	REG3	AUS CBG GUM INS J(USA) LAO MHL(USA) PNG VTN
3 071	REGY	ATA(ARG)
	REG1	AGL AZE BUL DJI(F) F G GRC HOL I ISL KAZ KGZ LTU LVA MOZ POR REU RUS STP TKM TUN UKR UZB
	REG2	ALS ARG B BER(USA) CLM JON MDW USA
	REG3	AUS BGD CHN HKG J MHL(USA) PAK PNG
3 074	REGY	ATA(ARG)
	REG1	AGL AZE AZR BUL CPV EGY F G GIB GRC HNG I KAZ KGZ LVA MLT MOZ NIG POR RUS S STP TUN UKR UZB
	REG2	ALS ARG B BER(USA) CAN CLM GRL GTM HTI JON MDW USA
	REG3	AUS BGD CHN CLN GUM HKG J MHL(USA) MLA PAK PNG SNG*
3 077	REGY	ATA(ARG)
	REG1	ARS AZR CYP(G) D F G GRC KGZ LVA MLT POR RUS UKR
	REG2	ALS ARG B CAN HWA PRG URG USA VEN
	REG3	AUS CHN HKG J KOR NZL PNG SNG
3 080	REGY	ATA(ARG)
	REG1	ARS AZR CYP(G) D EGY F FIN G GIB KEN KGZ LBY LVA MLT POR ROU RUS SOM TUR UKR
	REG2	ALS ARG B CAN CUB HWA PRG PRU SLV URG USA VEN
	REG3	AUS CHN CLN FJI GUM HKG IND J J(USA) KOR MLA* NZL PNG SNG
3 083	REG1	CYP(G) G GMB GRC I KGZ QAT RUS
	REG3	HKG J MLD
3 086	REG1	AFS BLR CYP(G) D F G GRC KAZ KGZ MDA OMA ROU RUS SVK UKR UZB
	REG2	ALS B BER(USA) CAN CG7 CHL HWA MDW PNR PTR USA
	REG3	AUS BRM CHN GUM J(USA) MHL(USA) PNG
3 089	REGY	ATA(USA)
	REG1	ALG AZE BLR D EGY G GRC GRC(USA) I I(USA) KAZ MDA MRC POR ROU RUS SEY SUI SVK UAE UKR UZB
	REG2	ALS B BER(USA) CG7 CHL GRL HWA MDW PNR PTR USA
	REG3	AUS CHN GUM J(USA) MHL(USA) PNG
3 092	REGY	ATA(ARG)
	REG1	ALG ARS AZE AZR DJI(F) F G GEO GIB ISL KAZ POL REU RUS TJK TKM UZB
	REG2	ALS ARG B BER(USA) CAN CG7 DOM HWA MDW MEX PNR PTR USA
	REG3	AUS BGD CHN GUM J MHL(USA) NZL PNG

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3 095	REGY	ATA(ARG)
	REG1	ALG ARS CYP(G) E EGY F G GEO GIB GRC(USA) I ISR KAZ KEN LBY MLT POL RUS SOM TJK TKM UZB ZWE
	REG2	ALS ARG B CAN CG7 CTR DOM HWA MDW MEX PNR PRU PTR USA
	REG3	AUS BGD CHN CLN FJI GUM HKG J MHL(USA) MLA NZL PNG SNG*
3 098	REG1	ALB AZE AZR BHR(USA) BLR CNR E G GEO GIB I I(USA) KAZ NIG RUS TJK UKR
	REG2	ALS ATG(USA) B BAH(USA) BER(USA) BRB(USA) CHL HWA MDW MRT PNR PTR TCA(USA) TRD(USA) USA
	REG3	AUS BGD GUM HKG J MHL(USA) PAK PNG
3 101	REG1	AFS ALB AZE AZR BHR(USA) BLR CNR D E EGY ERI ETH G GEO GIB GRC(USA) HNG I I(USA) ISL KAZ LBY MLT RUS SUI TJK TUN UKR
	REG2	ALS B BER(USA) BRB(USA) CAN CHL GRL HND HWA MDW MRT PNR PTR TRD(USA) USA
	REG3	AUS BGD CHN CLN GUM HKG J MHL(USA) MLA PAK PNG SNG*
3 104	REG1	E GEO GIB I IRL ISL RUS SDN TUN UAE UKR
	REG2	ALS
	REG3	J NPL
3 107	REG1	CNR D E F G GRC(USA) I KAZ LTU MDA MNG RUS S UKR ZMB
	REG2	ALS B BER(USA) CG7 CHL HWA MDW PNR PTR USA
	REG3	AUS BRM CHN GUM IND INS J MHL(USA) PAK PNG
3 110	REG1	AFS ALB AZR CNR D E EGY G GRC(USA) I ISL KAZ LTU MDA MNG MRC NIG RUS S TJK TUR UKR UZB
	REG2	ALS B BER(USA) CAN CG7 CHL GRL HWA MDW PNR PTR USA
	REG3	AUS CHN DGA(USA) GUM IND INS J(USA) MHL(USA) PAK PNG
3 113	REG1	ALB ALG AZE BLR E F G G(USA) GRC KAZ KEN KGZ MDA RUS SVK TJK TKM TUN UKR UZB
	REG2	B CAN CHL DOM MEX USA VEN
	REG3	AUS CHN GUM HKG J(USA) PAK PNG SNG
3 116	REG1	AFS ALG AZE BLR D EGY G GIB I ISL KAZ KGZ MDA MLT MNG RUS SVK TJK TKM TUN UKR UZB
	REG2	B CAN CHL CTR DOM EQA MEX USA VEN
	REG3	AUS CHN CLN HKG IND J J(USA) MLA NZL PAK PNG SNG*
3 119	REGY	ATA(ARG)
	REG1	ALB BLR DJI F G GRC(USA) HOL I I(USA) KAZ MRC ROU RUS SVN UKR UZB
	REG2	ALS ARG B BER(USA) HWA MDW PNR PTR USA
	REG3	AUS BGD CHN FJI GUM IND INS J KIR MHL(USA) PNG
3 122	REGY	ATA(ARG)
	REG1	AZR BLR E EGY F G GEO GRC(USA) HOL I I(USA) KAZ MRC ROU RUS TUR UKR
	REG2	ALS ARG B BER(USA) BOL CAN GRL HWA MDW PNR PTR USA
	REG3	AUS BGD CHN FJI GUM INS J KIR MHL(USA) NZL PAK PNG
3 125	REG1	BLR CYP(G) G GEO HOL KAZ LBR MLT MNG MWI ROU RUS SMR
	REG2	BLZ
	REG3	J PAK SMO
3 128	REG1	BEL BLR G GRC HNG HOL I KAZ LVA NIG ROU RUS UKR
	REG2	ALS ATN CAN CUB HWA MDW PNR PTR URG USA
	REG3	AUS CHN FJI GUM HKG IND INS J MHL(USA) NCL NZL OCE PAK PNG
3 131	REG1	BEL EGY G GRC HOL I LSO LVA MNG RUS SRL TKM UKR
	REG2	ALS ATN BOL CAN CHL CUB EQA GTM HWA MDW PNR PTR SUR URG USA
	REG3	AUS CHN CKH FJI GUM IND INS J MHL(USA) NCL NZL OCE PAK PNG VUT

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3 134	REG1	ARM ARS(USA) AZE AZR BUL D(USA) E G HOL I KAZ LVA OMA RUS TJK TKM TUR(USA) UKR UZB
	REG2	ALS B BER(USA) DOM HWA JON PRG USA VEN
	REG3	AUS CHN GUM IND J MHL(USA) PNG TMP(POR)
3 137	REG1	ARM ARS(USA) AZE AZR BHR BUL D(USA) E EGY F G G(USA) I KAZ LVA MDA MNG MRC NIG RUS TJK TKM TUR(USA) UKR UZB
	REG2	ALS B BER(USA) CAN CHL DOM EQA GRL GTM HWA JON PRG SUR USA VEN
	REG3	AUS CHN GUM IND J(USA) MHL(USA) PHL(USA) PNG TMP(POR)
3 140	REGY	ATA(ARG)
	REG1	ALG AZE CME COG D F G GAB GEO GRC I KAZ LVA MDA MDG MKD MLI ROU RUS SEN* TCD TJK UKR
	REG2	ALS ARG B BER(USA) GRL HWA JON PNR USA
	REG3	AUS CHN GUM J J(USA) MHL(USA) PNG
3 143	REGY	ATA(ARG)
	REG1	ALG AZE BIH CME COG CTI CYP(G) D EGY F G GAB GEO GIB GRC HRV KAZ KGZ LVA MDG MKD MLI* MLT MRC ROU RUS SEN SVN TCD TJK TUN UKR YUG
	REG2	ALS ARG B BER(USA) CAN GRL HWA JON PNR USA
	REG3	AUS BRM CHN GUM J J(USA) MHL(USA) PNG
3 146	REG1	AZE BEL COM CYP G GHA I KGZ MLT MNG RUS
	REG2	BAH
	REG3	J NRU PAK
3 149	REG1	AGL ALG AZE BLR BUL CME COG D D(F) EST G GAB GHA GRC I KAZ MDG MLI* MLT MTN ROU RUS SEN* TCD TUN UKR
	REG2	ALS CAN DOM HWA MDW MEX PNR PTR USA
	REG3	AUS BRM CHN GUM INS J PAK PNG WAK
3 152	REG1	ALG BLR BUL CME COG CTI D D(F) EGY G GAB KAZ MDG MLI* MRC NIG ROU RUS SEN TCD TUN UAE UKR
	REG2	ALS ARG B BOL CAN CHL CLM DOM EQA HWA MDW MEX PNR PRG PRU PTR SUR URG USA VEN
	REG3	AUS CHN GUM INS J NZL PNG WAK
3 900	REG1	ALG BIH CME COG CZE D E F G ISL KAZ KGZ LTU MDA MDG MLI* OMA RUS SEN TCD TJK TKM TUN TUR UKR
3 903	REG1	AFS ALG CME COG CTI CZE D EGY F G HRV ISL KAZ KGZ LTU MDA MDG MLI MRC REU RUS SEN* SVN TCD TJK TKM TUN TZA UGA UKR YUG
3 906	REG1	ALB AZE BEL GMB HOL HRV IRL KAZ MLT NIG RUS TZA UGA UKR YEM
3 909	REG1	AZE BLR COG DJI(F) E F G GIB HRV KAZ LVA MDG REU RUS SEN TCD UKR UZB
3 912	REG1	BLR COG CTI EGY F G GIB HRV KAZ LVA MDG MRC RUS SEN SVN TCD UKR UZB YUG
3 915	REG1	ALB ALG BLR COM CZE F G GRC KAZ LTU LVA MNG ROU RUS SVK TJK TKM UKR UZB YEM
3 918	REG1	AFS ALB ALG BLR CZE EGY ERI ETH F G I KAZ LTU LVA MRC NIG ROU RUS SVK TJK TKM UKR UZB
3 921	REG1	ALG DJI F G GRC KWT LVA MLT POR ROU RUS UKR UZB ZMB
3 924	REG1	AZR BEN CYP(G) D EGY F G GEO GIB GRC LSO LVA MLT POR ROU RUS UAE UKR
3 927	REG1	BUL GEO GIB HOL IRL LBR LIE MWI RUS SDN TUR
3 930	REG1	AFS ALG BUL CAF CME CYP(G) DJI(F) G GIB GRC HOL LVA MDG MLI MLT ROU RUS SMR SVK TUN UKR
3 933	REG1	ALG AUT CAF CME CTI CYP(G) D DJI(F) E F G GIB GRC I KAZ LVA MDG MLI MLT MRC QAT ROU RUS SVK TUN UKR
3 936	REG1	AFS AZE BEL CNR E G I KAZ NIG POL RUS TJK TUR UZB YEM

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3 939	REG1	AFS AZE CNR CYP(G) D E F G GRC I KAZ MLT POL RUS TJK TUN UZB YEM
3 942	REG1	CYP CZE F G GIB ISL KAZ LVA NOR POL RUS SRL SWZ UKR UZB YEM
3 945	REG1	AFS ALG CZE ERI ETH F G GIB GRC ISL KAZ LVA MRC NOR POL RUS SEN UKR UZB
4 700	REG1	ARM ARS AZE BEN BHR(USA) CYP(G) G GIB I KAZ KEN LBY MLT POL RUS SWZ TJK TKM
	REG2	ALS B CAN DOM HWA MDW MEX PNR PTR USA
	REG3	AUS BGD BRM CHN DGA(USA) FJI GUM HKG IND J(USA) KOR MAC MHL(USA) NZL PAK PNG TMP(POR)
4 703	REG1	AFS ALG ARM ARS AZE AZR BHR(USA) CYP(G) DNK E EGY F G GEO GIB I KAZ KEN LBY MLT MRC POL RUS SOM TJK TKM TUR
	REG2	ALS B CAN CHL DOM HWA MDW MEX PNR PTR SUR USA
	REG3	AUS BGD BRM CHN CLN FJI GUM HKG IND J J(USA) KOR MAC MHL(USA) MLA NZL PAK PNG TMP(POR)
4 706	REGY	ATA(USA)
	REG1	ALG BLR CYP(G) D F G GEO HRV I I(USA) KAZ KEN KGZ LBY LSO LTU MDA MLT RUS TJK TKM TUR UKR YEM
	REG2	ALS B BER(USA) CAN CG7 HWA MDW PAQ PNR PRG PTR URG USA
	REG3	AUS CHN DGA(USA) GUM IND J(USA) MHL(USA) NZL SNG THA
4 709	REG1	AFS ALG ARS BLR CYP(G) D F G GRC I I(USA) KAZ KEN KGZ LBR LBY LTU MDA MLT OMA RUS TJK TKM TUR UKR YUG
	REG2	ALS B BER(USA) CG7 CHL HWA MDW PAQ PNR PRG PTR URG USA
	REG3	AUS CHN GUM IND INS J MHL(USA) NZL THA
4 712	REGY	ATA(USA)
	REG1	AZR BLR CYP(G) EGY F GIB I(USA) IRL ISL KAZ MLT MRC MWI POL ROU RUS SOM SRL UKR YEM
	REG2	ALS BER(USA) CAN CG7 GRL HWA MDW PNR PRU PTR USA
	REG3	AUS CBG FJI GUM J(USA) KRE LAO MHL(USA) NPL PHL PNG VTN
4 715	REGY	ATA(ARG) ATA(USA)
	REG1	AGL ALB AZR BHR(USA) BLR CME DJI(F) F G GMB GRC HOL I ISL ISR KAZ LTU MDA MNG MOZ POL POR RUS STP TCD TUN TUR UKR UZB
	REG2	ALS ARG ATG(USA) ATN BAH(USA) BER(USA) BRB(USA) CAN CLM HWA MDW PNR PTR TCA(USA) TRD(USA) USA
	REG3	AUS BGD BRM FJI GUM HKG IND J(USA) MHL(USA) MLA PAK THA
4 718	REGY	ATA(ARG) ATA(USA)
	REG1	AGL ALB ALG AZR BHR(USA) CME CPV DJI(F) F G HOL I ISL ISR KAZ KGZ LTU MDA MDG MLT MOZ POR RUS STP TCD TUN UKR UZB
	REG2	ALS ARG ATN BER(USA) BRB(USA) CAN CLM GRL HWA MDW PNR PRU PTR TRD(USA) USA
	REG3	AUS BGD BRM CLN FJI GUM HKG IND J(USA) MHL(USA) MLA NZL PAK PNG SNG* THA
4 721	REGY	ATA(ARG)
	REG1	AGL ALG BLR CME CNR D D(USA) DJI(F) E F G GEO I KAZ KGZ MLT MOZ POR ROU RUS STP TCD TJK TUR(USA) UKR
	REG2	ALS ARG BER(USA) CAN CUB GRL HWA JON PNR PRU USA
	REG3	AUS BGD CHN GUM IND J(USA) MHL(USA) NCL NZL OCE PAK PNG THA TMP(POR)

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4 724	REGY	ATA(ARG)
	REG1	AGL ALG AZR BEL BLR CME CNR CPV D D(USA) DJI(F) E EGY EST F G G(USA) GEO HNG I KAZ MDG MOZ POR REU RUS STP TCD TJK TUR(USA) UAE UKR
	REG2	ALS ARG BER(USA) CAN CG7 CUB GRL HWA JON PNR USA
	REG3	AUS BGD CBG CHN GUM IND INS J(USA) LAO MHL(USA) NCL NZL OCE PAK PHL(USA) PNG THA TMP(POR) VTN VUT
4 727	REG1	AZE BEL BUL COG CYP(G) CZE DJI(F) F G GEO KAZ LVA MDG QAT ROU RUS SEN TCD TJK TUN TUR UKR
	REG2	ALS BER(USA) CAN CUB FLK GRL HWA JON URG USA
	REG3	AUS BRM CHN GUM IND J MHL(USA) THA TON
4 730	REG1	AFS AZE BUL COG CTI CYP(G) CZE F G GEO I KAZ LVA MDG MNG ROU RUS SEN TJK TUN UKR YEM
	REG2	ALS ATG BER(USA) CAN CUB DMA EQA FLK GRD GRL HWA JMC JON LCA SCN URG USA VCT
	REG3	AUS BRM CHN GUM IND INS J(USA) MHL(USA) NZL THA
4 733	REG1	ALG BDI BEL COM DJI E G GUI KWT LBN LIE MLT MRC NMB RUS S SDN SMR TKM UAE
	REG2	BAH HND HWA NCG PRU USA
	REG3	AUS BTN GUM J MLD NRU SMO VUT
4 736	REGY	ATA(ARG)
	REG1	AFS ALB ALG ARS AUT AZE AZR BLR BUL COG D DJI(F) E ERI ETH F GRC I IRL KAZ LBN MDG MLI MRC NOR OMA POR REU RUS SEN* TCD TJK TKM UKR UZB
	REG2	ALS ARG B BER(USA) CAN CG7 HND HWA JON MDW MEX MRT PNR PTR USA
	REG3	AUS CHN GUM IND J MHL(USA) NZL THA TUV WAK
4 739	REGY	ATA(ARG)
	REG1	ALB ALG ARS AUT AZE AZR BLR COG CTI D EGY F G GIB I ISL KAZ LBN MDG MLI NOR POR ROU RUS SEN* TCD TJK TKM UKR UZB
	REG2	ALS ARG B BOL CAN CG7 HWA JON MDW MRT PNR PTR USA
	REG3	AUS CHN FJI GUM IND J MHL(USA) MLA* NZL PAK PNG SNG THA WAK
4 742	REG1	ALG CME COG CYP DJI(F) F G GEO GIB I KAZ MDG MKD MLI MNG POL POR REU ROU RUS SEN* TCD TGO TUN UZB YEM
	REG2	ALS BER(USA) CAN CHL GRL HND HWA JON PRG URG USA VEN
	REG3	AUS BRU CHN FJI GUM HKG IND IRN J J(USA) KOR MHL(USA) PAK PNG
4 745	REG1	AZR BEL CME COG CTI D DJI(F) EGY F G GEO I ISL KAZ MDG MLI* MRC POL POR REU RUS SEN SUI TCD TGO TUN TUR UZB YEM ZMB
	REG2	ALS BER(USA) CAN CHL GRL HND HWA JON PRG URG USA VEN
	REG3	AUS CBG CHN FJI GUM IND IRN J(USA) KOR LAO MHL(USA) NZL PNG VTN
5 684	REGY	ATA(ARG)
	REG1	AGL ALB AZE AZR BLR CPV CYP D F G GEO I KAZ KWT LVA MOZ POR RUS SRL STP TJK TKM UKR UZB YEM
	REG2	ARG ATN CAN MEX PRG USA
	REG3	AUS CHN GUM HKG IND J(USA) KOR SMO THA VTN
5 687	REGY	ATA(ARG)
	REG1	AFS AGL ALB AZE AZR BLR CPV D E EGY G GEO GIB HRV I KAZ LVA MOZ NIG OMA POR RUS STP SVN TJK TKM UKR UZB YUG
	REG2	ARG ATN CAN EQA MEX PRG USA
	REG3	AUS CHN GUM IND INS IRN J KOR NZL PNG THA VUT
5 690	REG1	BDI DJI E GMB GNE GRC HOL I IRL ROU RUS SWZ TUR UAE
	REG2	HTI
	REG3	CHN IRN J TON

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5 693	REGY	ATA(ARG)
	REG1	AFS ARS AZR CME COG CYP(G) F G GIB I IRQ ISL ISR KAZ LVA MLI MRC ROU RUS SVK TUN TUR UKR YEM
	REG2	ALS ARG ATG(USA) BAH(USA) BER(USA) BRB(USA) CAN CG7 HWA MDW PNR PTR TCA(USA) TRD(USA) USA VEN
	REG3	AUS BGD BRM GUM HKG J J(USA) MLA NZL PAK PNG THA
5 696	REGY	ATA(ARG)
	REG1	ARS BEL CME COG CTI CYP(G) EGY G GIB GRC(USA) IRQ ISL KAZ KEN LBY LVA MCO MDG MLI MLT OMA ROU RUS SOM SVK TUR UKR
	REG2	ALS ARG BER(USA) BOL BRB(USA) CAN CG7 GRL GTM HWA MDW MEX PNR PTR TRD(USA) USA VEN
	REG3	AUS BGD BRM CLN FJI GUM J(USA) NZL PAK SNG THA
5 699	REGY	ATA(ARG)
	REG1	ALG AZR BFA BLR CME DJI(F) F G GAB KAZ LTU LVA MDA MLI MWI RUS TCD TUR UKR YUG
	REG2	ALS ARG CAN GRL GTM HWA MEX PTR USA
	REG3	AUS BRM CHN GUM IND IRN J MAC MHL(USA) NZL PAK THA VTN
5 702	REGY	ATA(ARG)
	REG1	ALG AZR BFA BLR CME CTI DJI(F) E EGY ERI ETH F G G(USA) GAB GRC HOL KAZ LSO LTU LVA MDA MDG MLI* MRC MTN OMA POR REU ROU RUS SEN* TCD TJK UKR UZB YUG
	REG2	ALS ARG BOL CAN CLM GRL MEX USA
	REG3	AUS BRM CHN FJI IND INS IRN J(USA) MAC NZL PNG THA
5 705	REG1	BEN CYP(G) ERI ETH F G GIB GRC HOL KAZ MLT QAT ROU RUS TJK UAE UKR UZB ZMB
	REG2	ATG B BLZ DMA GRD JMC LCA SCN VCT
	REG3	BRU HKG J MLD NPL NRU
5 708	REG1	AFS AGL COG F GRC HNG IRL IRQ KAZ KGZ LBN MTN* NOR OMA POL ROU RUS SEN SEY SYR TJK TKM TUN TUR YEM
	REG2	ALS B BER(USA) BOL CAN CHL CLM GRL HWA MDW USA
	REG3	AUS BRM CHN IND J KOR MHL(USA) NZL PNG SNG THA TMP(POR)
5 711	REG1	AGL COG CTI F G GIB GRC IRQ ISL KAZ KGZ LBN MDG MRC MTN* NOR POL RUS SEN SYR TJK TKM TUN TUR UAE UKR YEM
	REG2	ALS B BER(USA) BOL CAN CHL CLM GRL HWA MDW USA
	REG3	AUS BRM CHN IND J(USA) KOR MHL(USA) MLA NZL PNG THA TMP(POR)
5 714	REGY	ATA(USA)
	REG1	AFS ARM AUT AZE BLR BOT BUL CME CTI CYP(G) D D(F) DJI(F) F G GIB HRV I KAZ MLI MLT MNG NMB(AFS) REU ROU RUS TCD TGO TJK TKM TUN UKR UZB
	REG2	ALS B CAN CUB HWA MDW PNR PTR USA
	REG3	AUS CHN DGA(USA) FJI GUM J(USA) MHL(USA) NZL PAK THA
5 717	REGY	ATA(USA)
	REG1	AFS ARM AUT AZE AZR BLR BOT BUL CME CTI CYP(G) D D(F) DJI(F) E EGY EST ERI ETH F G GRC KAZ MDG MLI MLT MRC NMB(AFS) OMA REU ROU RUS SEN* TCD TGO TJK TKM TUN UKR UZB
	REG2	ALS B BOL CAN CHL CUB GTM HWA MDW MEX PNR PTR USA
	REG3	AUS CBG CHN DGA(USA) FJI GUM J(USA) LAO MHL(USA) NZL PAK PNG THA VTN
5 720	REG1	ALG BEL COM CYP(G) G GIB ISL LBR LIE MLT NMB OMA ROU RUS SDN SMR TKM UAE
	REG2	BAH BOL GTM
	REG3	HKG IND J KRE PHL TUV

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5 723	REGY	ATA(USA)
	REG1	AFS ALG AZE BHR(USA) BLR COG F G GRC(USA) HNG I ISL KAZ LVA MRC MTN NMB(AFS) POR RUS SEN* SOM SVK TKM UAE UKR
	REG2	ALS ATG(USA) B BER(USA) BRB BRB(USA) CAN CG7 CHL HND HWA MDW PNR PTR TCA(USA) URG USA
	REG3	AUS CHN GUM IND J J(USA) KOR MHL(USA) NCL OCE PNG THA
5 726	REGY	ATA(USA)
	REG1	AFS ALG AZE AZR BHR(USA) BLR COG CTI EGY F G GIB I ISL KAZ LVA MDG MTN NMB(AFS) POR ROU RUS S SEN* SVK TKM UKR YEM
	REG2	ALS ATG(USA) B BAH(USA) BER(USA) BRB CAN CG7 CHL GRL HND HWA MDW PNR PTR TCA(USA) URG USA
	REG3	AUS CBG CHN GUM IND J J(USA) KOR LAO MHL(USA) NCL NZL OCE THA VTN VUT
6 685	REG1	AFS AGL ALB ARS AZE BHR(USA) CPV D EGY G GEO GNB GRC(USA) I I(USA) ISL KAZ MOZ MRC NIG NOR POR RUS STP SUI SVK TJK TUR UZB YUG
	REG2	ALS B BER(USA) CAN CG7 DOM EQA HWA MDW MEX PNR PTR URG USA
	REG3	AUS CBG CHN CLN GUM HKG IND J LAO MHL(USA) MLA PAK PNG SNG* VTN
6 688	REG1	ALB ALG AZR EGY F FIN G GRC(USA) HRV I I(USA) ISL MLT MRC RUS SVK TJK TUN YEM ZMB
	REG2	ALS CG7 DOM HWA MDW NCG PNR PTR USA
	REG3	AFG AUS BGD FJI GUM J KRE MHL(USA) PAK VUT
6 691	REGY	ATA(ARG)
	REG1	ALG ARS AZR BUL CYP(G) CZE E G GHA GIB HNG I I(USA) KAZ KEN LBY MLT ROU RUS TJK TKM UZB
	REG2	ALS ARG CAN CLM HWA MDW MEX PNR PTR USA
	REG3	AUS BGD BRM CHN GUM HKG IND J J(USA) KOR PAK SLM SNG WAK
6 694	REGY	ATA(ARG)
	REG1	ALG ARS AZR BLR BUL CYP(G) CZE EGY ERI ETH G GIB I I(USA) KAZ KEN LBY NIG OMA ROU RUS SOM TKM UZB
	REG2	ALS ARG CAN HWA MDW MEX PNR PTR USA
	REG3	AUS BRM CHN CLN FJI GUM HKG IND J(USA) KOR MLA NZL PNG SNG* WAK
6 697	REGY	ATA(ARG)
	REG1	ARS BDI BHR(USA) BLR CYP(G) D G I I(USA) ISL MLT MRC RUS SMR
	REG2	ALS ARG BER(USA) CAN CG7 HWA MDW PNR PTR TRD USA
	REG3	AUS BGD GUM HKG J(USA) PAK THA
6 700	REGY	ATA(ARG)
	REG1	ARS AZR BHR(USA) CYP(G) D EGY F G GIB GRC I I(USA) ISL KEN LBY MLT MRC RUS SOM TUR
	REG2	ALS ARG ATG(USA) BAH(USA) BER(USA) BRB CAN CG7 GRL HWA MDW PNR PTR TCA(USA) TRD USA
	REG3	AUS BGD CLN GUM HKG J(USA) MHL(USA) MLA NZL PAK PNG SNG* THA
6 703	REG1	ALB BEN ERI ETH I IRL ISL LUX NMB QAT RUS SVN UKR
	REG2	HTI
	REG3	J MLD NPL PHL SMO
6 706	REG1	AFS BLR CYP(G) EGY G GIB GNE GRC KAZ MDA MLT RUS SVK UKR UZB YEM YUG
	REG2	ALS B CAN CUB HWA MDW PNR PTR USA
	REG3	AUS BGD CHN DGA(USA) FJI GUM HKG IND INS J KIR MAC MHL(USA) NZL PAK THA

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6 709	REG1	BEL BIH BLR CYP(G) G GEO HRV KAZ KEN LBY LSO MDA MLT ROU RUS SOM SVN UKR UZB YUG
	REG2	ALS B CAN CUB HWA MDW PNR PTR SUR USA
	REG3	AUS BGD CHN CLN FJI GUM HKG IND INS J KIR MAC MHL(USA) NZL PAK PNG THA VTN
6 712	REG1	AFS ALG AUT AZE BLR CME COG CYP(G) D D(F) DJI(F) F G GEO ISL ISR KAZ LVA MDG MLI* MLT MTN OMA REU ROU RUS SEN* TCD TGO TJK TKM TUN TUR TUR(USA) UKR UZB
	REG2	B CAN HWA MEX PNR USA
	REG3	AUS BRM CHN IND J(USA) KOR PAK THA TMP(POR) VTN
6 715	REG1	AFS ALG AUT AZE BLR CME COG CTI D D(F) DJI(F) E F G G(USA) HNG ISR KAZ LVA MDG MLI MRC MTN* REU ROU RUS SEN* TCD TGO TJK TKM TUN TUR(USA) UAE UKR UZB
	REG2	B CAN GRL HWA MEX PNR SUR USA
	REG3	AUS BRM CHN FJI GUM IND INS J(USA) KOR NZL PAK PHL(USA) PNG THA TMP(POR)
6 718	REG1	AGL ALG CYP F HOL IRL MLT NIG ROU TUR TZA UZB YEM
	REG2	BAH
	REG3	IND NRU PAK
6 721	REGY	ATA(ARG) ATA(USA)
	REG1	AGL ARS AZR BHR(USA) F G GEO GRC(USA) HOL I I(USA) JOR KAZ LTU MDA MRC RUS SRL TJK TZA UKR UZB
	REG2	ALS ARG BER(USA) CAN CG7 HWA MDW MEX PNR PTR USA
	REG3	AUS CHN FJI GUM IND J(USA) MHL(USA) NZL SNG THA
6 724	REGY	ATA(ARG) ATA(USA)
	REG1	AFS ARS BHR(USA) CNR E EGY G GEO GRC GRC(USA) HRV I I(USA) KAZ LBR LTU MDA MRC RUS SVN TJK UKR UZB YUG
	REG2	ALS ARG BER(USA) CG7 GRL HWA MDW MEX PNR PTR SUR USA
	REG3	AUS CHN FJI GUM IND J(USA) MHL(USA) MLA* NZL PNG SNG THA
6 727	REGY	ATA(ARG)
	REG1	AGL ALG ARS ARS(USA) AZR D(USA) ERI ETH G GRC KAZ LIE MOZ RUS STP TUR(USA) UKR UZB
	REG2	ALS ARG BER(USA) CAN CUB GRL GUY HWA JON MDW PNR USA
	REG3	AUS CHN GUM IND J MHL(USA) THA
6 730	REGY	ATA(ARG)
	REG1	AGL ALG ARM ARS ARS(USA) AZR CPV D D(USA) DNK E ERI ETH F G GNB GRC ISL KAZ MOZ NIG POR ROU RUS STP SYR TUR(USA) UKR UZB
	REG2	ALS ARG BER(USA) CAN CG7 CUB GRL GUY HWA JON MDW PNR USA
	REG3	AUS CHN GUM IND J J(USA) MHL(USA) MLA NZL PAK PNG SNG* THA
6 733	REG1	ALG ARM F G GUI I KEN NIG RUS SWZ TUR UAE YEM
	REG2	B
	REG3	IND J TUV VTN
6 736	REG1	AFS ARM ASC(USA) AZE CYP(G) CZE G GIB GRC I ISL KEN MLT MRC NMB(AFS) OMA ROU RUS SEY(USA) TJK TKM
	REG2	ALS B BER(USA) CAN CHL CLM GTM HWA PNR PTR URG USA
	REG3	AUS BRM CHN GUM J KOR MHL(USA) PAK SNG THA VTN
6 739	REG1	AFS ARM ASC(USA) AZE CYP(G) CZE EGY F G G(USA) I MLT NMB(AFS) ROU RUS TJK TKM TUR(USA) UKR YEM
	REG2	ALS BER(USA) CHL CLM GRL GTM HND HWA PNR PTR SUR URG USA
	REG3	AUS BRM CHN CLN GUM J(USA) KOR MHL(USA) MLA NZL PAK PNG THA VTN VUT

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6 742	REG1	BFA BLR CAF CME COG CYP(G) DJI(F) F FIN G GIB GRC KAZ LVA MDG MLI* NGR POL REU RUS SEN TCD TGO TUN TUR UKR
	REG2	ALS BER(USA) CAN CG7 CHL CUB GTM HWA JON MDW PNR PTR USA
	REG3	AUS CHN GUM HKG IND IRN J MHL(USA) NZL SNG THA VTN WAK
6 745	REG1	ALG ASC(USA) BFA BLR CAF CME CNR COG CTI CYP(G) CZE DJI(F) E EGY F FIN G GIB GRC HNG KAZ LVA MDG MLI MLT MRC NGR POL REU RUS SEN* SEY(USA) TCD TGO TUN UKR
	REG2	ALS BER(USA) BOL CAN CG7 CHL CUB GTM HWA JON MDW PNR PTR USA
	REG3	AUS BGD CBG CHN FJI GUM HKG IND IRN J LAO MHL(USA) NZL PNG SNG THA VTN WAK
6 748	REG1	BEL BUL CYP(G) E G GMB GRC KWT MLT POR REU RUS SDN UAE UKR ZWE
	REG2	ATG DMA GRD JMC LCA SCN VCT
	REG3	BGD BRU J TON
6 751	REG1	ASC(USA) BFA BUL CME COG COM CTI CYP(G) D DJI E F G HNG KGZ LVA MTN OMA POR RUS SEN* TCD TUN UAE UKR YUG
	REG2	B CAN CHL HWA JON MEX USA
	REG3	AUS CHN FJI GUM IND INS J J(USA) MHL(USA) NZL THA VTN
6 754	REG1	ALG ASC(USA) BFA COG CTI D EGY ERI ETH F G GRC KGZ LVA MDG MRC NIG RUS SEN TCD TUN UAE UKR
	REG2	B BOL CAN CHL HWA JON MEX SUR USA
	REG3	AUS CBG FJI GUM IND INS J LAO MHL(USA) NZL THA VTN VUT
6 757	REGY	ATA(ARG)
	REG1	ARS AZE BLR COG F G GIB KAZ KGZ LVA MLT MWI RUS SEN SVK TCD TJK TKM TUN UKR
	REG2	ARG ATN BER(USA) BOL HWA JON USA
	REG3	AUS BRM CHN GUM IND J MHL(USA) THA TMP(POR)
6 760	REGY	ATA(ARG)
	REG1	ALG ARS AZE BLR COG CTI F G ISL ISR KAZ KGZ LVA MDG MRC RUS SEN SVK TCD TJK TKM TUN UKR
	REG2	ALS ARG ATN BER(USA) HWA JON USA
	REG3	AUS BRM CHN GUM IND J J(USA) MHL(USA) MLA NZL PNG SNG* THA TMP(POR)
8 965	REG1	AFS ASC(USA) CTI CYP(G) D EGY ERI ETH G GIB KEN NMB(AFS) RUS SMR TUR
	REG2	ALS B CAN GRL HWA MEX PNR USA
	REG3	AUS BRM FJI HKG J(USA) KRE MHL(USA) NZL PAK PNG
8 968	REG1	AFS ARS CYP(G) D G GIB HRV KEN LBY MLT NIG NMB(AFS) OMA RUS SOM SVN YUG
	REG2	ALS B BOL CAN GRL HWA MEX PNR USA
	REG3	AUS BRM CLN FJI HKG INS J(USA) MHL(USA) MLA NZL PNG SNG*
8 971	REGY	ATA(ARG)
	REG1	ARS AZE AZR BHR(USA) BLR E F G GEO GRC(USA) HOL HRV I I(USA) ISL ISR KAZ KGZ LVA MRC RUS S TJK TKM UKR ZMB
	REG2	ALS ARG ATG(USA) ATN BAH(USA) BER(USA) BOL BRB(USA) CG7 DOM HWA MDW PNR PTR TCA(USA) TRD(USA) USA
	REG3	AUS BRM CHN DGA(USA) GUM J(USA) MHL(USA) PNG VTN
8 974	REGY	ATA(ARG)
	REG1	AFS AZE AZR BLR E GEO GNE GRC(USA) HOL I I(USA) IRL ISL ISR KAZ KGZ LVA MRC RUS TJK TKM UKR YEM
	REG2	ALS ARG ATG(USA) ATN BAH(USA) BER(USA) BRB(USA) CG7 DOM HWA MDW PNR PTR TCA(USA) USA
	REG3	AUS BRM CHN GUM J(USA) MHL(USA) NZL PNG VTN

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8 977	REG1	ALB ARS BHR(USA) G GRC(USA) I ISL MRC MWI OMA RUS UKR
	REG2	ALS BRB(USA) HWA MDW PNR PTR TRD(USA) USA
	REG3	AUS CBG CLN DGA(USA) GUM INS J(USA) LAO
8 980	REGY	ATA(ARG)
	REG1	ALB ALG ARS AZR BFA BHR(USA) CME COG CYP(G) D DJI(F) F G I KAZ LBN MDG REU RUS SEN TCD TGO TUN UZB
	REG2	ALS ARG ATG(USA) BAH(USA) BER(USA) BRB BRB(USA) CG7 HWA MDW PNR PTR TCA(USA) USA
	REG3	AUS CHN GUM HKG IND INS J(USA) MHL(USA)
8 983	REGY	ATA(ARG)
	REG1	ALG BFA BHR(USA) CME COG CYP(G) D DJI(F) F G HNG I KAZ LBN MDG MLT MNG MRC MTN OMA REU RUS SEN* TCD TGO TUN UZB
	REG2	ALS ARG BER(USA) BRB(USA) CG7 GRL HWA MDW PNR PTR USA
	REG3	AUS CBG CHN GUM IND J(USA) LAO MHL(USA) NZL PNG VTN
8 986	REG1	ALG BHR(USA) CYP(G) F G GRC KGZ MDG MLT ROU RUS TUR UKR YEM
	REG2	BRB(USA) CG7
	REG3	J J(USA) PHL TUV
8 989	REG1	AGL BEL BLR G KAZ KGZ LVA MCO MDA MOZ POL POR ROU RUS STP UKR UZB YEM
	REG2	ALS BER(USA) CAN GRL HWA MEX USA
	REG3	AUS BRM FJI IND J J(USA) NZL
8 992	REG1	AGL ASC(USA) BLR CPV F G GNB GRC ISL KAZ LVA MDA MOZ POL POR RUS S SDN STP UKR UZB
	REG2	ALS BER(USA) CAN CHL HWA MEX USA
	REG3	AUS BRM CHN FJI GUM IND J(USA) NZL PNG
8 995	REG1	ARS AZR COM CYP(G) G GIB GRC ISL LBR MLT MNG RUS UKR YEM
	REG2	BLZ
	REG3	BRU HKG TON
8 998	REGY	ATA(USA)
	REG1	AGL AZR BHR(USA) BLR COG F G GRC(USA) HOL ISL LVA MDG MTN NOR SEN* TUN UAE UKR
	REG2	ALS B BER(USA) CG7 CUB HWA MDW PNR PTR TRD(USA) USA
	REG3	AUS CHN GUM IND J(USA) MHL(USA) NZL
9 001	REGY	ATA(USA)
	REG1	AGL ALG ARM BHR(USA) BLR COG CTI CYP(G) EGY F G GRC(USA) HOL I(USA) ISL JOR LVA MDG MLT MRC MTN NOR SEN* TUN UKR
	REG2	ALS B BER(USA) CG7 CUB HWA MDW PNR PTR TRD(USA) USA
	REG3	AUS CHN DGA(USA) GUM HKG IND J(USA) MHL(USA) NZL
9 004	REG1	ARM BDI BEN BLR CYP(G) IRL ISL KWT LSO LUX MLT ROU
	REG2	B BAH
	REG3	HKG IRN J MLD NRU
9 007	REG1	AZR BUL CME COG G GIB GRC GRC(USA) I(USA) ISL KAZ MDG MLT REU ROU RUS SEN TCD YUG
	REG2	ALS B CAN HWA MDW MEX PNR PTR USA
	REG3	AUS BRM CHN FJI GUM INS IRN J KIR VTN WAK
9 010	REG1	ARS AZR BEL BUL CME COG CTI G KAZ LIE MDG REU RUS SEN TCD TUR
	REG2	ALS ARG B CAN HWA MDW MEX PNR PTR USA VEN
	REG3	AUS BRM FJI GUM INS IRN J KIR NZL PAK VTN WAK
9 013	REG1	AFS ARS ERI ETH G GMB GRC HRV MLT MOZ RUS UKR
	REG2	ARG ATG DMA GRD GTM JMC LCA SCN VCT
	REG3	AUS FJI IND J

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9 016	REG1	AUT COG F G GIB HNG MDG RUS SEN TCD TUN TUR UKR
	REG2	BER(USA) CHL CUB
	REG3	AUS CHN FJI HKG IRN J(USA) NZL PAK SNG THA
9 019	REG1	ALG AUT CNR COG CTI E F G GIB GRC MDG MLT MRC NIG RUS SEN TCD TUN UKR
	REG2	ALS BER(USA) BOL CHL CUB HWA
	REG3	AUS CHN IRN J MLA* NZL PAK PNG SNG THA VUT
9 022	REGY	ATA(ARG)
	REG1	AFS ALG ARM AZE AZR COG CYP(G) CZE D(USA) EGY ERI ETH F G GEO KAZ MDG MLT REU RUS SEN SOM TJK TKM UZB
	REG2	ARG BER(USA) CAN GRL HWA JON PNR PTR USA
	REG3	AUS CHN GUM HKG IND J MHL(USA) NZL
9 025	REGY	ATA(ARG) ATA(NZL)
	REG1	AFS ALG ARM AZE AZR COG CYP(G) CZE D D(USA) E EGY G GEO GIB KAZ MDG MLT REU ROU RUS SEN TJK TKM UZB
	REG2	ARG BER(USA) CUB HWA JON MEX PNR PTR USA
	REG3	AUS CHN FJI GUM HKG IND J(USA) MHL(USA) NZL PAK PHL(USA) PNG SNG THA
9 028	REG1	COD E G G(USA) GIB GRC MLT MRC QAT ROU RUS UAE UZB
	REG2	ALS CAN CG7 CUB GRL HWA MEX USA
	REG3	AUS J MLA SMO
9 031	REGY	ATA(USA)
	REG1	CYP(G) G G(USA) GIB GRC(USA) I I(USA) MLT MRC POL RUS SVK SWZ TUR
	REG2	ALS BER(USA) CAN CHL CLM HWA MDW PNR PTR URG USA
	REG3	AUS BGD BRM CHN GUM J MHL(USA) MLA NZL PAK TMP(POR) WAK
9 034	REGY	ATA(USA)
	REG1	AUT DNK G G(USA) GHA GRC(USA) I I(USA) MRC NIG POL RUS SEY TUR YEM
	REG2	ALS BER(USA) CHL CLM EQA HWA MDW PNR PTR URG USA
	REG3	BGD BRM CHN GUM INS J MHL(USA) MLA NZL PAK SMO TMP(POR) WAK
9 037	REGY	ATA(USA)
	REG1	AUT CYP DJI G I I(USA) LTU MRC NMB RUS SRL TUR UAE
	REG2	ALS CAN HWA MDW PNR PTR USA
	REG3	AUS DGA(USA) GUM J(USA) MHL(USA) NPL WAK
11 175	REG1	ASC(USA) G GRC MLT SDN TUR(USA) UAE
	REG2	ALS HWA USA
	REG3	AUS GUM J(USA)
11 178	REGY	ATA(ARG)
	REG1	AGL G GRC MOZ NIG NOR POL POR RUS STP TUN TUR(USA)
	REG2	ALS ARG ATN CLM HWA JON USA
	REG3	AUS CHN GUM IND INS J J(USA) MHL(USA) NZL
11 181	REGY	ATA(ARG)
	REG1	AGL AZR CPV E EGY G GNB ISL MOZ NOR POL POR RUS STP TUR TUR(USA)
	REG2	ALS ARG ATN CLM JON USA
	REG3	AUS CHN GUM IND INS J(USA) MHL(USA) NZL
11 184	REG1	CYP(G) E G GNE ISL MKD MLT MNG ROU TUR
	REG2	BLZ
	REG3	J MLD TON

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11 187	REGY	ATA(USA)
	REG1	ALG BEL BHR(USA) BLR CME COG DJI(F) ERI ETH F GEO GRC(USA) ISL ISR KAZ LVA MDG ROU RUS SEN TCD TJK TKM UKR UZB
	REG2	ALS ATG(USA) BAH(USA) BER(USA) BRB(USA) CAN CHL HWA MDW MEX PNR PTR TCA(USA) TRD(USA) USA
	REG3	AUS CHN DGA(USA) GUM IRN J(USA) MHL(USA)
11 190	REGY	ATA(USA)
	REG1	ALG BHR(USA) BLR CME COG DJI(F) GEO GRC ISR KAZ LVA MDG MRC ROU RUS SEN TCD TJK TKM UKR UZB
	REG2	ALS ATG(USA) BAH(USA) BER(USA) BRB(USA) CAN CHL HWA MDW MEX PNR PTR TCA(USA) TRD(USA) USA
	REG3	AUS BRM CHN DGA(USA) GUM INS IRN J(USA) MHL(USA) NZL
11 193	REG1	CYP(G) G GRC MNG NIG RUS
	REG2	MEX URG
	REG3	IND PHL TUV
11 196	REG1	ARS BHR(USA) CYP(G) D G KEN RUS
	REG2	ALS ATG(USA) B BAH(USA) BER(USA) BRB(USA) CG7 HWA MDW PNR PTR TCA(USA) TRD(USA) URG USA
	REG3	AUS CHN GUM HKG J(USA) MHL(USA) WAK
11 199	REG1	ARS BHR(USA) CYP(G) D EGY G GIB I(USA) KEN LBY MLT MRC OMA RUS SOM
	REG2	ALS ATG(USA) B BAH(USA) BER(USA) BRB(USA) CG7 HWA MDW PNR PTR TCA(USA) TRD(USA) USA
	REG3	AUS CHN CLN GUM HKG IRN J(USA) MLA PNG SNG* WAK
11 202	REG1	BHR(USA) CYP IRL SMR TUN YEM
	REG2	ALS ATG(USA) BAH(USA) BER(USA) BRB(USA) CG7 HWA MDW PTR TCA(USA) TRD(USA) USA
	REG3	AUS GUM J(USA) WAK
11 205	REGY	ATA(ARG)
	REG1	AZR CME COG DJI(F) F G KAZ MDG MNG REU RUS SEN TGO TUN
	REG2	ALS ARG CAN CUB HWA JON MDW PNR PTR USA
	REG3	AUS GUM J WAK
11 208	REGY	ATA(ARG)
	REG1	ALG AZR CME COG CYP(G) DJI(F) F G GIB GRC(USA) HNG KAZ LBY MDG MRC REU RUS SEN TGO TUN TUR
	REG2	ALS ARG CAN CUB HWA JON MDW PNR PTR USA
	REG3	AUS CBG GUM IRN J LAO PNG VTN WAK
11 211	REG1	BEL E G OMA RUS SWZ TUN
	REG2	ALS HWA JON MDW PNR PTR
	REG3	GUM IRN J MHL(USA) WAK
11 214	REGY	ATA(ARG)
	REG1	AUT COG DJI(F) F G GAB GIB ISL MDG MLT REU RUS SEN TCD TUN
	REG2	ALS ARG BER(USA) CAN HWA MRT USA
	REG3	AUS BRU NCL NPL OCE
11 217	REGY	ATA(ARG)
	REG1	ASC(USA) AUT COG D DJI(F) F G GRC MDG MRC RUS SEN SEY(USA) TCD TUN
	REG2	ALS ARG BER(USA) CAN GRL HWA MRT USA
	REG3	AUS CHN NCL NZL OCE
11 220	REG1	BDI BEL GMB KWT ROU RUS
	REG2	CAN USA
	REG3	AUS CBG CHN J LAO VTN VUT

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11 223	REG1	BEN G MLT ROU S UKR YEM
	REG2	ALS ATG CAN DMA GRD JMC LCA SCN VCT
	REG3	AUS IRN J KRE
11 226	REG1	ARS(USA) AZR D D(USA) G RUS SRL TUR(USA) UKR YUG
	REG2	ALS BER(USA) CHL CUB GRL HWA JON MDW PNR USA
	REG3	AUS BGD CHN GUM J(USA) MHL(USA) NZL PAK PHL(USA)
11 229	REG1	ARS(USA) AZR D D(USA) G MRC RUS TUR(USA) YUG
	REG2	ALS BER(USA) CAN CG7 CUB GRL HWA JON MDW PNR USA
	REG3	AUS BGD CHN GUM J MHL(USA) NZL PAK
11 232	REG1	HOL IRL LIE NIG QAT RUS UAE YEM
	REG2	BAH CAN
	REG3	AUS J SNG
11 235	REG1	AFS ARM AZE BLR CYP(G) D F G KAZ KGZ LVA MNG RUS SEN TJK TKM TUN UKR UZB
	REG2	ALS ARG BER(USA) CAN GRL HWA MEX USA
	REG3	AUS BRM GUM J PNG SNG
11 238	REG1	ALG ARM AZE BLR D KAZ KGZ LSO LVA MRC RUS SEN TJK TKM TUN UKR UZB
	REG2	ALS ARG BER(USA) CAN HWA MEX
	REG3	AUS CHN IRN J J(USA) NZL
11 241	REG1	CYP(G) DJI G GIB LBR MLT RUS TUR(USA)
	REG2	USA
	REG3	CHN HKG NRU
11 244	REG1	ALG COM CYP(G) DNK G G(USA) GIB KAZ MNG RUS TUR(USA) UZB
	REG2	B BER(USA) CAN USA
	REG3	AUS FJI IRN J(USA) NZL PNG
11 247	REG1	ALG CYP(G) EGY G GIB KAZ LBY MLT RUS UZB ZMB
	REG2	B BER(USA) CAN HWA MEX
	REG3	AUS CHN CLN FJI GUM HKG J(USA) MLA NZL
11 250	REG1	ALG F G GIB GUI I NIG RUS TUR
	REG2	CAN
	REG3	AUS CHN
11 253	REGY	ATA(USA)
	REG1	AZE AZR BHR(USA) BLR ERI ETH F G GRC(USA) I I(USA) KAZ MOZ MRC RUS TJK TKM UKR UZB
	REG2	ALS B BER(USA) BRB(USA) CG7 HWA MDW PNR PTR TRD(USA) USA
	REG3	CHN GUM J(USA) MHL(USA)
11 256	REGY	ATA(USA)
	REG1	AZE BHR(USA) BLR ERI ETH G GRC(USA) HOL I I(USA) ISL KAZ MRC RUS TJK TKM UKR UZB
	REG2	ALS B BRB(USA) CG7 HWA MDW PNR PTR TRD(USA) USA
	REG3	AUS BRM CHN FJI GUM INS IRN J(USA)
11 259	REGY	ATA(USA)
	REG1	AZR BHR(USA) CYP(G) G ISL MLT MWI UAE UKR
	REG2	ALS ATG(USA) BAH(USA) BER(USA) BRB(USA) CG7 HWA MDW PNR PTR TCA(USA) TRD(USA) USA
	REG3	GUM J(USA) SMO
11 262	REGY	ATA(ARG) ATA(USA)
	REG1	CZE D E G GRC(USA) I I(USA) ISL KAZ LTU MDA MRC RUS TUR UKR
	REG2	ALS ARG BER(USA) CAN CG7 HWA MDW PNR PTR USA
	REG3	AUS CHN DGA(USA) GUM IND J(USA) MHL(USA)

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11 265	REGY	ATA(ARG) ATA(USA)
	REG1	AZR BEL CZE D EGY GRC(USA) I I(USA) ISL KAZ LTU LVA MDA MNG MRC OMA POR RUS UKR UZB
	REG2	ALS ARG BER(USA) CAN CG7 HWA MDW PNR PTR USA
	REG3	CHN GUM IND J(USA) MHL(USA)
11 268	REGY	ATA(USA)
	REG1	ALG ARS BEL COG G ISL KAZ LVA MDG MLT REU RUS SEN SVN UZB
	REG2	ALS BER(USA) HWA MDW PNR PTR USA
	REG3	AUS GUM IRN J(USA) MHL(USA)
11 271	REG1	ALG ARS AZE BLR BUL COG F G GEO KAZ MDA MDG MLT MRC REU ROU RUS SEN TJK UKR UZB
	REG2	B CAN MEX
	REG3	AUS J(USA)
13 200	REG1	AFS ALG BEL CYP G GMB RUS UAE YEM
	REG2	ALS GRL HWA USA
	REG3	AUS J(USA) KRE NPL
13 203	REGY	ATA(ARG)
	REG1	ALG ARS CYP(G) D EGY G GIB KEN NIG ROU RUS SVN TUR TUR(USA) UZB
	REG2	ALS ARG ATN HWA JON MEX USA
	REG3	AUS HKG IRN J J(USA) PNG
13 206	REGY	ATA(ARG)
	REG1	ALG ARS CYP(G) D E G GIB ISL KEN LBY MLT ROU RUS SOM SUI TUR TUR(USA) UZB
	REG2	ALS ARG ATN GRL HWA JON MEX USA
	REG3	AUS CLN HKG IRN J MLA NZL SNG*
13 209	REG1	CYP(G) G GIB LIE LSO MLT MNG RUS SDN
	REG2	BAH
	REG3	HKG J MLD SMO
13 212	REGY	ATA(ARG)
	REG1	ARS(USA) AZR CAF CME COG CZE D(USA) ERI ETH GRC IRL MDG RUS SEN TUR(USA)
	REG2	ALS ARG BER(USA) CAN CUB GRL HWA JON PNR PTR USA
	REG3	AUS BGD CHN GUM J J(USA) MHL(USA) NZL PAK
13 215	REGY	ATA(ARG)
	REG1	ARS(USA) AZR CAF CME COG CZE D(USA) E EGY F G MDG MRC OMA RUS SEN TUR(USA)
	REG2	ALS ARG BER(USA) CAN CG7 CUB GRL HWA JON MEX PNR PTR USA
	REG3	AUS BGD CHN GUM IRN J(USA) MHL(USA) NZL PAK
13 218	REG1	CYP(G) DJI G KAZ LBR MLT MWI RUS SMR
	REG2	ALS CAN HWA MDW MEX URG USA
	REG3	AUS HKG J MHL(USA)
13 221	REG1	ALG AZE BLR CME COG D DJI(F) GEO GRC(USA) KAZ KGZ LVA MDG MLI REU RUS SEN* TCD TGO TJK TKM TUN UKR UZB
	REG2	ALS B CAN HWA MDW PNR PTR URG USA
	REG3	AUS CHN FJI GUM J(USA) KIR MHL(USA) NZL
13 224	REG1	ALG ASC(USA) AZE BLR CME COG CTI D DJI(F) F G GEO HNG JOR KAZ KGZ LVA MDG MLI MNG REU RUS S SEN* SEY(USA) TCD TGO TJK TKM TUN UKR UZB
	REG2	ALS B CAN CUB HWA MDW PNR PTR USA
	REG3	AUS CHN FJI GUM IRN J(USA) KIR MHL(USA) NZL PNG

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13 227	REG1	BEL COM GNE IRL KAZ MRC QAT RUS TUR
	REG2	ALS CAN CUB HWA MDW PNR PTR USA
	REG3	AUS CBG GUM HKG J(USA) LAO VTN
13 230	REG1	G GRC KAZ LTU MLT RUS SRL UAE YEM ZMB
	REG2	ALS CAN CG7 HWA MDW PNR PTR USA
	REG3	GUM J(USA) MHL(USA) PHL TON
13 233	REGY	ATA(ARG)
	REG1	AUT AZR CME COG D D(F) DJI(F) E F ISL KAZ MDG MLI MNG REU RUS SEN* TCD TGO TJK TKM TUN UZB
	REG2	ALS ARG BER(USA) CAN CG7 HWA MDW MRT PNR PTR USA
	REG3	CHN GUM J(USA) MHL(USA) NCL OCE
13 236	REGY	ATA(ARG)
	REG1	AUT AZR CME COG CTI D D(F) DJI(F) F G GRC(USA) I(USA) KAZ MDG MLI MRC NIG REU RUS SEN* TCD TGO TJK TKM TUN UZB
	REG2	ALS ARG BER(USA) CAN CG7 GRL HWA MDW MRT PNR PTR USA
	REG3	AUS CBG CHN GUM J(USA) LAO MHL(USA) NCL NZL OCE VTN VUT
13 239	REG1	AZR BEN G HOL KAZ KWT LUX NMB ROU RUS
	REG2	ATG DMA GRD JMC LCA SCN VCT
	REG3	BRU IRN J NRU
13 242	REG1	ALG ARM AZE BLR CAF CME COG F G G(USA) GEO KAZ MDG POL REU ROU RUS SEN TJK TKM TUN UKR UZB
	REG2	B BER(USA) HWA JON USA
	REG3	AUS CHN FJI GUM J(USA) MHL(USA) NZL OCE
13 245	REG1	ALG ARM ASC(USA) AZE BLR CAF CME COG E F G GEO GRC ISR KAZ MDG MNG POL REU RUS SEN TJK TKM TUN UKR UZB
	REG2	B BER(USA) CAN HWA JON USA
	REG3	AUS BRM CHN FJI GUM J J(USA) MHL(USA) NZL OCE VTN
13 248	REG1	ALG BLR COD CYP(G) G G(USA) MLT RUS UKR YUG
	REG2	USA
	REG3	AUS HKG J SNG TUV
13 251	REGY	ATA(ARG) ATA(USA)
	REG1	AGL ALB AZR BHR(USA) BLR CYP(G) F GRC(USA) I I(USA) MOZ MRC NOR POR RUS STP UKR
	REG2	ALS ARG CAN CG7 HWA JON MDW MEX PNR PTR USA
	REG3	AUS CHN GUM IND IRN J(USA) NZL WAK
13 254	REGY	ATA(ARG) ATA(USA)
	REG1	AGL AZR BHR(USA) GRC(USA) HOL I I(USA) MNG MOZ MRC NOR POR RUS STP UZB
	REG2	ALS ARG BER(USA) CAN CG7 HWA JON MDW MEX PNR PTR USA
	REG3	AUS BRM CHN GUM IND J(USA) NZL WAK
13 257	REGY	ATA(USA)
	REG1	BEL BHR(USA) CPV G GNB HRV MRC ROU SWZ UZB
	REG2	CAN CG7 HWA JON MDW PTR USA
	REG3	AUS GUM INS J(USA) MHL(USA) WAK
15 010	REG1	BEL BEN DJI IRL MLT RUS
	REG2	BLZ CAN HWA
	REG3	AUS GUM KRE NPL

1	2	
15 013	REGY	ATA(ARG)
	REG1	D(USA) G GRC MLT NIG RUS TUR(USA) UZB
	REG2	ALS ARG BER(USA) CUB GRL HWA JON PNR USA
	REG3	GUM J J(USA) MHL(USA)
15 016	REGY	ATA(ARG)
	REG1	ASC(USA) CNR D(USA) E G MRC ROU RUS TUR(USA) UZB
	REG2	ALS ARG BER(USA) CAN CG7 CUB GRL HWA JON PNR PRU USA
	REG3	AUS CHN GUM IRN J(USA) MHL(USA) NZL PHL(USA)
15 019	REG1	ARS F LBR MLT ROU RUS UKR
	REG2	ALS CAN GRL URG USA
	REG3	AUS J
15 022	REGY	ATA(USA)
	REG1	AGL ALB ARS BHR(USA) BLR GEO ISL KAZ LVA MDA MOZ MRC POR RUS S STP TJK TUR UKR UZB
	REG2	ALS BRB(USA) CAN HWA MDW PNR PTR TRD(USA) URG USA
	REG3	AUS CHN DGA(USA) GUM IND IRN J(USA) MAC TMP(POR) WAK
15 025	REGY	ATA(USA)
	REG1	AGL ARS AZR BHR(USA) BLR CPV G GEO GNB ISL KAZ LVA MDA MLT MOZ MRC OMA POR RUS STP TJK TUR UKR UZB
	REG2	ALS ATG(USA) BAH(USA) BER(USA) BRB(USA) CHL HWA MDW MEX PNR PTR TCA(USA) TRD(USA) USA
	REG3	AUS FJI GUM IND J(USA) MAC NZL TMP(POR) WAK
15 028	REGY	ATA(USA)
	REG1	ALG BHR(USA) GRC(USA) ISL MLT RUS TJK
	REG2	ALS BRB(USA) HWA MDW PNR PTR TRD(USA) USA
	REG3	AUS GUM J(USA) WAK
15 031	REG1	ALG COM CYP(G) G MLT RUS TJK
	REG2	ATG CAN DMA GRD JMC LCA SCN VCT
	REG3	AUS J J(USA)
15 034	REG1	ALG ARS(USA) AZE AZR BLR CME COG D(USA) DJI(F) F G GEO GRC ISR KAZ LTU MDA MDG MLI REU RUS SEN* TCD TJK TKM TUR(USA) UKR UZB
	REG2	B CAN GRL HWA USA
	REG3	AUS GUM IRN NZL PHL
15 037	REG1	ALG ARS(USA) AZE AZR BLR CME COG CTI D(USA) G GEO KAZ LTU MDA MDG MLI MRC REU RUS SEN* TCD TJK TKM TUR(USA) UKR UZB YUG
	REG2	ALS B CAN HWA MEX USA
	REG3	AUS J(USA)
15 040	REG1	CYP(G) G GUI LIE QAT RUS
	REG2	USA
	REG3	AUS J MLD NRU
15 043	REGY	ATA(ARG)
	REG1	CYP(G) DNK ERI ETH G GMB KAZ
	REG2	ALS ARG CUB
	REG3	AUS BGD FJI IRN J(USA) PAK
15 046	REGY	ATA(ARG)
	REG1	CYP(G) E ERI ETH G ISL KAZ MLT RUS SUI YUG
	REG2	ALS ARG CUB USA
	REG3	AUS BGD FJI J NZL PAK PNG

1	2	
15 049	REG1	COD CYP(G) G GIB RUS SMR UAE
	REG2	USA
	REG3	AUS HKG J TUV
15 052	REGY	ATA(ARG)
	REG1	BHR(USA) G GRC(USA) I I(USA) MRC NOR RUS
	REG2	ALS ARG BER(USA) HWA MDW PNR PTR TRD(USA) USA
	REG3	CHN GUM IND J(USA) MHL(USA) NZL VTN
15 055	REGY	ATA(ARG)
	REG1	AFS ALG ARM BHR(USA) G G(USA) GRC(USA) I I(USA) ISL MRC NOR RUS
	REG2	ALS ARG BER(USA) HWA MDW PNR PTR TRD(USA) USA
	REG3	AUS CHN GUM IND J(USA) MHL(USA) NZL VTN
15 058	REG1	ALG ARM BHR(USA) G GRC(USA) I(USA) RUS SWZ
	REG2	ALS HWA MDW PNR PTR TRD(USA) USA
	REG3	AUS GUM J(USA) MHL(USA)
15 061	REG1	ALG CNR E F G GRC LSO RUS UZB
	REG2	ALS BRB(USA) CG7 HWA MDW PNR PTR USA
	REG3	AUS GUM J(USA) MHL(USA)
15 064	REG1	AZR CME COG DJI(F) F G GRC ISL KAZ KGZ MDG MLI* MTN REU RUS SEN* TCD TGO TJK TKM TUN UZB
	REG2	ALS ATG(USA) BAH(USA) BER(USA) BRB BRB(USA) CG7 CHL HWA MDW PNR PTR TCA(USA) USA
	REG3	AUS DGA(USA) GUM J(USA) PNG
15 067	REG1	ALG AZR CME COG CTI DJI(F) F KAZ KGZ MDG MLI* MRC REU RUS SEN TCD TGO TJK TKM TUN UZB
	REG2	ALS ATG(USA) BAH(USA) BER(USA) BRB BRB(USA) CG7 HWA MDW PNR PTR TCA(USA) USA
	REG3	AUS CBG GUM J(USA) LAO VTN
15 070	REG1	BEL BHR(USA) GEO RUS SRL TUR
	REG2	ALS HWA JON MDW PNR PTR USA
	REG3	AUS GUM J WAK
15 073	REGY	ATA(ARG)
	REG1	BHR(USA) COG D DJI(F) E F GEO GRC(USA) ISL MDG MNG RUS SEN TUN UKR
	REG2	ALS ARG BER(USA) CAN HWA JON MDW PNR PTR USA
	REG3	AUS CHN GUM IND J MHL(USA) NCL OCE WAK
15 076	REGY	ATA(ARG)
	REG1	AUT BHR(USA) COG CTI D DJI(F) F G MDG MRC RUS SEN TUN UKR
	REG2	ALS ARG BER(USA) HWA JON MDW PNR PTR USA
	REG3	AUS CBG CHN GUM IND IRN J LAO MHL(USA) NCL NZL OCE VTN VUT WAK
15 079	REG1	BDI E G GRC KWT ROU RUS TKM
	REG2	PTR USA
	REG3	BRU J TON
15 082	REG1	AZE BHR(USA) BLR CNR E GRC(USA) I I(USA) KAZ KGZ LVA MRC POL ROU RUS TJK TKM UKR
	REG2	ALS B BER(USA) BRB(USA) HWA MDW MEX PNR PTR USA
	REG3	AUS FJI GUM J(USA) KIR NZL
15 085	REG1	AZE BHR(USA) BLR CNR DNK E G GRC(USA) HOL I I(USA) KAZ KGZ LVA MNG MRC NIG POL RUS TJK TKM UKR
	REG2	ALS B BER(USA) BRB(USA) HWA MDW MEX PNR PTR TRD(USA) USA
	REG3	AUS CHN FJI GUM J(USA) KIR MHL(USA) NZL PNG

1	2	
15 088	REG1	BEL BHR(USA) BLR E RUS UAE
	REG2	ALS ATG(USA) BAH(USA) BER(USA) BRB(USA) HWA MDW PNR PTR TCA(USA) USA
	REG3	AUS GUM HKG J(USA)
15 091	REG1	E G HRV MLT RUS ZMB
	REG2	B MEX USA
	REG3	AUS HKG IRN J J(USA)
15 094	REGY	ATA(ARG)
	REG1	E HOL MLT MNG MWI RUS TUR
	REG2	ALS ARG ATN BER(USA) GTM HWA USA
	REG3	AUS CHN GUM J
15 097	REG1	CYP IRL RUS SDN TUR
	REG2	ALS ARG BAH BER(USA)
	REG3	INS J SMO
17 970	REG1	AFS ALG CYP DJI G KWT MCO RUS
	REG2	ATG DMA GRD JMC LCA SCN VCT
	REG3	BRU PHL SMO
17 973	REGY	ATA(ARG)
	REG1	AGL ALG ARM ARS(USA) AZE AZR BLR CYP(G) D F G I KAZ LTU LVA MDA MNG MOZ NIG POR ROU RUS STP SVN TJK TKM UKR UZB
	REG2	ALS ARG BER(USA) GRL HWA JON USA
	REG3	AUS GUM IND IRN J(USA) MAC MHL(USA) TMP(POR)
17 976	REG1	CPV D G G(USA) I MRC ROU RUS SWZ TUR(USA) UAE UZB YUG
	REG2	CAN GRL URG USA
	REG3	AUS J(USA) MLD
17 979	REG1	BHR(USA) CYP(G) E G GIB GRC(USA) I I(USA) LSO MRC RUS UZB
	REG2	ALS B BER(USA) CG7 HWA MDW PNR PTR TRD(USA) USA
	REG3	AUS BGD GUM HKG J(USA) NZL PAK
17 982	REG1	ARS AZR BHR(USA) CYP(G) EGY G GIB GRC(USA) I I(USA) ISL JOR KEN MLT MRC OMA RUS S UKR
	REG2	ALS B BER(USA) CAN CG7 HWA MDW PNR PTR TRD(USA) USA
	REG3	AUS BGD GUM HKG IRN J(USA) MHL(USA) NZL PAK PNG
17 985	REG1	BEN BHR(USA) D G ISL LBY MNG SOM UKR
	REG2	ALS BER(USA) CG7 HWA MDW PNR PTR TRD(USA) USA
	REG3	AUS CLN GUM J(USA) MLA SNG
17 988	REG1	CYP(G) G GIB LIE MLT NIG RUS TUN
	REG2	BAH
	REG3	AUS HKG IND J
17 991	REGY	ATA(ARG)
	REG1	AFS CME COG D D(F) DJI(F) F GAB GRC HOL ISL MDG MLI* MTN* REU RUS SEN TCD TGO TUN
	REG2	ALS ARG BER(USA) GRL HWA JON MRT USA
	REG3	AUS CHN FJI GUM J NCL NZL OCE
17 994	REGY	ATA(ARG)
	REG1	ALG AUT CME COG CTI D D(F) DJI(F) F ISR MDG MLI MNG MRC REU RUS SEN* TCD TGO TKM TUN UKR
	REG2	ALS ARG CAN GRL HWA JON MRT USA
	REG3	AUS CBG CHN FJI GUM IRN J LAO NCL NZL OCE VTN VUT
17 997	REG1	ALG CYP(G) G GIB LUX MLT MWI RUS TKM UKR
	REG3	HKG J TON

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18 000	REGY	ATA(ARG)
	REG1	ALG BLR G GEO GRC KAZ LVA POL RUS TJK TUR UKR UZB ZMB
	REG2	ARG CAN MEX USA
	REG3	AUS BGD J J(USA) NZL PAK
18 003	REGY	ATA(ARG)
	REG1	ALG BLR COM CYP(G) G GEO KAZ LVA MLT MNG POL RUS TJK TUR UAE UKR UZB
	REG2	ALS ARG MEX USA
	REG3	AUS J(USA) NZL PNG
18 006	REG1	BEL G HOL LBR MLT RUS SMR
	REG2	BLZ
	REG3	AUS IRN J(USA)
18 009	REGY	ATA(USA)
	REG1	BHR(USA) CME COG CYP(G) D DJI(F) E F G GRC(USA) I I(USA) ISL MDG MLI MLT MRC REU ROU RUS SEN* TCD TGO TUN
	REG2	ALS ATG(USA) BAH(USA) BER(USA) BRB BRB(USA) CAN CG7 HWA MDW PNR PTR TCA(USA) USA
	REG3	AUS CHN FJI GUM J MHL(USA) NZL
18 012	REGY	ATA(USA)
	REG1	BHR(USA) CME COG CTI D DJI(F) E F G GRC(USA) I I(USA) MDG MLI* MRC MTN REU ROU RUS SEN* TCD TGO TUN
	REG2	ALS BER(USA) BRB(USA) CAN CG7 CHL HWA MDW PNR PTR USA
	REG3	CHN FJI GUM J(USA) MHL(USA) NZL
18 015	REGY	ATA(USA)
	REG1	ALG BHR(USA) CNR E F G GRC(USA) I(USA) MNG MRC RUS UKR
	REG2	ALS BRB(USA) CAN CG7 GRL HWA MDW PNR PTR USA
	REG3	AUS CHN GUM HKG J(USA)
18 018	REG1	ASC(USA) E G G(USA) HRV RUS SRL UKR
	REG2	CAN
	REG3	AUS HKG IRN J(USA)
18 021	REG1	AZE BEL BLR E G GEO GHA GRC KAZ KGZ LVA OMA RUS TJK TKM UKR
	REG2	B BER(USA) USA
	REG3	GUM J TUV
18 024	REG1	AZE BLR E G GEO KAZ KGZ LVA MNG MOZ POR RUS S SUI TJK TKM TUR UKR
	REG2	B BER(USA) CAN GRL USA
	REG3	AUS FJI INS J(USA)
18 027	REG1	BEL G GMB NMB QAT RUS SDN TUR
	REG2	CAN USA
	REG3	AUS KRE NPL NRU

NOTES
ON THE CONCLUDED OPERATIONAL AGREEMENTS

1 The Administrations of Canada and the United States of America informed the Radiocommmunication Bureau that they had concluded an operational agreement. The agreement constitutes a sharing arrangement between the two countries for use of all shared allotments appearing in the present version of Part III of this Appendix.

2 The Administrations of Mali, Mauritania and Senegal concluded an operational agreement whose terms of reference are given as follows:

2.1 the use of the following allotments by Mali is subject to coordination with the administrations of Mauritania and Senegal: 3 044, 3 047, 3 143, 3 149, 3 152, 3 900, 4 745, 5 702, 6 712, 6 742, 15 064, 15 067, 17 991 and 18 012 kHz;

2.2 the use of the following allotments by Mauritania is subject to coordination with the administrations of Mali and Senegal: 3 038, 5 708, 5 711, 6 715 and 17 991 kHz;

2.3 the use of the following allotments by Senegal is subject to coordination with the administrations of Mali and Mauritania: 3 044, 3 047, 3 050, 3 053, 3 056, 3 059, 3 140, 3 149, 3 903, 4 736, 4 739, 4 742, 5 702, 5 717, 5 723, 5 726, 6 712, 6 715, 6 745, 6 751, 8 983, 8 998, 9 001, 13 221, 13 224, 13 233, 13 236, 15 034, 15 037, 15 064, 17 994, 18 009 and 18 012 kHz.

3 The Administrations of Brunei Darussalam, Malaysia and Singapore concluded an operational agreement whose terms of reference are given as follows:

3.1 the use of the following allotments by Singapore is subject to coordination with the Administration of Malaysia: 3 074, 3 095, 3 101, 3 116, 4 718, 6 685, 6 694, 6 700, 6 730, 6 760, 8 968, 11 199 and 13 206 kHz;

3.2 the use of the following allotments by Malaysia is subject to coordination with the administration of Singapore: 3 080, 4 739, 6 724 and 9 019 kHz.

PART IV – Criteria for compatibility assessment

S26/6 For assessment of the possibilities of sharing between the allotments contained in Part III of this Appendix, and any new assignment which is not covered by an appropriate allotment, the following criteria shall be used:

S26/6.1 A new station, not covered by an allotment, which uses the standardized transmission characteristics (J3E, 36 dBW (PX)) shall be considered compatible with the Plan, if it fulfils the criterion of being separated from any point of any allotment area, indicated in the Plan on the

given channel, by the repetition half-distance, determined for the given conditions of operation (frequency band used, geographical position of the station, direction of propagation), which are given below:

Frequency band (kHz)	Repetition half-distancy (km)			
	Northern hemisphere		Southern hemisphere	
	North-South	East-West	North-South	East-West
3 025- 3 155	550	600	550	600
3 900- 3 950	650	650	650	650
4 700- 4 750	725	775	725	775
5 680- 5 730	1 175	1 325	1 150	1 300
6 685- 6 765	1 350	1 600	1 225	1 425
8 965- 9 040	2 525	3 525	2 225	3 075
11 175-11 275	3 375	5 575	2 675	3 925
13 200-13 260	4 550	6 650	3 475	5 625
15 010-15 100	5 050	7 450	4 800	7 100
17 970-18 030	5 750	8 250	5 675	7 475

S26/6.2 The relevant value of the repetition half-distance for paths which are situated partly in the northern hemisphere and partly in the southern hemisphere shall be corrected using the linear interpolation procedure. This procedure shall be used to calculate the correction due to the azimuth of the propagation path with respect to true North.

S26/6.3 The relevant value of the repetition half-distance, obtained in accordance with No. **S26**/6.2, shall be corrected, where necessary, to take into account the difference in the radiated power of the assignment with respect to the reference radiated power (30 dBW, mean radiated power) on the basis that a variation of 1 dB in the radiated power corresponds to a variation of 4% in the repetition distance.

PART V – Procedure for modification and maintenance of Part III

S26/7 Part III will be updated by the Bureau in accordance with the following procedure:

S26/7.1 *a)* when a country which has no allotment in Part III requests an allotment, the Bureau shall select an appropriate allotment on a priority basis and shall enter it in Part III;

S26/7.2 *b)* when a request is submitted for an additional allotment, the Bureau shall apply the criteria of Part IV, and, where appropriate, enter the corresponding allotment in Part III;

S26/7.3 *c)* when an administration informs the Bureau that it renounces the use of an allotment, the Bureau shall cancel the allotment concerned from Part III.

S26/8 The Bureau shall maintain an up-to-date master copy of Part III, and shall periodically, but no less frequently than once a year, prepare recapitulative documents listing all amendments made to Part III.

S26/9 The Secretary-General shall publish an up-to-date version of Part III in an appropriate form at least once every four years.

APPENDIX S27*

Frequency allotment Plan for the aeronautical mobile (R) service and related information

(See Article **S43**)

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PART I – General Provisions

* *Note by the Secretariat:* This edition of Appendix **S27** incorporates editorial amendments to the Appendix 27 Aer2 as adopted by the WARC-Aer2.

In conformity with the new numbering of the Radio Regulations the references in Appendix **S27** follow the new numbering scheme. In addition, the text of Appendix **S27** contains updated definitions of the relevant aeronautical areas conforming with the new geographical situation reflecting the political changes since 1979. It also contains updated references to the classes of emissions in accordance with Article **S2**.

PART II – Plan for the allotment of frequencies for the aeronautical mobile (R) service in the exclusive bands between 2 850 and 22 000 kHz

Page

PART I – General provisions

Section I – Definitions

S27/1 1 *Frequency allotment Plan:* A Plan which shows the frequencies to be used in particular areas without specifying the stations to which the frequencies are to be assigned.

S27/2 2 The terms to express the different methods of frequency distribution as used in this Appendix have the following meanings:

Frequency distribution to	French	English	Spanish
Services	Atribution (attribuer)	Allocation (to allocate)	Atribución (atribuir)
Areas	Allotissement (allotir)	Allotment (to allot)	Adjudicación (adjudicar)
Stations	Assignation (assigner)	Assignment (to assign)	Asignación (asignar)

S27/3 3 *A major world air route* is a long-distance route, made up of one or more segments, essentially international in character, extending through more than one country and requiring long-distance communication facilities.

S27/4 4 *A major world air route area (MWARA)* is an area embracing a certain number of major world air routes, which generally follow the same traffic pattern and are so related geographically that the same frequency families may logically be applied.

S27/5 5 *Regional and Domestic Air Route* are all those using the Aeronautical Mobile (R) Service not covered by the definition of a Major World Air Route in No. **S27**/3.

S27/6 6 *Regional and Domestic Air Route Area (RDARA)* is an area embracing a certain number of the air routes defined in No. **S27**/5.

S27/7 7 *A VOLMET Allotment Area* is an area encompassing all points where an HF broadcast facility might be required to operate on a family of frequencies common to the area

S27/8 8 *A VOLMET Reception Area* is an area within which aircraft should be able to receive broadcasts front one or more stations in the associated VOLMET Allotment Area.

S27/9 9 *A World-Wide Allotment Area* is one in which frequencies are allotted to provide long-distance communication between an aeronautical station within that allotment area and aircraft operating anywhere in the world[1].

S27/10 10 *Family of Frequencies in the Aeronautical Mobile (R) Service* contains two or more frequencies selected from different aeronautical mobile (R) bands and is intended to permit communication at any time within the authorized area of use (see Nos. **S27**/213 to **S27**/231)**)** between aircraft stations and appropriate aeronautical stations.

Section II – Technical and operational principles used for the establishment of the Plan of allotment of frequencies in the aeronautical mobile (R) service

A – Channel characteristics and utilization

1 Frequency separation

S27/11 1.1 The frequency separation between carrier (reference) frequencies shall be 3 kHz. This is adequate to permit communications using the classes of emission referred to in Nos. **S27**/56-**S27**/59 in the frequency bands between 2 850 kHz and 22 000 kHz allocated exclusively to the aeronautical mobile (R) service. The carrier (reference) frequency of the channels in the Plan shall be an integral multiple of 1 kHz.

S27/12 1.2 For radiotelephone emissions the audio frequencies will be limited to between 300 Hz and 2 700 Hz and the occupied bandwidth of other authorized emissions will not exceed the upper limit of J3E emissions. In specifying these limits, however, no restriction in their extension is implied in so far as emissions other than J3E are concerned, provided that the limits of unwanted emissions are met (see Nos. **S27**/73 and **S27**/74).

S27/13 NOTE – For aircraft and aeronautical station transmitter types first installed before 1 February 1983, the audio frequencies will be limited to 3 000 Hz.

S27/14 1.3 On account of the possibility of interference, a given channel should not be used in the same allotment area for radiotelephony and data transmissions.

S27/15 1.4 The use of channels derived from the frequencies indicated in No. **S27**/18 for the various classes of emissions other than J3E and H2B will be subject to special arrangements by the administrations concerned and affected in order to avoid harmful interference which may result from the simultaneous use of the same channel for several classes of emission.

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[1] **S27**/9.1 The type of communication referred to in **S27**/9 may be regulated by administrations.

S27/16 1.5 To preclude the possibility of interference, adjacent channels in the list of frequencies in No. **S27**/18 have not as a rule been allotted to the same MWARA, RDARA or VOLMET areas. However, to satisfy particular needs, the administrations concerned may conclude special arrangements for the assignment of adjacent channels derived from the frequencies in the table.

S27/17 1.6 The arrangements contemplated in Nos. **S27**/15 and **S27**/16 should be made under the Articles of the Constitution and Convention of the International Telecommunication Union and the Radio Regulations entitled "Special Arrangements"*.

2 Frequencies allotted

S27/18 The list of carrier (reference) frequencies allotted in the bands allocated exclusively to the aeronautical mobile (R) service, on the basis of the frequency separation provided for under No. **S27**/11, will be found in the following table[2].

[2] **S27**/18.1 To calculate the assigned frequency from a carrier (reference) frequency given in the table, reference should be made to Nos. **S27**/75, **S27**/77 and **S27**/78.

* *Note by the Secretariat:* The relevant article in the Radio Regulations is now Article **S6** entitled "Special Agreements".

2 850-3 025 kHz

2 851	2 938	
2 854	2 941	
2 857	2 944	
2 860	2 947	
2 863	2 950	
2 866	2 953	
2 869	2 956	
2 872	2 959	
2 875	2 962	
2 878	2 965	
2 881	2 968	
2 884	2 971	
2 887	2 974	
2 890	2 977	
2 893	2 980	57 channels
2 896	2 983	
2 899	2 986	
2 902	2 989	
2 905	2 992	
2 908	2 995	
2 911	2 998	
2 914	3 001	
2 917	3 004	
2 920	3 007	
2 923	3 010	
2 926	3 013	
2 929	3 016	
2 932	3 019	
2 935		
	3 023	(R) and (OR)

3 400-3 500 kHz

3 401	3 452	
3 404	3 455	
3 407	3 458	
3 410	3 461	
3 413	3 464	
3 416	3 467	
3 419	3 470	
3 422	3 473	33 channels
3 425	3 476	
3 428	3 479	
3 431	3 482	
3 434	3 485	
3 437	3 488	
3 440	3 491	
3 443	3 494	
3 446	3 497	
3 449		

4 650-4 700 kHz

4 651	4 675	
4 654	4 678	
4 657	4 681	16 channels
4 660	4 684	
4 663	4 687	
4 666	4 690	
4 669	4 693	
4 672	4 696	

5 450-5 480 kHz

Region2

5 451	5 466	
5 454	5 469	9 channels
5 457	5 472	
5 460	5 475	
5 463		

5 480-5 680 kHz

5 481	5 580	
5 484	5 583	
5 487	5 586	
5 490	5 589	
5 493	5 592	
5 496	5 595	
5 499	5 598	
5 502	5 601	
5 505	5 604	
5 508	5 607	
5 511	5 610	
5 514	5 613	
5 517	5 616	
5 520	5 619	
5 523	5 622	
5 526	5 625	
5 529	5 628	66 channels
5 532	5 631	
5 535	5 634	
5 538	5 637	
5 541	5 640	
5 544	5 643	
5 547	5 646	
5 550	5 649	
5 553	5 652	
5 556	5 655	
5 559	5 658	
5 562	5 661	
5 565	5 664	
5 568	5 667	
5 571	5 670	
5 574	5 673	
5 577	5 676	
	5 680	(R) and (OR)

6 525-6 685 kHz

6 526	6 607	
6 529	6 610	
6 532	6 613	
6 535	6 616	
6 538	6 619	
6 541	6 622	
6 544	6 625	
6 547	6 628	
6 550	6 631	
6 553	6 634	
6 556	6 637	
6 559	6 640	
6 562	6 643	53 channels
6 565	6 646	
6 568	6 649	
6 571	6 652	
6 574	6 655	
6 577	6 658	
6 580	6 661	
6 583	6 664	
6 586	6 667	
6 589	6 670	
6 592	6 673	
6 595	6 676	
6 598	6 679	
6 601	6 682	
6 604		

8 815 -8 965 kHz

8 816	8 891	
8 819	8 894	
8 822	8 897	
8 825	8 900	
8 828	8 903	
8 831	8 906	
8 834	8 909	
8 837	8 912	
8 840	8 915	
8 843	8 918	
8 846	8 921	
8 849	8 924	
8 852	8 927	49 channels
8 855	8 930	
8 858	8 933	
8 861	8 936	
8 864	8 939	
8 867	8 942	
8 870	8 945	
8 873	8 948	
8 876	8 951	
8 879	8 954	
8 882	8 957	
8 885	8 960	
8 888		

10 005-10 100 kHz

10 006	10 054	
10 009	10 057	
10 012	10 060	
10 015	10 063	
10 018	10 066	
10 021	10 069	
10 024	10 072	31 channels
10 027	10 075	
10 030	10 078	
10 033	10 081	
10 036	10 084	
10 039	10 087	
10 042	10 090	
10 045	10 093	
10 048	10 096	
10 051		

11 275-11 400 kHz

11 276	11 339	
11 279	11 342	
11 282	11 345	
11 285	11 348	
11 288	11 351	
11 291	11 354	
11 294	11 357	
11 297	11 360	
11 300	11 363	
11 303	11 366	41 channels
11 306	11 369	
11 309	11 372	
11 312	11 375	
11 315	11 378	
11 318	11 381	
11 321	11 384	
11 324	11 387	
11 327	11 390	
11 330	11 393	
11 333	11 396	
11 336		

13 260-13 360 kHz

13 261	13 312	
13 264	13 315	
13 267	13 318	
13 270	13 321	
13 273	13 324	
13 276	13 327	
13 279	13 330	
13 282	13 333	33 channels
13 285	13 336	
13 288	13 339	
13 291	13 342	
13 294	13 345	
13 297	13 348	
13 300	13 351	
13 303	13 354	
13 306	13 357	
13 309		

17 900-17 970 kHz

17 901	17 937	
17 904	17 940	
17 907	17 943	
17 910	17 946	
17 913	17 949	23 channels
17 916	17 952	
17 919	17 955	
17 922	17 958	
17 925	17 961	
17 928	17 964	
17 931	17 967	
17 934		

21 924-22 000 kHz

21 925	21 964	
21 928	21 967	
21 931	21 970	
21 934	21 973	
21 937	21 976	
21 940	21 979	25 channels
21 943	21 982	
21 946	21 985	
21 949	21 988	
21 952	21 991	
21 955	21 994	
21 958	21 997	
21 961		

S27/19 3 The International Civil Aviation Organization (ICAO) coordinates radiocommunications of the aeronautical mobile (R) service with international aeronautical operations and this Organization should be consulted in all appropriate cases in the operational use of the frequencies in the Plan.

4 Adaptation of allotment procedure

S27/20 It is recognized that not all the sharing possibilities have been exhausted in the allotment Plan contained in this Appendix. Therefore, in order to satisfy particular operational requirements which are not otherwise met by this allotment Plan, Administrations may assign frequencies from the aeronautical mobile (R) bands in areas other than those to which they are allotted in this Plan. However, the use of the frequencies so assigned must not reduce the protection to the same frequencies in the areas where they are allotted by the Plan below that determined by the application of the procedure defined in Part I, Section II B of this Appendix.

S27/21 5 When necessary to satisfy the needs of international air operations Administrations may adapt the allotment procedure for the assignment of aeronautical mobile (R) frequencies, which assignments shall then be the subject of prior agreement between Administrations affected.

S27/22 6 The coordination described in No. **S27**/21 shall be effected where appropriate and desirable for the efficient utilization of the frequencies in question, and especially when the procedures of No. **S27**/19 are unsatisfactory.

B – Interference range contours

S27/23 1 General provisions

S27/24 1.1 Service range

Due to factors such as the power of the transmitter, propagation loss, noise level, etc., there is a limit to the distance at which reliable communications can be effected between an aeronautical station and an aircraft station. This limiting distance, based on the weakest path, is the service range. The boundary of the air route area is often assumed to be the limiting distance.

S27/25 1.2 Interference range

This is the minimum distance from the limit of the service range of a wanted station to a potentially interfering station needed to produce a protection ratio of 15 dB. This

protection ratio is between the wanted signal at an aircraft station at the limit of the service range and the signal from a potentially interfering aeronautical station operating on the same frequency. The interference range has been calculated for different frequencies indicated on the data tables contained in Nos. **S27**/46-**S27**/55 for day and night conditions, for median latitudes, for conditions of median sunspot activity and for a mean effective radiated power of 1 kW at the aeronautical station.

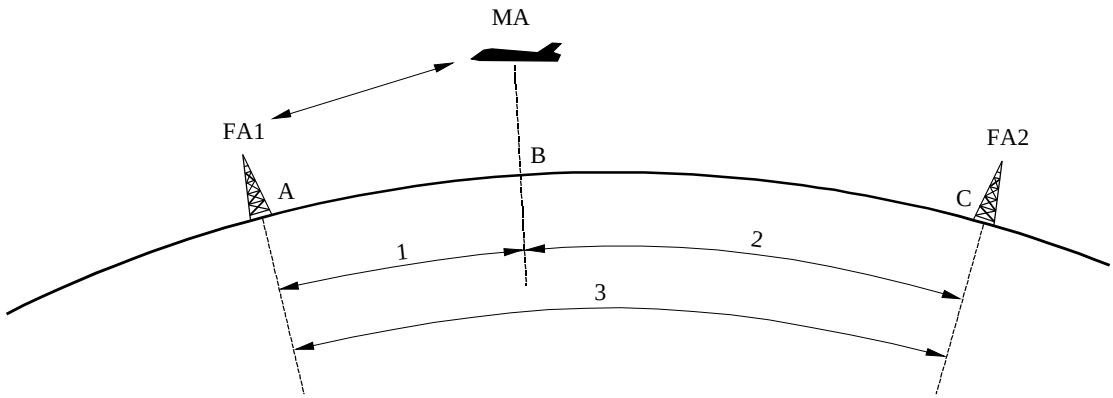
S27/26 1.3 Repetition distance

This is the distance at which a frequency may be successfully shared and is equal to the sum of the service range and the interference range.

S27/27 1.4 Figure 1 illustrates the use of the concept of interference range in frequency planning through the determination of repetition distance.

FIGURE 1

Service range, interference range, repetition distance



FA1 : aeronautical station in communication with aircraft station MA

FA2 : aeronautical station in communication with aircraft stations other than MA

MA : aircraft station in communication with aeronautical station FA1

1 : service range AB

2 : interference range CB

3 : repetition distance AC

APS27/27-01

S27/28 1.5 The transparencies associated with this Appendix show, for the frequencies stated, the interference range defined in No. **S27**/25 between an interfering aeronautical station and an aircraft station operating at the limit of its service range. Because of the variability of propagation conditions not only from hour to hour within the daytime and night time periods but also from day to day, with season, with solar activity level and geographic

location, the 15 dB protection ratio may be expected to have marked variations and accordingly a greater protection may be available much of the time, especially when the aircraft is not operating at the limit of its service range.

S27/29 1.6 Supplementary information on service range, interference range and repetition distance, as well as on the use of the transparencies can be found in the technical documentation issued by the ex-IFRB, such as texts of the ex-IFRB Seminar on frequency management and use of the frequency spectrum; Doc. No. 11/76 or revisions thereof.

S27/30 1.7 Two types of transparencies are provided for use respectively with the Mercator projection world maps and the Lambert azimuthal equal area of projection maps for the polar areas. The Mercator projection transparencies encompass the area between latitude 60° North and 60° South. The transparencies associated with the Polar area projections encompass the areas north of latitude 30° North and south of latitude 30° South. The Mercator projection overlaps the Polar projection maps between latitudes 30° and 60° North and 30° and 60° South. This overlap is intended to provide continuity between transparencies, of the two projections.

2 Type of maps used

S27/31 The transparencies mentioned in Nos. **S27**/28 and **S27**/30, can be used only on a world or polar map of the projection and scales given on each transparency and will not be suitable for use on any other projection or scale. The world and polar maps associated with this Appendix, depicting MWARA, RDARA and VOLMET areas, are to the correct scale so that the transparencies carrying the interference range contours can be directly used on these maps. The auroral zones are marked on the polar maps.

3 Change of scale of projection

S27/32 3.1 Should any other scale or projection be desired, then new interference range contours can be drawn to fit the new scales or projections by using the co-ordinates given in the tables shown below.

S27/33 3.2 When new transparencies are constructed, the intersection of the vertical line of symmetry, i.e., the meridian of longitude and the horizontal line of latitude should be at 00° latitude for the 00° contour, 20° N for the 20° contour, 40° N for 40° contour, etc.

S27/34 3.3 The co-ordinates shown in the tables under Nos. **S27**/46-**S27**/55 are given with reference to the 180° meridian taken as the axis of symmetry for the construction of the contours.

4 Sharing conditions between areas

4.1 Frequency bands 3 MHz to 11.3 MHz

S27/35 4.1.1 The transparencies are constructed on the basis of the following sharing conditions:

Areas	Bands between (MHz)	Sharing conditions
MWARA or VOLMET area to MWARA or VOLMET area	3 and 6.6 9 and 11.3	Night propagation Day propagation NOTE – 6.6 MHz and 5.6 MHz caring conditions are considered to be the same.
MWARA or VOLMET area to RDARA	3 and 5.6 6.6 and 11.3	Night propagation Day propagation
RDARA to RDARA	3 and 4.7 5.6 and 11.3	Night propagation Day propagation

S27/36 4.1.2 The additional “Day” contours included for 3 MHz, 3.5 MHz and 4.7 MHz are for determining daylight sharing possibilities.

4.2 Frequency bands between 13 and 22 MHz

S27/37 4.2.1 The revised frequency allotment Plan for the 13 MHz, 18 MHz and 22 MHz bands is based on daytime protection only. This results in the following sharing possibilities:

S27/38 4.2.2 for the 13 MHz band, the repetition factor is at least 3 whilst for the 18 and 22 MHz bands it is 4. It is to be noted that the longitudinal separation might the decreased to allow for a repetition of 4 (at 13 MHz) and 6 (at 18 and 22 MHz), taking into account operational and local circumstances;

S27/39 4.2.3 the sharing takes into account the likely locations of the aeronautical stations rather than the area boundaries.

5 Method of use of the transparencies for the bands 3 to 11.3 MHz

S27/40 5.1 Take the appropriate MWARA, RDARA or VOLMET area map associated with this Appendix and select the transparency for the frequency order and sharing conditions under consideration.

S27/41 5.2 The equal area projections (Lambert) are applicable in the polar areas north of 60° N and south of 60° S; and the Mercator projections are applicable between 60° N and 60° S.

S27/42 5.3 Place the centre of the transparency (i.e. the intersection of the axis of symmetry and the latitude line) over the boundary of the area (use the reception area boundary in the case of VOLMET) at the point on the boundary nearest to the potentially interfering transmitter or at the location of the interfering transmitter. Note the latitude of the selected point and use the interference range contour corresponding to this latitude.

S27/43 5.4 A transmitter located at any point outside the contour will result, as defined in No. **S27**/25, in a protection ratio of better than 15 dB.

S27/44 5.5 A transmitter located at any point inside the contour will result in a protection ratio of less than 15 dB. However, if the transmitter is located inside the contour but the propagation path traverses an auroral zone, it is assumed that the signal attenuation within this zone will result in a protection ratio of better than 15 dB.

S27/45 5.6 For the Northern Hemisphere the Mercator projection transparencies should be used in their natural position as published, but for the Southern Hemisphere the transparencies should be inverted. This point should be carefully observed when following the boundaries of areas which involve the transition of the equator.

6 Data for tracing interference contours

S27/46 3.0 and 3.5 MHz day

Data for plotting 700 km interference contours

Latitude	**00°**		**10°**		**20°**		**30°**		**40°**	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	6.3	180.0	16.3	180.0	26.3	180.0	36.3	180.0	46.3
	178.9	6.2	178.9	16.2	178.8	26.2	178.6	36.2	178.4	46.2
	177.8	5.9	177.8	15.9	177.6	25.9	177.3	35.9	176.9	45.9
	176.8	5.5	176.7	15.4	176.5	25.4	176.1	35.4	175.5	45.4
	175.9	4.8	175.8	14.8	175.5	24.8	175.1	34.7	174.3	44.7
	175.2	4.0	175.0	14.0	174.7	24.0	174.2	33.9	173.3	43.9
	174.5	3.1	174.4	13.1	174.1	23.0	173.5	33.0	172.5	42.9
	174.1	2.2	173.9	12.1	173.6	22.0	173.0	32.0	172.0	41.9
	173.8	1.1	173.7	11.0	173.4	21.0	172.8	30.9	171.8	40.8
	173.7	0.0	173.6	9.9	173.3	19.9	172.7	29.8	171.8	39.7
	173.8	–1.1	173.7	8.8	173.4	18.8	172.9	28.7	172.0	38.6
	174.1	–2.2	174.0	7.8	173.8	17.7	173.3	27.7	172.5	37.6
	174.5	–3.1	174.5	6.8	174.3	16.8	173.9	26.7	173.2	36.6
	175.2	–4.0	175.2	5.9	175.0	15.9	174.6	25.8	174.1	35.8
	175.9	–4.8	175.9	5.2	175.8	25.1	175.5	25.1	175.1	35.1
	176.8	–5.5	176.8	4.5	176.8	14.5	176.5	24.5	176.2	34.5
	177.8	–5.9	177.8	4.1	177.8	14.1	177.6	24.1	177.4	34.0
	178.9	–6.2	178.9	3.8	178.9	13.8	178.8	23.8	178.7	33.8
	180.0	–6.3	180.0	3.7	180.0	13.7	180.0	23.7	180.0	33.7

Latitude	**50°**		**60°**		**70°**		**80°**		**90°**	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	56.3	180.0	66.3	180.0	76.3	180.0	86.3	All longitudes	83.7
	178.0	56.2	177.3	66.2	175.4	76.2	163.9	86.1		83.7
	176.2	55.9	174.7	65.8	171.2	75.8	152.2	85.4		83.7
	174.5	55.3	172.5	65.3	167.7	75.1	145.2	84.5		83.7
	173.0	54.6	170.6	64.5	164.9	74.3	141.9	83.4		83.7
	171.8	53.8	169.1	63.6	162.9	73.4	140.8	82.4		83.7
	171.0	52.8	168.1	62.7	161.8	72.3	141.3	81.3		83.7
	170.4	51.8	167.5	61.6	161.3	71.2	142.8	80.2		83.7
	170.2	50.7	167.3	60.5	161.5	70.1	144.9	79.2		83.7
	170.3	49.6	167.5	59.4	162.1	69.1	147.6	78.2		83.7
	170.6	48.5	168.1	58.3	163.2	68.0	150.5	77.3		83.7
	171.2	47.5	169.0	57.4	164.6	67.1	153.8	76.5		83.7
	172.1	46.6	170.1	56.4	166.4	66.2	157.3	75.8		83.7
	173.1	45.7	171.4	55.6	168.3	65.5	160.8	75.2		83.7
	174.3	45.0	172.9	55.0	170.4	64.9	164.6	74.6		83.7
	175.6	44.5	174.6	54.4	172.7	64.4	168.4	74.2		83.7
	177.0	44.0	176.3	54.0	175.1	64.0	172.2	739		83.7
	178.5	43.8	178.2	53.8	177.5	63.8	176.1	73.8		83.7
	180.0	43.7	180.0	53.7	180.0	63.7	180.0	73.7		83.7

S27/47 3.0 MHz night

Data for plotting 3 500 km interference contours

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	31.5	180.0	41.5	180.0	51.5	180.0	61.5	180.0	71.5
	173.9	31.0	173.1	40.9	171.7	50.8	169.3	60.7	164.3	70.4
	168.2	29.4	166.7	39.2	164.2	48.9	160.1	58.4	152.1	67.5
	163.0	26.9	161.1	36.4	158.0	45.8	153.0	54.9	144.2	63.5
	158.5	23.6	156.4	32.8	153.2	41.9	148.0	50.6	139.7	58.7
	154.9	19.6	152.9	28.6	149.8	37.4	144.9	45.8	137.5	53.6
	152.0	15.1	150.3	23.9	147.6	32.5	143.3	40.7	137.0	48.4
	150.1	10.3	148.7	18.9	146.4	27.4	142.9	35.5	137.6	43.2
	148.9	5.2	148.0	13.7	146.3	22.1	143.4	30.3	139.1	38.1
	148.5	0.0	148.1	8.5	146.9	17.0	144.7	25.2	141.3	33.2
	148.9	–5.2	149.0	3.4	148.3	11.9	146.7	20.9	144.1	28.6
	150.1	–10.3	150.6	–1.6	150.3	7.1	149.3	15.8	147.4	24.3
	152.0	–15.1	152.9	–6.3	153.1	2.6	152.5	11.5	151.1	20.4
	154.9	–19.6	156.0	–10.5	156.4	–1.4	156.2	7.8	155.3	16.9
	158.5	–23.6	159.7	–14.2	160.3	–4.8	160.3	4.6	159.8	14.0
	163.0	–26.9	164.1	–17.3	164.7	–7.7	164.8	2.0	164.5	11.6
	168.2	–29.4	169.1	–19.6	169.6	–9.8	169.7	0.1	169.5	9.9
	173.9	–31.0	174.4	–21.0	174.7	–11.1	174.8	–1.1	174.7	8.9
	180.0	–31.5	180.0	–21.5	180.0	–11.5	180.0	–1.5	180.0	8.5

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	81.5	0	88.5	0	78.5	0	68.5	All longitudes	58.5
	149.5	79.7	78.0	84.7	25.3	77.7	14.2	68.3		58.5
	133.9	75.6	90.4	79.7	46.5	75.7	28.0	67.7		58.5
	127.6	70.7	97.5	74.7	62.9	72.9	41.3	66.7		58.5
	125.7	65.6	103.3	69.8	75.9	69.7	53.8	65.4		58.5
	126.0	60.3	108.7	65.0	86.6	66.4	65.5	63.9		58.5
	127.6	55.2	113.9	60.3	95.8	62.9	76.4	62.3		58.5
	129.9	50.2	118.9	55.9	104.1	59.6	86.7	60.5		58.5
	132.9	45.4	124.1	51.6	111.9	56.3	96.5	58.8		58.5
	136.4	40.8	129.2	47.6	119.2	53.2	105.8	57.1		58.5
	140.2	36.5	134.5	43.9	126.2	50.4	114.8	55.5		58.5
	144.4	32.6	139.8	40.5	133.1	47.7	123.4	54.0		58.5
	148.8	29.0	145.3	37.4	139.9	45.4	131.9	52.6		58.5
	153.6	25.9	150.8	34.8	146.6	43.3	140.1	51.4		58.5
	158.5	23.3	156.5	32.6	153.3	41.6	148.2	50.4		58.5
	163.7	21.2	162.3	30.8	160.0	40.3	156.2	49.6		58.5
	169.1	19.7	168.1	29.5	166.6	39.3	164.2	49.0		58.5
	174.5	18.8	174.1	28.8	173.3	38.7	172.1	48.6		58.5
	180.0	18.5	180.0	28.5	180.0	38.5	180.0	48.5		58.5

S27/48 3.5 MHz night

Data for plotting 4 000 km interference contours

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	36.0	180.0	46.0	180.0	56.0	180.0	66.0	180.0	76.0
	172.8	35.4	171.7	45.3	169.7	55.1	166.1	64.9	157.6	74.5
	166.0	33.5	164.0	43.2	160.6	52.7	154.7	62.0	142.8	70.6
	160.0	30.6	157.5	39.9	153.4	49.0	146.6	57.7	134.9	70.6
	155.0	26.8	152.3	35.7	148.1	44.4	141.5	52.6	131.2	59.9
	150.9	22.2	148.4	30.8	144.5	39.2	138.7	47.0	129.9	54.0
	147.8	17.1	145.7	25.5	142.3	33.6	137.4	41.2	130.2	48.2
	145.7	11.6	144.1	19.8	141.4	27.7	137.4	35.4	131.6	42.4
	144.4	5.9	143.4	13.9	141.4	21.9	138.3	29.5	133.8	36.7
	144.0	0.0	143.6	8.1	142.3	16.1	140.0	23.9	136.5	31.3
	144.4	–5.9	144.6	2.3	143.9	10.4	142.4	18.4	139.8	26.2
	145.7	–11.6	146.4	–3.3	146.3	5.0	145.4	13.3	143.6	21.5
	147.8	–17.1	149.0	–8.6	149.4	0.0	149.0	8.6	147.8	17.2
	150.9	–22.2	152.4	–13.4	153.1	–4.5	153.2	4.4	152.4	13.3
	155.0	–26.8	156.6	–17.6	157.5	–8.4	157.8	0.8	157.4	10.1
	160.0	–30.6	161.6	–21.2	162.5	–11.6	162.9	–2.1	162.8	7.5
	166.0	–33.5	167.3	–23.8	168.0	–14.0	168.4	–4.2	168.3	5.6
	172.8	–35.4	173.5	–25.4	173.9	–15.5	174.1	–5.6	174.1	4.4
	180.0	–36.0	180.0	–26.0	180.0	–16.0	180.0	–6.0	180.0	4.0

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	86.0	0	84.0	0	74.0	0	64.0	All longitudes	54.0
	126.9	82.7	46.5	81.9	20.9	73.4	13.4	63.8		54.0
	115.7	77.1	69.8	77.6	39.7	71.6	26.5	63.2		54.0
	113.9	71.3	83.0	72.8	55.5	69.1	39.2	62.3		54.0
	114.9	65.4	92.2	67.8	68.8	66.1	51.3	61.0		54.0
	117.1	59.6	99.7	62.8	80.1	62.8	62.8	59.6		54.0
	120.1	54.0	106.4	57.9	90.1	59.4	73.7	58.0		54.0
	123.5	48.5	112.6	53.2	99.0	56.0	84.1	56.3		54.0
	127.4	43.3	118.6	48.7	107.3	52.7	93.9	54.5		54.0
	131.5	38.3	124.5	44.5	115.2	49.5	103.4	52.8		54.0
	135.9	33.7	130.4	40.5	122.8	46.5	112.6	51.2		54.0
	140.7	29.4	136.3	36.9	130.1	43.7	121.5	49.6		54.0
	145.7	25.5	142.3	33.6	137.4	41.3	130.2	48.2		54.0
	150.9	22.1	148.4	30.8	144.5	39.1	138.7	47.0		54.0
	156.4	19.3	154.6	28.4	151.6	37.3	147.1	45.9		54.0
	162.1	17.0	160.8	26.5	158.7	35.9	155.4	45.1		54.0
	168.0	15.3	167.2	25.1	165.8	34.8	163.6	44.5		54.0
	174.0	14.3	173.6	24.3	172.9	34.2	171.8	44.1		54.0
	180.0	14.0	180.0	24.0	180.0	34.0	180.0	44.0		54.0

S27/49 4.7 MHz day

Data for plotting 1 200 km interference contours

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	10.8	180.0	20.8	180.0	30.8	180.0	40.8	180.0	50.8
	178.1	10.6	178.0	20.6	177.8	30.6	177.5	40.6	177.1	50.6
	176.3	10.1	176.1	20.1	175.8	30.1	175.2	40.1	174.3	50.0
	174.6	9.3	174.3	19.3	173.8	29.2	173.1	39.2	171.8	49.1
	173.0	8.3	172.7	18.2	172.2	28.1	171.2	38.0	169.7	47.8
	171.7	6.9	171.4	16.8	170.3	26.7	169.7	36.5	168.0	46.4
	170.6	5.4	170.3	15.2	169.7	25.1	168.6	34.9	166.8	44.7
	169.8	3.7	169.6	13.5	168.9	23.3	167.9	33.1	166.1	42.9
	169.4	1.9	169.1	11.7	168.6	21.5	167.5	31.3	165.8	41.0
	169.2	0.0	169.0	9.8	168.5	19.6	167.6	29.4	166.0	39.2
	169.4	–1.9	169.3	8.0	168.8	17.8	168.0	27.6	166.6	37.3
	169.8	–3.7	169.8	6.2	169.4	16.0	168.7	25.8	167.5	35.6
	170.6	–5.4	170.6	4.5	170.4	14.4	169.8	24.2	168.7	34.0
	171.7	–6.9	171.7	3.0	171.5	12.9	171.0	22.8	170.2	32.6
	173.0	–8.3	173.1	1.7	172.9	11.6	172.6	21.5	171.9	31.4
	174.6	–9.3	174.6	0.6	174.5	10.6	174.3	20.5	173.8	30.5
	176.3	–10.1	176.3	–0.2	176.3	9.8	176.1	19.8	175.8	29.8
	178.1	–10.6	178.1	–0.6	178.1	9.4	178.0	19.3	177.9	29.3
	180.0	–10.8	180.0	–0.8	180.0	9.2	180.0	19.2	180.0	29.2

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	60.8	180.0	70.8	180.0	80.8	0	89.2		79.2
	176.2	60.6	174.4	70.6	168.7	80.5	71.1	88.0		79.2
	172.6	60.0	169.3	69.8	159.4	79.5	87.5	86.3		79.2
	169.5	59.0	165.0	68.7	152.9	78.1	96.6	84.6		79.2
	167.0	57.6	161.8	67.3	149.1	76.4	103.6	82.9		79.2
	165.1	56.1	159.6	65.6	147.2	74.6	109.9	81.2	All	79.2
	163.8	54.4	158.4	63.8	146.8	72.8	115.8	79.6	longitudes	79.2
	163.2	52.5	158.0	62.0	147.4	70.9	121.4	78.1		79.2
	163.1	50.7	158.3	60.1	148.9	69.1	126.9	76.7		79.2
	163.5	48.8	159.1	58.3	150.8	67.4	132.3	75.3		79.2
	164.3	47.0	160.4	56.6	153.3	65.8	137.7	74.1		79.2
	165.5	45.3	162.1	54.9	156.0	64.3	143.0	73.0		79.2
	167.0	43.8	164.2	53.5	159.1	63.0	148.3	72.0		79.2
	168.3	42.5	166.4	52.2	162.3	61.9	153.6	71.2		79.2
	170.3	41.3	168.9	51.2	165.7	60.9	158.9	70.5		79.2
	172.9	40.4	171.6	50.3	169.1	60.2	164.2	69.9		79.2
	175.8	39.7	174.3	49.7	172.7	59.6	169.4	69.5		79.2
	177.6	39.3	177.1	49.3	176.3	59.3	174.7	69.3		79.2
	180.0	39.2	180.0	49.2	180.0	59.2	180.0	69.2		79.2

S27/50 4.7 MHz night and 10.0 MHz day

Data for plotting 5 500 km interference contours

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	49.5	180.0	59.5	180.0	69.5	180.0	79.5	178.7	89.5
	168.5	48.5	165.5	58.2	159.6	67.8	144.9	76.7	97.0	82.4
	158.2	45.6	153.2	54.7	144.6	63.3	128.3	70.7	98.4	74.8
	149.7	41.2	144.1	49.6	135.4	57.2	121.5	63.5	101.0	67.2
	143.0	35.6	137.8	43.3	130.1	50.3	119.0	56.0	104.1	59.7
	138.1	29.3	133.6	36.5	127.3	43. 0	118.6	48.4	107.5	52.4
	134.6	22.3	131.1	29.2	126.1	35.4	119.5	40.8	111.0	45.1
	132.3	15.1	129.8	21.6	126.1	27.8	121.2	33.4	114.8	38.1
	130.9	7.6	129.5	14.1	127.0	20.3	123.5	26.0	118.9	31.2
	130.5	0.0	130.1	6.5	128.7	12.8	126.5	18.9	123.2	24.7
	130.9	–7.6	131.5	–1.0	131.2	5.6	130.0	12.1	127.9	18.4
	132.3	–15.1	133.8	–8.2	134.4	–1.3	134.1	5.7	132.9	12.6
	134.6	–22.3	137.0	–15.2	138.3	–7.8	138.8	–0.3	138.4	7.3
	138.1	–29.3	141.2	–21.6	143.2	–13.7	144.2	–5.7	144.3	2.5
	143.0	–35.6	146.6	–27.4	148.9	–19.0	150.2	–10.4	150.7	–1.6
	149.7	–41.2	153.2	–32.4	155.5	–23.4	156.9	–14.2	157.6	–5.0
	158.2	–45.6	161.2	–36.2	163.1	–26.7	164.2	–17.1	164.8	–7.5
	168.5	–48.5	170.3	–38.7	171.3	–28.8	172.0	–18.9	172.3	–9.0
	180.0	–49.5	180.0	–39.5	180.0	–29.5	180.0	–19.5	180.0	–9.5

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	0	80.5	0	70.5	0	60.5	0	50.5		40.5
	40.2	78.2	22.2	69.5	15.3	60.0	11.9	50.3		40.5
	63.5	73.1	41.5	66.9	30.1	58.7	23.8	49.8		40.5
	77.1	67.0	57.1	63.1	43.8	56.7	35.4	48.9		40.5
	86.6	60.7	69.8	58.6	56.4	54.0	46.7	47.8		40.5
	94.2	54.3	80.4	53.8	67.8	51.0	57.7	46.4	All	40.5
	100.8	47.9	89.6	48.8	78.4	47.8	68.3	44.9	longitudes	40.5
	107.0	41.7	97.9	43.8	88.2	44.4	78.7	43.2		40.5
	112.9	35.6	105.7	38.9	97.5	41.0	88.7	41.5		40.5
	118.8	29.8	113.1	34.2	106.3	37.6	98.4	39.8		40.5
	124.7	24.4	120.4	29.8	114.8	34.4	108.0	38.1		40.5
	130.8	19.3	127.6	25.6	123.1	31.4	117.3	36.5		40.5
	137.1	14.7	134.8	21.9	131.3	28.7	126.5	35.0		40.5
	143.7	10.6	142.1	18.5	139.5	26.3	135.6	33.7		40.5
	150.5	7.1	149.5	15.7	147.6	24.3	144.5	32.6		40.5
	157.6	4.3	157.0	13.5	155.7	22.6	153.5	31.7		40.5
	164.9	2.2	164.6	11.8	163.8	21.5	162.3	31.0		40.5
	172.4	0.9	172.3	10.8	171.9	20.7	171.2	30.6		40.5
	180.0	0.5	180.0	10.5	180.0	20.5	180.0	30.5		40.5

S27/51 5.6 MHz day

Data for plotting 1 500 km interference contours

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	13.5	180.0	23.5	180.0	33.5	180.0	43.5	180.0	53.5
	177.6	13.3	177.5	23.3	177.2	33.3	176.8	43.3	176.1	53.2
	175.3	12.7	175.0	22.6	174.6	32.6	173.8	42.5	172.5	52.5
	173.2	11.7	172.8	21.6	172.1	31.5	171.0	41.4	169.3	51.3
	171.2	10.3	170.8	20.2	170.0	30.0	168.7	39.9	166.6	49.6
	169.6	8.6	169.1	18.5	168.3	28.3	166.9	38.0	164.6	47.7
	168.3	6.7	167.8	16.5	167.0	26.2	165.5	36.0	163.2	45.6
	167.3	4.6	166.9	14.3	166.1	24.1	164.7	33.7	162.4	43.3
	166.7	2.3	166.4	12.1	165.7	21.8	164.4	31.4	162.3	41.0
	166.5	0.0	166.3	9.7	165.7	19.4	164.5	29.1	162.6	38.7
	166.7	–2.3	166.6	7.4	166.1	17.1	165.1	26.8	163.4	36.4
	167.3	–4.6	167.3	5.2	166.9	14.9	166.0	24.6	164.6	34.3
	168.3	–6.7	168.3	3.1	168.0	12.9	167.3	22.6	166.1	32.4
	169.6	–8.6	169.7	1.2	169.5	11.0	169.0	20.9	168.0	30.7
	171.2	–10.3	171.4	–0.4	171.2	9.5	170.8	19.3	170.1	29.2
	173.2	–11.7	173.3	–1.7	173.2	8.2	172.9	18.1	172.4	28.0
	175.3	–12.7	175.4	–2.7	175.4	7.3	175.2	17.2	174.8	27.2
	177.6	–13.3	177.7	–3.3	177.7	6.7	177.6	16.7	177.4	26.7
	180.0	–13.5	180.0	–3.5	180.0	6.5	180.0	16.5	180.0	26.5

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	63.5	180.0	73.5	180.0	83.5	0	86.5	All longitudes	76.5
	174.8	63.2	172.0	73.1	160.8	82.9	35.2	86.0		76.5
	170.1	62.4	164.9	72.1	147.7	81.4	59.4	84.7		76.5
	166.1	61.0	159.4	70.6	140.7	79.4	75.5	83.1		76.5
	162.9	59.3	155.6	68.7	137.6	77.1	87.2	81.4		76.5
	160.7	57.3	153.3	66.5	137.0	74.8	96.7	79.6		76.5
	159.3	55.1	152.3	64.2	137.8	72.5	104.9	77.9		76.5
	158.7	52.8	152.3	61.9	139.6	70.2	112.4	76.3		76.5
	158.8	50.4	153.0	59.6	142.0	68.1	119.3	74.7		76.5
	159.5	48.1	154.4	57.4	144.9	66.0	125.9	73.3		76.5
	160.7	46.0	156.2	55.3	148.2	64.1	132.2	71.9		76.5
	162.3	43.9	158.4	53.3	151.7	62.4	138.4	70.7		76.5
	164.2	42.1	161.0	51.6	155.4	60.9	144.5	69.6		76.5
	166.4	40.4	163.8	50.1	159.3	59.6	150.5	68.7		76.5
	168.9	39.0	166.8	48.8	163.3	58.5	156.5	67.9		76.5
	171.5	37.9	170.0	47.8	167.4	57.6	162.4	67.3		76.5
	174.3	37.1	173.3	47.1	171.6	57.0	168.3	66.9		76.5
	177.1	36.7	176.6	46.6	175.8	56.6	174.1	66.6		76.5
	180.0	36.5	180.0	46.5	180.0	56.5	180.0	66.5		76.5

S27/52 5.6 and 6.6 MHz night

Data for plotting 6 500 km interference contours

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	58.5	180.0	68.5	180.0	78.5	180.0	88.5	0	81.5
	164.2	57.1	158.1	66.6	144.0	75.4	102.4	81.3	46.7	78.3
	150.8	53.2	142.2	61.6	126.6	68.7	100.1	72.8	68.5	71.7
	140.8	47.6	132.2	54.9	119.2	60.8	101.1	64.3	80.1	64.4
	133.6	40.8	126.2	47.2	116.0	52.4	102.9	55.8	88.0	56.7
	128.7	33.2	122.7	39.1	114.9	43.9	105.3	47.4	94.2	49.1
	125.3	25.2	120.8	30.7	115.1	35.4	108.0	39.1	99.7	41.5
	123.1	17.0	120.1	22.2	116.0	26.9	110.9	30.9	104.9	34.0
	121.9	8.5	120.2	13.7	117.7	18.5	114.3	22.9	110.0	26.7
	121.5	0.0	121.1	5.2	119.9	10.3	118.0	15.1	115.1	19.6
	121.9	–8.5	122.8	–3.2	122.8	2.3	122.1	7.6	120.5	12.9
	123.1	–17.0	125.2	–11.3	126.4	–5.5	126.8	0.5	126.3	6.5
	125.3	–25.2	128.6	–19.2	130.8	–12.8	132.0	–6.2	132.4	0.5
	128.7	–33.2	133.0	–26.7	136.1	–19.7	138.0	–12.3	139.0	–4.8
	133.6	–40.8	138.9	–33.5	142.5	–25.8	144.9	–17.7	146.2	–9.5
	140.8	–47.6	146.4	–39.5	150.2	–31.0	152.6	–22.2	154.0	–13.3
	150.8	–53.2	156.0	–44.3	159.1	–35.0	161.1	–25.6	162.3	–16.1
	164.2	–57.1	167.4	–47.4	169.2	–37.6	170.4	–27.8	171.0	–17.9
	180.0	–58.5	180.0	–48.5	180.0	–38.5	180.0	–28.5	180.0	–18.5

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	0	71.5	0	61.5	0	51.5	0	41.5		31.5
	25.7	70.1	17.6	60.7	13.6	51.1	11.4	41.3		31.5
	46.4	66.2	34.0	58.6	26.9	49.9	22.7	40.8		31.5
	61.7	61.0	43.4	55.3	39.6	48.0	33.8	40.0		31.5
	73.3	55.1	61.0	51.2	51.6	45.6	44.8	38.9		31.5
	82.7	48.8	71.9	46.6	62.8	42.7	55.5	37.6	All	31.5
	90.7	42.4	81.7	41.7	73.8	39.6	66.0	36.1	longitudes	31.5
	98.0	36.0	90.6	36.7	83.2	36.2	76.2	34.4		31.5
	104.8	29.7	99.0	31.8	92.7	32.8	86.2	32.7		31.5
	111.6	23.6	107.0	26.9	101.8	29.4	96.1	31.0		31.5
	115.1	17.8	114.9	22.2	110.7	26.1	105.7	29.3		31.5
	124.9	12.3	122.7	17.9	119.5	23.0	115.3	27.6		31.5
	131.8	7.3	130.5	13.8	128.1	20.2	124.7	26.1		31.5
	139.2	2.7	138.4	10.3	136.7	17.7	134.0	24.9		31.5
	146.8	–1.1	146.5	7.2	145.3	15.5	143.3	23.6		31.5
	154.7	–4.3	154.7	4.8	154.0	13.8	152.5	22.7		31.5
	162.9	–6.6	163.0	3.0	162.6	12.5	161.7	22.1		31.5
	171.4	–8.0	171.5	1.9	171.3	11.8	170.8	21.6		31.5
	180.0	–8.5	180.0	1.5	180.0	11.5	180.0	21.5		31.5

S27/53 6.6 MHz day

Data for plotting 1 900 km interference contours

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	17.1	180.0	27.1	180.0	37.1	180.0	47.1	180.0	57.1
	176.9	16.8	176.7	26.8	176.3	36.8	175.7	46.8	174.7	56.7
	174.0	16.0	173.6	26.0	172.9	35.9	171.7	45.8	169.7	55.7
	171.3	14.8	170.7	24.6	169.7	34.5	168.1	44.3	165.5	54.0
	168.8	13.0	168.2	22.8	167.0	32.6	165.2	42.3	162.2	51.9
	166.7	10.9	166.1	20.6	164.9	30.3	162.9	39.9	159.8	49.4
	165.1	8.5	164.5	18.1	163.3	27.7	161.3	37.2	158.2	46.6
	163.9	5.8	163.3	15.4	162.3	24.9	160.4	34.4	157.5	43.7
	163.1	2.9	162.7	12.5	161.8	22.0	160.2	31.5	157.5	40.8
	162.9	0.0	162.7	9.6	161.9	19.1	160.4	28.5	158.1	37.9
	163.1	–2.9	163.1	6.6	162.4	16.2	161.3	25.7	159.3	35.1
	163.9	–5.8	163.9	3.8	163.5	13.4	162.5	23.0	160.9	32.5
	165.1	–8.5	165.2	1.2	165.0	10.9	164.2	20.5	162.9	30.1
	166.7	–10.9	167.0	–1.2	166.8	8.6	166.3	18.3	165.2	28.0
	168.8	–13.0	169.1	–3.2	169.0	6.6	168.6	16.4	167.8	26.2
	171.3	–14.8	171.5	–4.9	171.5	5.0	171.2	14.9	170.7	24.8
	174.0	–16.0	174.2	–6.1	174.2	3.9	174.1	13.8	173.7	23.7
	176.9	–16.8	177.1	–6.8	177.1	3.1	177.0	13.1	176.8	23.1
	180.0	–17.1	180.0	–7.1	180.0	2.9	180.0	12.9	180.0	22.9

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	67.1	180.0	77.1	180.0	87.1	0	82.9		72.9
	172.6	66.7	167.3	76.5	137.0	85.7	23.2	82.5		72.9
	166.0	65.5	157.1	75.0	123.8	83.1	43.5	81.6		72.9
	160.7	63.6	150.3	72.8	120.8	80.1	60.0	80.2		72.9
	156.8	61.3	146.2	70.1	121.4	77.2	73.5	78.6		72.9
	154.4	58.6	144.4	67.3	123.5	74.3	84.9	76.9	All	72.9
	153.1	55.8	144.0	64.3	126.5	71.5	94.8	75.2	longitudes	72.9
	152.8	52.8	144.7	61.4	130.1	68.8	103.6	73.5		72.9
	153.3	49.9	146.3	58.6	133.9	66.3	111.8	71.8		72.9
	154.4	47.1	148.4	55.9	138.0	63.9	119.4	70.3		72.9
	156.1	44.4	151.0	53.3	142.3	61.7	126.8	68.8		72.9
	158.2	41.9	153.9	51.0	146.7	59.7	133.8	67.5		72.9
	160.7	39.6	157.2	49.0	151.3	58.0	140.7	66.3		72.9
	163.5	37.6	160.7	47.2	155.9	56.5	147.4	65.3		72.9
	166.5	36.0	164.3	45.7	160.7	55.2	154.0	64.4		72.9
	169.7	34.6	168.1	44.5	165.4	54.2	160.6	63.8		72.9
	173.1	33.7	172.0	43.6	170.3	53.5	167.1	63.3		72.9
	176.5	33.1	176.0	43.1	175.1	53.0	173.5	63.0		72.9
	180.0	32.9	180.0	42.9	180.0	52.9	180.0	62.9		72.9

S27/54 9.0 MHz day

Data for plotting 3 800 km interference contours

Latitude	**00°**		**10°**		**20°**		**30°**		**40°**	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	34.2	180.0	44.2	180.0	54.2	180.0	64.2	180.0	74.2
	173.3	33.6	172.3	43.5	170.6	53.4	167.5	63.2	160.6	72.9
	166.9	31.9	165.1	41.6	162.1	51.2	157.0	60.6	146.8	69.4
	161.2	29.1	158.9	38.5	155.3	47.8	149.3	56.6	138.8	64.8
	156.4	25.5	154.0	34.6	150.2	43.4	144.2	51.9	134.6	59.5
	152.5	21.2	150.2	30.0	146.6	38.5	141.2	46.6	133.0	53.9
	149.5	16.3	147.6	24.9	144.4	33.2	139.8	41.1	132.9	48.3
	147.4	11.1	145.9	19.4	143.4	27.6	139.6	35.5	134.0	42.8
	146.2	5.6	145.2	13.9	143.3	22.0	140.3	29.9	135.9	37.3
	145.8	0.0	145.4	8.3	144.1	16.4	141.9	24.4	138.4	32.1
	146.2	–5.6	146.3	2.7	145.7	11.0	144.1	19.2	141.5	27.2
	147.4	–11.1	148.1	–2.6	147.9	5.9	147.0	14.3	145.1	22.6
	149.5	–16.3	150.6	–7.7	150.9	1.1	150.4	9.8	149.1	18.4
	152.5	–21.2	153.9	–12.3	154.5	–3.2	154.4	5.8	153.6	14.8
	156.4	–25.5	157.9	–16.3	158.7	–7.0	158.8	2.3	158.4	11.6
	161.2	–29.1	162.6	–19.6	163.4	–10.1	163.7	–0.5	163.5	9.1
	166.9	–31.9	168.0	–22.1	168.7	–12.3	168.9	–2.5	168.8	7.3
	173.3	–33.6	173.9	–23.7	174.2	–13.7	174.4	–3.8	174.4	6.2
	180.0	–34.2	180.0	–24.2	180.0	–14.2	180.0	–4.2	180.0	5.8

Latitude	**50°**		**60°**		**70°**		**80°**		**90°**	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	84.2	0	85.8	0	75.8	0	65.8	All longitudes	55.8
	137.8	81.6	56.0	83.2	22.4	75.1	13.7	65.6		55.8
	123.5	76.7	77.1	78.6	42.0	73.3	27.0	65.0		55.8
	119.5	71.2	88.4	73.7	58.2	70.7	39.9	64.0		55.8
	119.2	65.6	96.4	68.7	71.4	67.6	52.2	62.8		55.8
	120.6	60.0	103.2	63.8	82.5	64.3	63.8	61.3		55.8
	123.0	54.5	109.3	59.0	92.2	60.8	74.7	59.7		55.8
	126.0	49.2	115.1	54.3	101.0	57.5	85.1	58.0		55.8
	129.5	44.1	120.7	49.9	109.1	54.2	94.9	56.2		55.8
	133.4	39.3	126.3	45.7	116.7	51.0	104.3	54.5		55.8
	137.6	34.8	132.0	41.9	124.1	48.1	113.4	52.9		55.8
	142.1	30.7	137.7	38.3	131.3	45.4	122.2	51.4		55.8
	146.9	26.9	143.5	35.2	138.3	42.9	130.8	50.0		55.8
	152.0	23.7	149.3	32.4	145.3	40.8	139.2	48.7		55.8
	157.2	20.9	155.3	30.1	152.3	39.0	147.5	47.7		55.8
	162.7	18.7	161.4	28.2	159.2	37.6	155.7	46.9		55.8
	168.4	17.1	167.6	26.9	166.1	36.6	163.8	46.3		55.8
	174.2	16.1	173.3	26.1	173.1	36.0	171.9	45.9		55.8
	180.0	15.8	180.0	25.8	180.0	35.8	180.0	45.8		55.8

S27/55 11.3 MHz day

Data for plotting 6 000 km interference contours

Latitude	00°		10°		20°		30°		40°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	180.0	54.0	180.0	64.0	180.0	74.0	180.0	84.0	0	86.0
	166.6	52.8	162.3	62.5	153.3	71.8	128.2	79.7	66.2	81.2
	154.8	49.5	148.2	58.3	136.6	66.3	115.0	72.2	82.1	73.8
	145.5	44.5	138.5	52.4	127.7	59.3	111.4	64.2	90.0	66.1
	138.5	38.3	132.2	45.4	123.2	51.6	111.0	58.2	95.7	58.5
	133.5	31.3	128.2	37.9	121.1	43.6	111.9	48.1	100.6	50.9
	130.0	23.9	126.0	30.0	120.6	35.5	113.6	40.1	105.2	43.4
	127.7	16.1	124.9	22.0	121.1	27.5	116.0	32.2	109.7	36.1
	126.4	8.1	124.8	13.9	122.3	19.5	118.8	24.6	114.3	29.0
	126.0	0.0	125.6	5.9	124.3	11.6	122.2	17.1	119.1	22.2
	126.4	–8.1	127.1	–2.1	127.0	4.0	126.0	9.9	124.2	15.7
	127.7	–16.1	129.5	–9.8	130.4	–3.4	130.4	3.1	129.6	9.5
	130.0	–23.9	132.8	–17.2	134.6	–10.3	135.4	–3.2	135.4	3.9
	133.5	–31.3	137.2	–24.2	139.7	–16.7	141.1	–9.0	141.7	–1.2
	138.5	–38.3	142.9	–30.5	145.8	–22.4	147.6	–14.1	148.5	–5.6
	145.5	–44.5	150.0	–36.0	152.9	–27.2	154.8	–18.2	155.6	–9.1
	154.8	–49.5	158.7	–40.3	161.2	–30.9	162.7	–21.4	163.6	–11.8
	166.6	–52.8	163.9	–43.0	170.3	–33.2	171.2	–23.3	171.7	–13.4
	180.0	–54.0	180.0	–44.0	180.0	–34.0	180.0	–24.0	180.0	–14.0

Latitude	50°		60°		70°		80°		90°	
	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.	Long.	Lat.
Coordinates for plotting contours	0	76.0	0	66.0	0	56.0	0	46.0	All longitudes	36.0
	31.1	74.2	19.5	65.1	14.4	55.6	11.6	45.8		36.0
	53.5	69.9	37.2	62.8	28.3	54.3	23.2	45.3		36.0
	68.6	64.2	52.3	59.2	41.5	52.4	34.5	44.5		36.0
	79.4	58.1	65.0	55.0	53.7	49.8	45.7	43.4		36.0
	88.1	51.7	75.8	50.3	65.1	46.9	56.5	42.0		36.0
	95.5	45.3	85.4	45.3	75.7	43.7	67.1	40.5		36.0
	102.3	38.9	94.1	40.3	85.6	40.3	77.4	38.3		36.0
	108.7	32.7	102.2	35.4	95.0	36.9	87.4	37.1		36.0
	115.0	26.3	110.0	30.6	104.0	33.5	97.2	35.4		36.0
	121.4	21.1	117.5	26.0	112.7	30.3	106.8	33.7		36.0
	127.8	15.8	125.1	21.8	121.2	27.2	116.2	32.1		36.0
	134.5	11.0	132.6	17.9	129.7	24.5	125.5	30.6		36.0
	141.4	6.7	140.2	14.4	138.1	22.0	134.7	29.2		36.0
	148.6	3.0	148.0	11.5	146.4	19.9	143.9	28.1		36.0
	156.1	–0.0	155.8	9.1	154.8	18.2	152.9	27.2		36.0
	163.9	–2.2	163.8	7.4	163.2	17.0	162.0	26.5		36.0
	171.0	–3.5	171.9	6.4	171.6	16.3	171.0	26.1		36.0
	180.0	–4.0	180.0	6.0	180.0	16.0	180.0	26.0		36.0

C – Classes of emission and power

1 Classes of emission

S27/56 In the aeronautical mobile (R) service the use of emissions such as those listed below is permissible subject to compliance with the special provisions applicable to each case and provided that such use does not cause harmful interference to other users of the channel concerned.

S27/57 **1.1 Telephony – amplitude modulation:**

– double sideband A3E*

– single sideband, full carrier H3E*

– single sideband, suppressed carrier J3E

1.2 Telegraphy (including automatic data transmission)

S27/58 **1.2.1 Amplitude modulation**

– telegraphy without the use of a modulating audio frequency (by on-off keying) A1A, A1B**

– telegraphy by the on-off keying of an amplitude modulating audio frequency or audio frequencies or by the on-off keying of the modulated emission and including selective calling, single sideband, full carrier H2B

– multichannel voice frequency telegraphy, single sideband, suppressed carrier J7B

– other transmissions such as automatic data transmission, single sideband, suppressed carrier JXX

S27/59 **1.2.2 Frequency modulation:**

– telegraphy by frequency shift keying without the use of a modulating audio frequency, one of two frequencies being emitted at any instant F1B**

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* A3E and H3E to be used only on 3 023 kHz and 5 680 kHz.

** A1A, A1B and F1B are permitted provided they do not cause harmful interference to the classes of emission H2B, J3E, J7B and JXX. In addition, AlA, A1B and FlB emissions shall be in accordance with the provisions in Nos. **S27**/70 to **S27**/74 and care should be taken to place these emissions at or near the centre of the channel. However, a modulating audio frequency is permitted with single sideband transmitters, where the carrier is suppressed in accordance with No. **S27**/69**.**

2 Power

S27/60 2.1 Unless otherwise specified in Part II of this Appendix, the peak envelope powers supplied to the antenna transmission line shall not exceed the maximum values indicated in the table below; the corresponding peak effective radiated powers being assumed to be equal to two-thirds of these values:

Class of emission	Stations	Maximum peak envelope power
H2B, J3E, J7B, JXX A3E*, H3E* (100% modulation)	Aeronautical stations Aircraft stations	6 kW 400 W
Other emissions such as A1A, A1B, F1B	Aeronautical stations Aircraft stations	1.5 kW 100 W

* A3E and H3E to be used only on 3 023 kHz and 5 680 kHz.

S27/61 2.2 It is assumed that the maximum peak envelope powers specified above for aeronautical stations will produce the mean effective radiated power of 1 kW used as a basis for the interference range contours.

S27/62 2.3 In order to provide satisfactory communication with aircraft, aeronautical stations serving MWARA, VOLMET and world-wide allotment areas may exceed the power limits specified in No. **S27**/60, except in the case of 3 023 kHz and 5 680 kHz which are subject to the special provisions of Nos. **S27**/232 to **S27**/238. In each such case, the administration having jurisdiction over the aeronautical station shall note No. **S15.2** and ensure:

S27/63 *a)* that when there is any possibility of harmful interference co-ordination is effected with the administrations concerned;

S27/64 *b)* that harmful interference is not caused to stations using frequencies in accordance with the applicable provisions of the allotment Plan;

S27/65 *c)* that in other MWARAs, RDARAs or VOLMET areas allotted the same frequencies, the specified protection ratios within the boundaries of those areas shall be maintained;

S27/66 *d)* that the directional characteristics of the antenna are such as to minimize radiation in unnecessary directions, particularly towards other MWARAs, RDARAs or VOLMET areas which have been allotted the same frequencies;

S27/67 *e)* that, in accordance with the Radio Regulations, all details of the assignment(s), including the transmitting antenna characteristics shall be notified to the Radiocommunication Bureau.

S27/68 2.4 It is recognized that the power employed by aircraft transmitters may, in practice, exceed the limits specified in No. **S27**/60. However, the use of such increased power (which normally should not exceed 600 W PX) shall not cause harmful interference to stations using frequencies in accordance with the technical principles on which the allotment Plan is based.

D – Limits to the power levels of unwanted emissions

1 Technical provisions relating to the use of single-sideband emissions

S27/69 **1.1 Definitions carrier modes:**

Carrier mode	Level *N* (dB) of the carrier with respect to peak envelope power
Full carrier (for example H2B)	$0 \geq N \geq -6$
Suppressed carrier (for example J3E)	Aircraft stations $N < -26$ Aeronautical stations $N < -40$

2 Tolerance for levels of emission outside the necessary bandwidth

S27/70 2.1 In a single-sideband transmission, the mean power of any emission supplied to the antenna transmission line of an aeronautical or aircraft station on any discrete frequency, shall be less than the mean power (PY) of the transmitter in accordance with the table in No. **S27**/71.

S27/71 2.2 For aircraft station transmitter types first installed before 1 February 1983:

Frequency separation Δ from the assigned frequency (kHz)	Minimum attenuation below mean power (PY) (dB)
$2 \leq \Delta < 6$	25
$6 \leq \Delta < 10$	35
$10 \leq \Delta$	Aircraft stations: 40 Aeronautical stations: $43 + 10\ 1\log_{10}$ (PY) (W)

S27/72 NOTE – All transmitters first placed in operation after 1 February 1983 shall comply with the specifications contained in No. **S27**/74.

S27/73 2.3 In a single-sideband transmission, the peak envelope power (PX) of any emission supplied to the antenna transmission line of an aeronautical or aircraft station on any discrete frequency, shall be less than the peak envelope power (PX) of the transmitter in accordance with the table in No. **S27**/74.

S27/74 2.4 For aircraft station transmitters first installed after 1 February 1983 and for aeronautical station transmitters in use after 1 February 1983:

Frequency separation Δ from the assigned frequency (kHz)	**Minimum attenuation below peak envelope power (PX) (dB)**
$1.5 \leq \Delta < 4.5$	30
$4.5 \leq \Delta < 7.5$	38
$7.5 \leq \Delta$	Aircraft stations: 43 Aeronautical stations: *

* For transmitter power up to and including 50 W: $43 + 10 \log_{10}$ (PX) (W). For transmitter powers more than 50 W, the attenuation shall be at least 60 dB.

E – Other technical provisions

1 Assigned frequencies

S27/75 1.1 For single-sideband emissions, except the class of emission H2B, the assigned frequency shall be at a value 1 400 Hz above the carrier (reference) frequency.

S27/76 1.2 For aeronautical stations equipped with selective calling systems, the class of emission H2B shall be indicated in the Supplementary Information column of the form of notice (see Appendix **S4**).

S27/77 1.3 For classes of emission A1A, A1B and F1B the assigned frequency shall be chosen in accordance with the provisions of the footnote to Nos. **S27**/58 and **S27**/59.

S27/78 1.4 The assigned frequency of a station employing double sideband emissions (A3E) shall be at the carrier (reference) frequency.

PART II – Plan for the allotment of frequencies for the aeronautical mobile (R) service in the exclusive bands between 2 850 and 22 000 kHz

Section I – Description of the boundaries of the areas and sub-areas

S27/79 1 The boundary descriptions which follow delineate the areas to which frequencies are allotted under the frequency allotment Plan.

S27/80 2 These areas are shown graphically on the maps associated with this Appendix. If there is any difference between the areas as shown on the maps and as described, the written description is to be considered correct.

S27/81 3 References to the name of a country or of a geographical area in the descriptions or on the maps and the borders shown on the maps do not imply the expression of any opinion whatsoever on the part of the ITU concerning the political status of such a country or geographical area or any official recognition of these borders.

S27/82 4 In the description of the Major World Air Route Areas (MWARAs) all lines between points not otherwise specified are defined as great circles.

S27/83 In the description of the Regional and Domestic Air Route Areas (RDARAs) and Sub-Areas all lines between points not otherwise specified are defined as straight lines on a Mercator Projection map.

S27/84 In the description of the VOLMET areas all lines between points are defined as great circles.

ARTICLE 1

Description of the boundaries of the major world air route areas (MWARAs)

S27/85 *Major World Air Route Area – CARIBBEAN* (MWARA-CAR)

From the point 20° N 120° W through the points 35° N 120° W, 35° N 85° W, 43° N 74° W, 40° N 60° W, 00° 48° W, 00° 80° W, to the point 20° N 120° W.

S27/86 *Mayor World Air Route Area – CENTRAL EAST PACIFIC* (MWARA-CEP)

From the point 50° N 122° W through the points 38° N 120° W, 15° N 110° W, 20° S 145° W, 20° S 152° W, 30° N 165° W, to the point 50° N 122° W.

S27/87 *Major World Air Route Area – CENTRAL WEST PACIFIC* (MWARA-CWP)

From the point 40° N 117° E through the points 25° N 155° W, 17° N 155° W, 00° 165° W, 00° 170° E, 12° S 165° E, 12° S 136° E, 09° N 115° E, 23° N 114° E, to the point 40° N 117° E.

S27/88 *Major World Air Route Area – EUROPE* (MWARA-EUR)

From the point 33° N 12° W through the points 54° N 12° W, 70° N 00°, 74° N 40° E, 74° N 52° E, 60° N 52° E, 40° N 36° E, 29° N 35° 30' E, 32° N 13° E, to the point 33° N 12° W.

S27/89 *Major World Air Route Area – INDIAN OCEAN* (MWARA-INO)

From the South Pole through the points 30° S 26° E, 20° N 35° E, 30° N 60° E, 30° N 90° E, 30° S 120° E, 40° S 160° E to the South Pole.

S27/90 *Mayor World Air Route Area – MIDDLE EAST* (MWARA-MID)

From the point 51° N 30° E through the points 57° N 37° E, 50° N 80° E, 44° N 94° E, 08° N 76° E, 11° 45' N 42° E, 16° N 42° E, 30° N 30° E, to the point 51° N 30° E.

S27/91 *Major World Air Route Area – NORTH ATLANTIC* (MWARA-NAT)

From the North Pole through the points 60° N 135° W, 49° N 120° W, 49° N 74° W, 39° N 78° W, 18° N 66° W, 05° N 55° W, 16° N 26° W, 32° N 08° W, 44° N 02° E, 60° N 20° E, to the North Pole.

S27/92 *Major World Air Route Area – NORTH CENTRAL ASIA* (MWARA-NCA)

From the North Pole through the points 75° N 10° E, 60° N 25° E, 30° N 25° E, 30° N 73° E, 37° N 73° E, 49° N 85° E, 42° N 97° E, 42° N 110° E, 45° N 113° E, 46° 30' N 120° E, 49° N 116° E, 54° N 123° E, 45° N 133° E, 40° N 124° E, 30° N 124° E, 25° N 135° E, 65° N 170° W, to the North Pole.

S27/93 *Major World Air Route Area – NORTH PACIFIC* (MWARA-NP)

From the North Pole through the points 60° N 135° W, 47° N 118° W, 30° N 165° W, 30° N 115° E, 41° N 116° E, 55° N 135° E to the North Pole.

S27/94 *Major World Air Route Area – AFRICA* (MWARA-AFI)

From the point 40° N 35° W, through the points 37° N 03° W, 37° N 44° E, the border between Iraq and the Islamic Republic of Iran, the points 29° N 48° E, 26° N 56° E, 20° N 62° E, 22° S 60° E, 35° S 30° E, 35° S 16° E, 05° N 03° W, 05° N 35° W, to the point 40° N 35° W.

S27/95 *Major World Air Route Area – SOUTH ATLANTIC* (MWARA-SAT)

From the South Pole through the points 30° S 75° W, 19° S 53° W, 00° 60° W, 20° N 60° W, 25° N 25° W, 41° N 15° W, 41° N 03° W, 15° N 03° W, 20° S 32° E to the South Pole.

S27/96 *Major World Air Route Area – SOUTH AMERICA* (MWARA-SAM)

From the South Pole through the points 15° N 125° W, 15° N 60° W, 10° N 60° W, 05° S 30° W, 36° S 52° W, to the South Pole.

S27/97 *Major World Air Route Area – SOUTH EAST ASIA* (MWARA-SEA)

From the point 26° N 130° E, through the points 00° 130° E, 00° 135° E, 12° S 145° E, 12° S 160° E, 25° S 155° E, 40° S 150° E, 35° S 115° E, 18° N 62° E, 26° N 65° E, to the point 26° N 130° E.

S27/98 *Mayor World Air Route Area – SOUTH PACIFIC* (MWARA-SP)

From the South Pole through the points 38° S 145° E, 00° 167° E, 00° 175° W, 22° N 158° W, 22° N 156° W, 00° 120° W to the South Pole.

S27/99 *Major World Air Route Area – EAST ASIA* (MWARA-EA)

From the point 55° N 124° E through the points 37° N 145° E, 26° N 130° E, 00° 130° E, 00° 80° E, 18° N 62° E, 37° N 67° E, 55° N 80° E to the point 55° N 124° E.

ARTICLE 2

Description of the boundaries of the regional and domestic air route areas (RDARAs)

S27/100 *Regional and Domestic Air Route Area – 1* (RDARA-1)

From the North Pole along the 15° W meridian to the point 72° N 15° W, then through the points 40° N 50° W, 30° N 39° W, 30° N 10° W, 31° N 10° W, to the point 31° N 10° E. Then along the Libya-Tunisia border to the Mediterranean, thence along the coast of Libya and Egypt to Alexandria. Thence to Cairo, eastward along the Cairo parallel to intersect the 40° E meridian, and north along the 40° E meridian to the intersection with the border between Syria and Iraq and along this border up to the Turkish border. Then along the border between Turkey and the following countries: Iraq, Islamic Republic of Iran, Armenia and Georgia, up to the Black Sea Coast. Thence along the Black Sea Coast of Turkey to intersect the 30° E meridian, then along the 30° E meridian to the border of Romania and Ukraine. Thence along the borders between Romania and Ukraine, Romania and Moldova, Romania and Ukraine. Thence along the border of Ukraine, and the following countries: Hungary, Slovakia and Poland. Thence along the border of Poland and the following countries: Belarus, Lithuania and the Russian Federation. Thence northeastward along the Baltic Sea coast, to the border between Finland and the Russian Federation, and between Norway and the Russian Federation, to the point 70° N 32° E, and along the 32° E meridian to the North Pole.

S27/101 *Sub-Area 1A*

From the point 65° N 26° W, and through the points 40° N 50° W, 40° N 20° W, 60° N 20° W, 60° N 26° W, to the point 65° N 26° W.

S27/102 *Sub-Area 1B*

From the North Pole along the 15° W meridian to the point 72° N 15° W, then through the points 65° N 26° W, 60° N 26° W, 60° N 20° W to the points 50° N 20° W and 50° N 10° W, thence east along the territorial waters between the Channel Islands and the French coastline, reaching the latter at the meridian 03° W. Thence following the French coastline northeastward and the frontier of France with Belgium, Luxembourg and Germany. Thence along the border between Germany and the following countries: Switzerland, Austria, Czech Rep. and Poland towards the Baltic Sea. Then west along the coastline of Germany to the border between the latter and Denmark. Along this border to the North Sea. Thence along the 55° N parallel to the point 55° N 04° E, then through the points 56° N 03° E, 59° N 02° E, 62° N 01° E. Thence along the 01° E meridian to the North Pole.

S27/103 *Sub-Area 1C*

From the North Pole along the meridian 01° E to the point 62° N 01° E. Thence through the points 59° N 02° E, 56° N 03° E, 55° N 04° E and then east along the 55° N parallel and the border between Denmark and Germany to the Baltic Sea and along the Baltic Sea coast of

Germany to the border between Germany and Poland. Along this border and continuing along the western borders of the Czech Rep. and Austria to the borders between Austria and Switzerland, Austria and Liechtenstein and Austria and Switzerland. Thence eastward along the southern borders of Austria and Hungary, thence along the border between Hungary and Romania. Thence, along the border between Ukraine and the following countries: Hungary, Slovakia and Poland. Thence along the border of Poland and the following countries: Belarus, Lithuania and the Russian Federation to the Baltic Sea. Thence northeastward along the Baltic Sea coast, along the borders between Finland and the Russian Federation and between Norway and the Russian Federation to the point 70° N 32° E, then along the 32° E meridian to the North Pole.

S27/104 *Sub-Area 1D*

From the junction of the borders of Ukraine, Hungary and Romania, westward along the southern borders of Hungary and Austria to the border between Switzerland and Italy, and the border between France and Italy to the Mediterranean Sea. Thence to 43° N 10° E to 41° N 10° E to 41° N 07° E, thence along the 07° E meridian to the North African coast. Then along the North African coast including Tunis, Tripoli, Benghazi, to the coastal border between Libya and Egypt. Thence along the coast to Alexandria, then to Cairo, and along the Cairo parallel to the 40° E meridian. North along the 40° E meridian to the intersection with the border between Syria and Iraq and along this border up to the Turkish border. Then along the border between Turkey and the following countries: Iraq, Islamic Republic of Iran, Armenia and Georgia, up to the Black Sea Coast. Thence along the Black Sea Coast of Turkey to intersect the 30° E meridian. Along the 30° E meridian to the border of Romania and Ukraine, thence along the borders between Romania and Ukraine, Romania and Moldova, Romania and Ukraine to the junction of the borders of Ukraine, Hungary and Romania.

S27/105 *Sub-Area 1E*

From the point 50° N 20° W, through the points 40° N 20° W, 40° N 50° W, 30° N 39° W, 30° N 10° W, 31° N 10° W, to the point 31° N 10° E. Then along the border between Libya and Tunisia to the Mediterranean, thence along the Tunisian coast to intersect the 10° E meridian. Thence along this meridian to the point 43° N 10° E; thence to the borders between Italy and France and between Italy and Switzerland, Austria and Switzerland, Austria and Liechtenstein, Austria and Switzerland, Switzerland and Germany, and between France and Germany, France and Luxembourg, and France and Belgium to the Channel coast. Thence west through the territorial waters between the Channel Islands and the French coast to the points 50° N 10° W and 50° N 20° W.

S27/106 *Regional and Domestic Air Route Area – 2* (RDARA-2)

From the North Pole along the 32° E meridian to the 70° N parallel. Then along the border between Norway and the Russian Federation and Finland and the Russian Federation to the Baltic coast. Thence southwestward along the Baltic coast to the border between the Russian

Federation and Poland. Thence along the border between Poland and the following countries: the Russian Federation, Lithuania, Belarus and Ukraine. Thence along the border between Ukraine and the following countries: Poland, Slovakia, Hungary and Romania, to the junction of the borders of Ukraine, Romania and Moldova. Thence along the borders of Romania and Moldova, Romania and Ukraine, to the Black Sea coast at the intersection of the 30° E meridian. Then along the 30° E meridian to the Black Sea coast of Turkey. Along the Black Sea coast of Turkey to the junction of the borders of Turkey and Georgia. Thence along borders between Turkey and the following countries: Georgia, Armenia and Azerbaijan, to the junction of the borders between the Islamic Republic of Iran and Azerbaijan. Then along the northern border of the Islamic Republic of Iran to Caspian Sea. Then along the Iran Caspian Sea coast to the border of Turkmenistan. Thence eastward along the southern borders of Turkmenistan, Uzbekistan, Tajikistan and Kyrgyzstan, and the eastern border of Kazakhstan, to the junction of the borders of Kazakhstan, the Russian Federation and China. Then along the border between the Russian Federation and China to the intersection of the Mongolia-China-Russian Federation borders at approximately 49° N 88° E. Then along the 88° E meridian to 55° N. Then along the 55° N parallel to 60° E, and along the 60° E meridian to the North Pole.

S27/107 *Sub-Area 2A*

From the North Pole along the 32° E meridian to 70° N. Then along the border between Norway and the Russian Federation, and Finland and the Russian Federation to the Baltic coast, and southwestward along the Baltic coast to the point 55° N 20° E, and thence to Moscow. Then to 55° N 60° E, and along the 60° E meridian to the North Pole.

S27/108 *Sub-Area 2B*

From the point 55° N 88° E and through the point 55° N 60° E to the point 47° N 53° E. Thence along the east coast of the Caspian Sea to the Iranian coast. Then along the Islamic Republic of Iran Caspian Sea coast to the border of Turkmenistan. Thence eastward along the southern borders of Turkmenistan, Uzbekistan, Tajikistan and Kyrgyzstan, and the eastern border of Kazakhstan, to the junction of the borders of Kazakhstan, the Russian Federation and China. Then along the border between the Russian Federation and China to the intersection of the Mongolia-China-Russian Federation borders at approximately 49° N 88° E; thence along the 88° E meridian to 55° N 88° E.

S27/109 *Sub-Area 2C*

From the point 55° N 60° E, to Moscow, to 55° N 20° E. Thence south along the borders between Poland and the following countries: Russian Federation, Lithuania, Belarus and Ukraine. Thence along the border between Ukraine and the following countries: Poland, Slovakia, Hungary and Romania, to junction of the borders of Ukraine, Romania and Moldova. Thence along the borders of Romania and Moldova, Romania and Ukraine to the Black Sea coast at the meridian 30° E. Along the meridian 30° E to the Black Sea coast of Turkey. Along

this coastline to the junction of the border between Turkey and Georgia. Thence along the borders between Turkey and the following countries: Georgia, Armenia and Azerbaijan, to the junction of the borders between the Islamic Republic of Iran and Azerbaijan. Then along the northern borders of the Islamic Republic of Iran to the Caspian Sea, then along the south coast of the Caspian Sea and thence north along the East Caspian Sea coast and through the point 47° N 53° E to 55° N 60° E.

S27/110 *Regional and Domestic Air Route Area – 3* (RDARA-3)

From the North Pole to the point 55° N 60° E, thence along the 55° N parallel to 88° E. Then along the 88° E meridian to the intersection of the Mongolia-China-Russian Federation borders at approximately 49° N 88° E. Then along the borders between Mongolia and China, and the Russian Federation and China, to the coast. Between the territorial waters of the Russian Federation and Japan to the point 43° N 147° E and through the point 50° N 164° E to 65° N 170° W. Then along the 170° W meridian to the North Pole.

S27/111 *Sub-Area 3A*

From the North Pole along the 60° E meridian to 55° N. Then along the 55° N parallel to 88° E. Then through the point 60° N 88° E to 60° N 110° E, and along the 110° E meridian to the North Pole.

S27/112 *Sub-Area 3B*

From the North Pole along the 110° E meridian to 60° N 110° E, and through the points 60° N 147° E, 43° N 147° E, 50° N 164° E, to 65° N 170° W. Then along the 170° W meridian to the North Pole.

S27/113 *Sub-Area 3C*

From the point 60° N 88° E to the intersection of Mongolia-China-the Russian Federation borders at approximately 49° N 88° E. Along the borders between Mongolia and China, and the Russian Federation and China, to the coast. Between the territorial waters of the Russian Federation and Japan to the point 43° N 147° E. Then through the point 60° N 147° E to the point 60° N 88° E.

S27/114 *Regional arid Domestic Air Route Area – 4* (RDARA-4)

From the point 30° N 39° W, and through the points 10° N 20° W, 05° S 20° W, to the point 05° S 12° E. Thence along the border between Congo and Angola, then along the northern border of the Dem. Rep. of the Congo, and the borders of the Congo, of the Central African Republic and the Sudan. Thence north along the western border of the Sudan. Along the western border of Egypt, northwards to the Mediterranean and along the Mediterranean and Atlantic coasts of North Africa to the point 30° N 10° W. West along the 30° N parallel to close the area at 30° N 39° W.

S27/115 *Sub-Area 4A*

From the point 30° N 39° W to 21° N 31° W. Thence to Gao and to Zinder. From Zinder, along the northern border of Nigeria, to the junction of the borders of Nigeria, Chad and Cameroon. Then along the border between Chad and Cameroon to a point west of N'Djamena. Then along the parallel to 12° N 22° E. Thence north along the western border of the Sudan, and along the western border of Egypt to the Mediterranean. Along the North African Mediterranean coast and Atlantic coast to a point 30° N 10° W. Thence along the 30° N parallel to close the sub-area at 30° N 39° W.

S27/116 *Sub-Area 4B*

From the point 21° N 31° W, through the points 10° N 20° W, 05° S 20° W to 05° S 12° E. Thence along the southern border of Congo and the Central African Republic to the junction between the Dem. Rep. of the Congo, the Sudan and the Central African Republic. Along the western border of the Sudan to the point 12° N 22° E. Thence along the N'Djamena parallel to the Nigerian border. Then westward along this border to the point 13° 12' N 10° 45' E, through Zinder and Gao, to the point 21° N 31° W.

S27/117 *Regional and Domestic Air Route Area – 5* (RDARA-5)

From the point 41° N 40° E to the point 37° N 40° E. Then along the border between Turkey and Syria to the Mediterranean coast. Thence to the common border of Libya and Egypt on the North African coast excluding Cyprus. Southward along the western border of Egypt, and the Sudan to the border of Kenya. Thence east along the northern border of Kenya, then south along the border between Kenya and Somalia and to the East African coast at 02° S 41° E. Then through the point 02° S 73° E to 37° N 73° E. Then east along the border between Afghanistan and Pakistan, and west along the northern borders of Afghanistan and the Islamic Republic of Iran to the Caspian Sea. Then along the northern border of the Islamic Republic of Iran and Turkey to close the area at 41° N 40° E.

S27/118 *Sub-Area 5A*

From the point 37° N 40° E, along the border between Turkey and Syria to the Mediterranean coast. Thence to the Libyan-Egyptian border on the North African coast, excluding Cyprus. Southward, along the western border of Egypt and east along the common border of Egypt and the Sudan to 24° N 37° E. Then through the points 11° 45' N 42° E, 11° 45' N 55° E, 20° N 52° E, to the point 26° N 52° E. Thence along the border between Islamic Republic of Iran and Iraq, and the border between Iraq and Turkey, to the point 37° N 40° E.

S27/119 *Sub-Area 5B*

From the point 41° N 40° E to 37° N 40° E. Thence east along the borders between Turkey and Syria, and Turkey and Iraq, and along the border between Iraq and the Islamic Republic of Iran to the point 30° N 49° E. Thence along the middle of the Gulf through the points 26° N 52° E and 24° N 60° E, to Mumbai. Then to 37° N 73° E. Then east along the border between Afghanistan and Pakistan, then west along the northern borders of Afghanistan and the Islamic Republic of Iran, to the Caspian Sea. Then along the northern border of the Islamic Republic of Iran and Turkey to close the sub-area at 41° N 40° E.

S27/120 *Sub-Area 5C*

From the point 26° N 52° E, and through the points 13° N 52° E, 13° N 54° E, 02° S 54° E, 02° S 73° E, to Mumbai. Then to 24° N 60° E. Then along the middle of the Gulf to 26° N 52° E.

S27/121 *Sub-Area 5D*

From the junction of Egypt, Libya and the Sudan southward along the western border of Sudan to the border of Kenya. Thence along the northern border of Kenya. Then south along the border between Kenya and Somalia to the east African coast, at the point 02° S 42° E. Then through the points 02° S 54° E, 13° N 54° E, 13° N 52° E to the point 12° N 44° E. Thence northwest along the middle of the Red Sea to 24° N 37° E. Thence along the southern border of Egypt to close the sub-area.

S27/122 *Regional and Domestic Air Route Area – 6* (RDARA-6)

From approximately 49° N 88° E, eastward along the border between China and the following countries: the Russian Federation, Kazakhstan, Kyrgyzstan, Tajikistan and Afghanistan. Then along the border between Afghanistan and Pakistan, and the Islamic Republic of Iran and Pakistan to the point 23° N 61° E. Thence to Mumbai. Then along the 73° E meridian to the point 02° S 73° E, and through the points 02° S 92° E, 10° S 92° E, 10° S 141° E, 00° 141° E, 00° 160° E, 03° 30' N 160° E, 03° 30' N 170° W, 10° N 170° W, 50° N 164° E, to the point 43° N 147° E. Thence west between the territorial waters of Japan and the Russian Federation and along the north-eastern and northern border of China to approximately 49° N 88° E.

S27/123 *Sub-Area 6A*

From the point 37° N 75° E, along the border between Pakistan and Afghanistan, and the Islamic Republic of Iran and Pakistan to the point 23° N 61° E. Thence to Mumbai. From Mumbai to 24° N 80° E. Thence to Calcutta. Thence along the coast of Bangladesh and Myanmar to reach the border between Myanmar and Thailand. North along this border and that between Myanmar

and Lao People's Democratic Republic. Thence along the border between China and Myanmar. Thence westward along the southern border of China to the point 37° N 75° E.

S27/124 *Sub-Area 6B*

From the point 39° 49' 41" N 124° 10' 06" E, through the points 39° 31' 51" N 124° 06' 31" E, 39° N 124° E to the point 32° 30' N 124° E. Between the point 32° 30' N 124° E and the point 25° N 123° E, the limit of this Sub-Area is undefined. From the point 25° N 123° E, through the points 21° N 121° 30' E, 20° N 120° E, 20° N 176° W, 50° N 164° E, 43° N 147° E, thence west between the territorial waters of Japan and the Russian Federation and along the border between the Dem. People's Rep. of Korea and the Russian Federation, and then the border between China and the Dem. People's Rep. of Korea, to the point 39° 49' 41" N 124° 10' 06" E.

S27/125 *Sub-Area 6C*

From the point 20° N 130° E through the point 04° N 130° E to 04° N 118° E. Thence along the southern borders of Sabah and Sarawak to the coast and then southward along the west coast of Borneo to the 110° E meridian. Thence along 110° E meridian to the point 10° S 110° E. Thence through the points 10° S 141° E, 00° 141° E, 00° 160° E, 03° 30' N 160° E, 03° 30' N 170° W, 10° N 170° W, 20° N 176° W to 20° N 130° E.

S27/126 *Sub-Area 6D*

From the junction of the borders of China, India and Myanmar, south along the India-Myanmar and Bangladesh-Myanmar borders to the Bay of Bengal. Along the coast of Myanmar to its southernmost point, then to Weh Island (off the north coast of Sumatra). Then to the point 02° S 92° E, and through the point 10° S 92° E to 10° S 110° E. Then eastward to 10° S 141° E extending northward to 00° 141° E and then to 04° N 130° E through the point 20° N 130° E to 20° N 113° E. Thence, south around the Island of Hainan, and along the border between China, Viet Nam, the Lao People's Democratic Republic and Myanmar, to close the Sub-Area at the junction of the borders of China, India and Myanmar.

S27/127 *Sub-Area 6E*

From the point 20° N 73° E, and through the points 02° S 73° E, 02° S 92° E, through Weh Island (off the north coast of Sumatra) to 10° N 97° E. Thence along the coasts of Myanmar, Bangladesh and India to Calcutta. Then through the points 24° N 80° E to 20° N 73° E.

S27/128 *Sub-Area 6F*

From the point 25° N 123° E, 21° N 121° 30' E, 20° N 120° E, 20° N 113° E, thence south around the Island of Hainan and along China-Viet Nam, China-Lao People's Democratic

Republic and China-Myanmar borders to the junction of the borders of China, India and Myanmar, south along the India-Myanmar and Bangladesh-Myanmar borders to the Bay of Bengal. Along the coast of Myanmar to its southernmost point then to Weh Island (off the north coast of Sumatra). Then to the point 02° S 92° E and through the point 10° S 92° E to 10° S 110° E. Then northward along 110° E meridian, thence along the boundary of Sub-Area 6C to the points 20° N 130° E, 43° N 147° E, thence westward between the territorial waters of Japan and the Russian Federation and along the border between the Dem. People's Rep. of Korea and the Russian Federation, then the border between China and the Dem. People's Rep. of Korea, to the points 39° 49' 41" N 124° 10' 06" E, 39° 31' 51" N 124° 06' 31" E, 39° N 124° E, then to the point 32° 30' N 124° E.

Between the points 32° 30' N 124° E and 25° N 123° E, the limit of this Sub-Area is undefined.

S27/129 *Sub-Area 6G*

From the point 32° 30' N 124° E northward to 39° N 124° E, 39° 31' 51" N 124° 06' 31" E then to 39° 49' 41" N 124° 10' 06" E on the border between China and the Dem. People's Rep. of Korea. Then along the border of China to the junction of the border with India and Myanmar. Thence southward along the India-Myanmar and Bangladesh-Myanmar borders to the Bay of Bengal. Along the coast of Myanmar to its southernmost point. Then to Weh Island (off the north coast of Sumatra). Then to the point 02° S 92° E and through the point 10° S 92° E to 10° S 110° E. Then eastward to 10° S 141° E extending northward to 00° 141° E and then to 04° N 130° E through the point 20° N 130° E to 20° N 120° 40' E. Thence northward to the points 21° N 121° 30' E and 25° N 123° E.

Between the points 25° N 123° E and the point 32° 30' N 124° E, the limit of this Sub-Area is undefined.

In the area where Sub-Areas 6D, 6F and 6G are common, the frequencies allotted to Sub-Area 6G shall be used only by the aeronautical stations of China; the frequencies allotted to Sub-Areas 6D and 6F will be used only by the aeronautical stations of the other administrations in the common area. Also in this common area, the operational use by China of the frequencies allotted to Sub-Area 6G shall be within the area defined by a line starting at 21° 32' 52" N 108° E, passing through the points 20° N 108° E, 20° N 107° E, 18° N 107° E, 18° N 108° E, 15° N 110° E, 10° N 110° E, 06° N 108° E, 03° 30' N 112° E, 04° N 113° E, 08° N 116° E, 10° N 118° E, 14° N 119° E, 18° N 119° E to 20° N 120° 40' E and thence along the limit of Sub-Area 6D to 21° 32' 52" N 108° E.

S27/130 *Regional and Domestic Air Route Area – 7* (RDARA-7)

From the South Pole along the 20° W meridian to 05° S. Then along the 05° S parallel to 12° E. Thence along the border between Congo and Angola, then along the northern border of the Dem. Rep. of the Congo, along the border between Uganda and Sudan, and the borders between Kenya and Sudan, Ethiopia and Somalia, to the point 02° S 42° E. Then to 02° S 60° E and along

the 60° E meridian to 11° S, then through the points 11° S 65° E, 40° S 65° E, 40° S 60° E to the South Pole.

S27/131 *Sub-Area 7A*

From the South Pole along the 20° W meridian to 05° S. Then through the points 05° S 10° E, 40° S 10° E, to 40° S 60° E. Then along the 60° E meridian to the South Pole.

S27/132 *Sub-Area 7B*

From the point 05° S 10° E to 05° S 12° E. Thence along the border between Congo and Angola, then along the northern border of the Dem. Rep. of the Congo, to the junction of the borders of Uganda, Dem. Rep. of the Congo and Sudan. Thence along the eastern borders of the Dem. Rep. of the Congo, Rwanda, Burundi, and the Dem. Rep. of the Congo. Thence along the southern borders of the Dem. Rep. of the Congo and Angola to the coast of the South Atlantic. Thence to the point 17° S 10° E, and then to the point 05° S 10° E.

S27/133 *Sub-Area 7C*

From the junction of the borders of Uganda, the Dem. Rep. of the Congo and Sudan along the western borders of Uganda and Tanzania, and then along the southern border of Tanzania to the coast. Thence through the points 11° S 41° E, 11° S 60° E, 02° S 60° E, to 02° S 41° E and thence to the east coast of Africa. Then north along the eastern border of Kenya, then west along the northern borders of Kenya and Uganda to close the sub-area at the junction of the borders of the Dem. Rep. of the Congo, Sudan and Uganda.

S27/134 *Sub-Area 7D*

From the border between Tanzania and Mozambique on Lake Nyasa, south along the west border of Mozambique to the east coast of Africa, then through the points 27° S 33° E, 40° S 33° E, 40° S 65° E, 11° S 65° E to 11° S 41° E. Thence along the northern border of Mozambique to Lake Nyasa.

S27/135 *Sub-Area 7E*

From the point 17° S 10° E, and through the points 40° S 10° E, 40° S 33° E, to 27° S 33° E. Thence along the west border of Mozambique and the part of the western border of Tanzania as far as the northern point of Lake Nyasa. Thence along the borders between Malawi and Tanzania and between Zambia and Tanzania and along the borders between the Dem. Rep. of the Congo and Zambia, Angola and Zambia, and Angola and Namibia to the coast at the point 17° S 10° E.

S27/136 *Sub-Area 7F*

From the point 05° S 10° E to 05° S 12° E, along the border between Congo and Angola to the junction point of the borders of the Congo, Angola, and the Dem. Rep. of the Congo. Thence along the border between Angola and the Dem. Rep. of the Congo until the coast of the Atlantic, along the coastline until the Zaire River and thence along the northern, eastern and southern border of Angola to the coast of the South Atlantic. Thence to the point 17° S 10° E and then to the point 05° S 10° E.

S27/137 *Regional and Domestic Air Route Area – 8* (RDARA-8)

From the South Pole along the 60° E meridian to 40° S then through the points 40° S 65° E, 11° S 65° E, 11° S 60° E, 02° S 60° E, 02° S 92° E, 10° S 92° E, to 10° S 110° E. Then along the 110° E meridian to the South Pole.

S27/138 *Regional and Domestic Air Route Area – 9* (RDARA-9)

From the South Pole along the 160° E meridian to 27° S. Then through the points 19° S 153° E, 10° S 145° E, 10° S 141° E, 00° 141° E, 00° 160° E, 03° 30' N 160° E, 03° 30' N 120° W. Then along the 120° W meridian to the South Pole.

S27/139 *Sub-Area 9B*

From the point 00° 141° E through points 10° S 141° E, 10° S 145° E, 27° S 160° E, 27° S 157° W, 03° 30' N 157° W, 03° 30' N 160° E, 00° 160° E to the point 00° 141° E.

S27/140 *Sub-Area 9C*

From the South Pole along the 170° W meridian to 03° 30' N. Then through the point 03° 30' N 120° W and along the 120° W meridian to the South Pole.

S27/141 *Sub-Area 9D*

From the South Pole along the 160° E meridian to 27° S. Then through the point 27° S 170° W and along the 170° W meridian to the South Pole.

S27/142 *Regional and Domestic Air Route Area – 10* (RDARA-10)

From the point 50° N 164° E to 66° N 169° W. Then along the 169° W meridian to the North Pole. Then through the points 82° N 30° E, 82° N 00°, 73° N 00°, 73° N 15° W. Then along the 15° W meridian to 72° N. Then through the points 40° N 50° W, 40° N 65° W to 44° 30' N 73° W, 41° N 81° W, 41° N 88° W. 48° N 91° W, 48° N 127° W, 50° N 130° W, then westward to the point 50° N 164° E.

S27/143 *Sub-Area 10A*

From the point 50° N 164° E to 66° N 169° W, along the 169° W meridian to the North Pole, along the 130° W meridian to 50° N, then westward to the point 50° N 164° E.

S27/144 *Sub-Area 10B*

From the point 57° N 140° W, along the 140° W meridian to the North Pole. Then along the 91 ° W meridian to 48° N. Thence through the points 48° N 127° W, 57° N 139° W, to 57° N 140° W.

S27/145 *Sub-Area 10C*

From the point 57° N 140° W, and through the points 60° N 140° W, 60° N 91° W, 48° N 91° W, 48° N 127° W, 57° N 139° W, to 57° N 140° W.

S27/146 *Sub-Area 10D*

From the point 48° N 98° W, along the 98° W meridian to the North Pole. Then along the 45° W meridian to 69° N. Then through the points 61° N 70° W, 45° N 72° W, 41° N 81° W, 41° N 88° W, 48° N 91° W, to 48° N 98° W.

S27/147 *Sub-Area 10E*

From the point 45° N 74° W, and through the point 61° N 72° W to 69° N 47° W. Then along the 47° W meridian to the North Pole. Then along the 15° W meridian to 72° N. Then through the points 40° N 50° W, 40° N 65° W, to close the sub-area at 45° N 74° W.

S27/148 *Sub-Area 10F*

From the North Pole through the points 82° N 30° E, 82° N 00°, 73° N 00°, 73° N 20° W, 70° N 20° W, 63° 30' N 39° W, 58° 30' N 43° W, 58° 30' N 50° W, 63° 30' N 55° 44' W, 65° 30' N 58° 39' W, 74° N 68° 18' W, 76° N 76° W, 78° N 75° W, 82° N 60° W to the North Pole.

S27/149 *Regional and Domestic Air Route Area – 11* (RDARA-11)

From the point 29° N 180° through the points 50° N 164° E, 50° N 127° W. Then along the border between the United States of America and Canada to 46° N 67° W, then to 40° N 65° W, 40° N 50° W, 25° N 35° W, 25° N 98° W, 33° N 119° W, 33° N 153° W, 29° N 153° W to the point 29° N 180°.

S27/150 *Sub-Area 11A*

From the point 29° N 180°, through the points 50° N 164° E, 50° N 130° W, 33° N 130° W, 33° N 153° W, 29° N 153° W, to the point 29° N 180°.

S27/151 *Sub-Area 11B*

From the point 50° N 130° W and through the points 33° N 130° W, 33° N 119° W, 25° N 98° W, 25° N 65° W, 40° N 65° W, 46° N 67° W. Then along the border between the United States of America and Canada through 50° N 127° W, to the point 50° N 130° W.

S27/152 *Sub-Area 11C*

From the point 25° N 65° W and through the points 40° N 65° W, 40° N 50° W, 25° N 35° W, to the point 25° N 65° W.

S27/153 *Regional and Domestic Air Route Area – 12* (RDARA-12)

From the point 03° 30' N 170° W to the point 10° N 170° W, then along the boundary between ITU Regions 2 and 3 to 29° N 180°, and thence to 29° N 153° W, 33° N 153° W, through the points 33° N 120° W, 35° N 120° W, 32° N 104° W, 25° N 91° W, 26° N 91° W, 26° N 79° W, 27° N 79° W, 27° N 76° 30' W, 25° N 70° W, 25° N 35° W and along the boundary between ITU Regions 1 and 2 to 00° 20° W. Thence through the points 00° 44° W, 04° 24' N 50° 39' W. Then along the boundaries between Brazil and the French Guiana, Surinam, Guyana, Venezuela, Colombia to the junction of Brazil, Peru and Colombia then along the boundaries between Peru and Colombia and Peru and Ecuador to the point 04° S 93° W. Then to the point 05° S 93° W and through the points 05° S 120° W, 03° 30' N 120° W to the point 03° 30' N 170° W.

S27/154 *Sub-Area 12A*

From the point 03° 30' N 170° W to the point 10° N 170° W, then along the boundary between ITU Regions 2 and 3 to 29° N 180°, and thence through the points 29° N 153° W, 03° 30' N 153° W to the point 03° 30' N 170° W.

S27/155 *Sub-Area 12B*

From the point 03° 30' N 153° W to 33° N 153° W, through the points 33° N 120° W, 17° N 115° W, 14° N 93° W, 02° N 86° W, 02° N 93° W, 05° S 93° W, 05° S 120° W, 03° 30' N 120° W, to the point 03° 30' N 153° W.

S27/156 *Sub-Area 12C*

From the point 33° N 120° W, through the points 35° N 120° W, 32° N 104° W, 25° N 91° W, 23° N 83° W, 22° N 83° W, 13° N 90° W, 16° N 116° W, to the point 33° N 120° W.

S27/157 *Sub-Area 12D*

From the point 20° N 91° W, through the points 26° N 91° W, 26° N 79° W, 27° N 79° W, 27° N 76° 30' W, 26° N 73° W, 17° N 58° W, to 10° N 58° W. Thence through Panama City, Colon, Swan Island, and Belize City to the point 20° N 91° W.

S27/158 *Sub-Area 12E*

From the point 15° N 95° W and through 23° N 92° W, 23° N 85° W, 19° N 85° W, 09° N 77° W, 02° N 79° W. Thence to 01° N 75° W along the eastern and southern border of Ecuador to the point 04° S 81° W, and from there to 02° N 81° W and 02° N 86° W, 14° N 93° W to close the sub-area at 15° N 95° W.

S27/159 *Sub-Area 12F*

From the point 02° N 79° W to the point 08° N 83° W, then along the border between Panama and Costa Rica, through the points 10° N 83° W, 13° N 83° W, 13° N 70° W, 08° N 70° W, 06° N 67° W and 01° N 66° W. Then along the border between Brazil and Colombia to 04° S 70° W. Thence along the border between Colombia and Peru, continuing along the border between Colombia and Ecuador, to the point 02° N 79° W.

S27/160 *Sub-Area 12G*

From the point 07° N 73° W, through the points 14° N 73° W, 14° N 58° W, 01° 31' N 58° W and along the borders of Brazil with Guyana, Venezuela, Colombia through the points 01° 57' N 68° W, 05° N 69° W, to the point 07° N 73° W.

S27/161 *Sub-Area 12H*

From the point 05° N 70° W, through the points 08° 45' N 60° W, 08° N 58° W, 08° N 49° W, 04° 10' N 51° 36' W, and along the borders of Brazil with French Guiana, Surinam, Guyana, Venezuela and Colombia to the junction of the borders of Brazil, Colombia and Peru, to the point 05° N 70° W.

S27/162 *Sub-Area 12I*

From the point 25° N 70° W, through the point 25° N 35° W and along the boundary between ITU Regions 1 and 2, to 00° 20° W. Thence through the points 00° 44° W, 08° N 54° W, 08° N 58° W, 17° N 58° W, to the point 25° N 70° W.

S27/163 *Sub-Area 12J*

From the point 04° S 93° W, through the points 02° N 93° W, 02° N 79° W. Then along the border between Ecuador and Colombia to the junction with the borders of Colombia, Peru and Ecuador. Thence along the border between Peru and Ecuador to the point 04° S 93° W.

S27/164 *Regional and Domestic Air Route Area – 13* (RDARA-13)

From the South Pole along the 120° W meridian to 05° S. Then through the points 05° S 93° W, 04° S 82° W, and along the southern border of Ecuador, Colombia, Venezuela, Guyana, Surinam, the French Guiana, to the point 04° 24' N 50° 39' W. Then through the points 04° 24' N 47° W, 00° 32° W to the point 00° 20° W, and along the 20° W meridian to the South Pole.

S27/165 *Sub-Area 13A*

From the point 05° S 120° W through the points 05° S 93° W, 04° S 82° W, 19° S 81° W, 57° S 81° W, to 57° S 90° W. Thence to the South Pole to the point 05° S 120° W.

S27/166 *Sub-Area 13B*

From the point 29° S 111° W, through the points 24° S 111° W, 24° S 104° W, 29° S 104° W, to the point 29° S 111° W.

S27/167 *Sub-Area 13C*

From the point 15° S 47° W, through the points 20° S 44° W, 23° l9' S 42° W, 25° S 45° W, 22° 30' S 50° 39' W, 19° 52' S 58° W, and along the borders of Brazil with Paraguay, Bolivia, Peru, Colombia, Venezuela, Guyana, Surinam and French Guiana to 04° 24' N 50° 39' W, 04° 24' N 47° W, to the point 15° S 47° W.

S27/168 *Sub-Area 13D*

From 11° S 69° 30' W along the border between Bolivia and Brazil and through the point 20° 10' S 58° W, along the border between Bolivia and Paraguay to 22° 30' S 62° 30' W. Then along the border between Bolivia and Argentina and through the point 23° S 67° W along the border between Bolivia and Chile and through the point 16° 30' S 69° 30' W following the border between Bolivia and Peru to the point 11° S 69° 30' W.

S27/169 *Sub-Area 13M*

From the point 19° S 81° W, through the points 04° S 82° W, 03° S 80° W, following the boundaries between Peru and Ecuador, Colombia and Brazil to the point 11° S 69° 30' W, along the border of Peru with Bolivia to 17° 30' S 69° 30' W, then along the border of Peru with Chile to the point 19° S 81° W.

S27/170 *Sub-Area 13N*

From the point 22° 30' S 62° 30' W along the border of Paraguay with Bolivia to 20° 10' S 58° W, along the border of Paraguay with Brazil to 25° 50' S 54° 30' W and thence along the border of Paraguay with Argentina to the point 22° 30' S 62° 30' W.

S27/171 *Sub-Area 13E*

From the point 32° S 81° W through the point 19° S 81° W, up to the intersection of the coast with the border between Chile and Peru, Bolivia and Argentina, to the point of intersection with 32° S and then to the point 32° S 81° W.

S27/172 *Sub-Area 13F*

From the point 57° S 81° W, through the point 32° S 81° W to the intersection of 32° S with the border between Chile and Argentina, through points the 52° S 67° W, 57° S 67° W, 57° S 40° W to the South Pole to the point 57° S 81° W.

S27/173 *Sub-Area 13G*

From the point 36° S 55° W to the intersection of 32° S with the border between Argentina and Chile, then north along the borders of Argentina with Bolivia. Paraguay, Brazil and Uruguay to the point 36° S 55° W.

S27/174 *Sub-Area 13H*

From the point 57° S 90° W and through the point 57° S 70° W to 52° S 70° W. Then along the border between Chile and Argentina to its intersection by 32° S and through the points 36° S 55° W, 57° S 55° W, 57° S 25° W to the South Pole and then to the point 57° S 90° W.

S27/175 *Sub-Area 13I*

From the point 40° S 50° W through the point 36° S 55° W and along the borders of Uruguay with Argentina and Brazil, then through the point 35° S 45° W to the point 40° S 50° W.

S27/176 *Sub-Area 13J*

From the point 15° S 47° W through the points 20° S 44° W, 23° l9' S 42° W, 29° S 40° W, 35° S 45° W, and thence along the borders of Brazil with Uruguay, Argentina, Paraguay and Bolivia to the point 19° 52' S 58° W, then through the point 18° S 57° 37' W to the point 15° S 47° W.

S27/177 *Sub-Area 13K*

From the point 22° 30' S 50° 39' W and through the points 25° S 45° W, 29° S 40° W, 20° S 32° W, 00° 32° W, 04° 24' N 47° W, 04° 24' N 50° 39' W to the point 22° 30' S 50° 39' W.

S27/178 *Sub-Area 13L*

From the point 00° 32° W through the points 00° 20° W, the South Pole, 57° S 55° W, 36° S 55° W, 40° S 50° W, 20° S 32° W, to the point 00° 32° W.

S27/179 *Regional and Domestic Air Route Area – 14* (RDARA-14)

From the South Pole along the 110° E meridian to 10° S. Then through the points 10° S 145° E, 19° S 153° E, 27° S 160° E. Then along the 160° E meridian to the South Pole.

S27/180 *Sub-Area 14A*

From the South Pole along the 110° E meridian to 19° S. Then through the points 19° S 118° E, 24° S 120° E, 24° S 131° E. Then along the 131° E meridian to the South Pole.

S27/181 *Sub-Area 14B*

From the point 19° S 110° E to the point 10° S 110° E, thence through 10° S 131° E, 24° S 131° E, 24° S 120° E, 19° S 118° E to the point 19° S 110° E.

S27/182 *Sub-Area 14C*

From the point 24° S 131° E to the point 10° S 131° E, thence through10° S 139° E, 24° S 139° E to the point 24° S 131° E

S27/183 *Sub-Area 14D*

From the South Pole along the 131° E meridian to 24° S, then through the points 24° S 139° E, 27° S 139° E, 27° S 142° E, 34° S 142° E, 34° S 139° E. Then along the 139° E meridian to the South Pole.

S27/184 *Sub-Area 14E*

From the point 24° S 139° E along the 139° E meridian to 10° S, then through the points 10° S 145° E, 19° S 153° E to the point 24° S 139° E.

S27/185 *Sub-Area 14F*

From the point 27° S 139° E along the 139° E meridian to 24° S, then through the points 19° S 153° E, 27° S 160° E to the point 27° S 139° E.

S27/186 *Sub-Area 14G*

From the South Pole along the 139° E meridian to 34° S, then through the points 34° S 142° E, 27° S 142° E, 27° S 160° E. Then along the 160° E meridian to the South Pole.

ARTICLE 3

Description of the boundaries of the VOLMET allotment areas and VOLMET reception areas

VOLMET Area – AFRICA-INDIAN OCEAN (AFI-MET)

S27/187 *The AFI-MET allotment area is* defined by a line drawn from the point 29° N 20° W, through the points 37° N 03° W, 37° N 36° E, 30° N 35° E, 10° N 52° E, 22° S 60° E, 35° S 35° E, 35° S 15° E, 08° S 15° W, 12° N 20° W, to the point 29° N 20° W.

S27/188 *The AFI-MET reception area is* defined by a line drawn from the point 37° N 03° W, through the points 37° N 36° E, 30° N 35° E, 10° N 52° E, 10° N 100° E, the South Pole, the points 29° N 40° W, 29° N 20° W, to the point 37° N 03° W.

VOLMET Area – NORTH ATLANTIC (NAT-MET)

S27/189 The *NAT-MET allotment area is* defined by a line drawn from the point 41° N 78° W, through the points 51° N 55° W, 24° N 50° W, 24° N 74° W, to the point 41° N 78° W.

S27/190 The *NAT-MET reception area is* defined by a line drawn from the point 24° N 97° W, through the points 24° N 85° W, 75° N 85° W, 75° N 20° W, 00° 20° W, 00° 95° W, to the point 24° N 97° W.

VOLMET Area – EUROPE (EUR-MET)

S27/191 The *EUR-MET allotment area is* defined by a line drawn from the point 33° N 12° W, through the points 54° N 12° W, 70° N 00°, 74° N 40° E, 40° N 36° E, 29° N 35° 30' E, 32° N 13° E, to the point 33° N 12° W.

S27/192 The *EUR-MET reception area is* defined by a line drawn from the point 15° N 20° W, through the points 40° N 50° W, 75° N 50° W, 75° N 45° E, 15° N 45° E, to the point 15° N 20° W.

VOLMET Area – MIDDLE EAST (MID-MET)

S27/193 The *MID-MET allotment area is* defined by a line drawn from the point 50° N 80° E, through the points 29° N 80° E, 27° N 85° E, 16° N 78° E, 22° N 56° E, 16° N 42° E, 30° N 30° E, 51° N 30° E, 57° N 37° E, to the point 50° N 80° E.

S27/194 The *MID-MET reception area is* defined by a line drawn from the point 50° N 80° E, through the points 50° N 90° E, 35° N 90° E, 27° N 85° E, 16° N 78° E, 22° N 56° E, 16° N 42° E, 30° N 30° E, 51° N 30° E, 57° N 37° E, to the point 50° N 80° E.

VOLMET Area – NORTH CENTRAL ASIA (NCA-MET)

S27/195 The *NCA-MET allotment area is* defined by a line drawn from the point 76° N 32° E, through the points 80° N 90° E, 75° N 168° W, 66° N 168° W, 48° N 160° E, 42° N 135° E, 50° N 130° E, 50° N 90° E, 35° N 70° E, 45° N 30° E, 60° N 20° E, to the point 76° N 32° E.

S27/196 The *NCA-MET reception area is* defined by a line drawn from the North Pole, through the points 40° N 168° W, 30° N 140° E, 35° N 70° E, 30° N 20° E, to the North Pole.

VOLMET Area – PACIFIC (PAC-MET)

S27/197 The *PA C-MET allotment area is* defined by a line drawn from the point 52° N 132° E, through the points 63° N 149° W, 38° N 120° W, 50° S 120° W, 50° S 145° E, 28° S 145° E, 03° S 129° E, 22° N 112° E to the point 52° N 132° E.

S27/198 The *PA C-MET reception area is* defined by a line drawn from the point 60° N 100° E through the points 75° N 160°W, 75° N 110° W, 65° S 110° W, 65° S 145° E, 28° S 145° E, 03° S 129° E, 05° N 80° E, 40° N 80° E, to the point 60° N 100° E.

VOLMET Area – SOUTH EAST ASIA (SEA-MET)

S27/199 The *SEA-MET allotment area is* defined by a line drawn from the point 55° N 75° E, through the points 55° N 135° E, 45° N 135° E, 35° N 130° E, 10° N 130° E, 10° S 155° E, 35° S 155° E, 35° S 116° E, 08° N 75° E, 26° N 65° E, to the point 55° N 75° E.

S27/200 The *SEA-MET reception area is* defined by a line drawn from the point 55° N 50° E, through the points 55° N 180°, 50° S 180°, 50° S 70° E, 08° N 70° E, 08° N 50° E, to the point 55° N 50° E.

VOLMET Area – CARIBBEAN (CAR-MET)

S27/201 The *CAR-MET allotment area is* defined by a line drawn from the point 30° N 110° W, through the points 30° N 75° W, 00° 50° W, following the equator to 00° 80° W to the point 30° N 110° W.

S27/202 The *CAR-MET reception area is* defined by a line drawn from the point 40° N 120° W, through the points 40° N 20° W, 25° S 20° W, 25° S 120° W, to the point 40° N 120° W.

VOLMET Area – SOUTH AMERICA (SAM-MET)

S27/203 The *SAM-MET allotment area is* defined by a line drawn from the point 15° N 83° W, through the points 15° N 60° W, 05° S 35° W, 55° S 60° W, 55° S 83° W, to the point 15° N 83° W.

S27/204 The *SAM-MET reception area is* defined by a line drawn from the point 30° N 120° W through the point 30° N 00°, the South Pole, to the point 30° N 120° W.

ARTICLE 4

World-wide allotment areas

S27/205 *World-wide Area I*

The boundaries of this allotment area comprise those of RDARAs 1, 2 and 3.

S27/206 *World-wide Area II*

The boundaries of this allotment area comprise those of RDARAs 10, 11 12A, 12B, 12C, and 12D.

S27/207 *World-wide Area III*

The boundaries of this allotment area comprise those of RDARAs 6, 8, 9 and 14.

S27/208 *World-wide Area IV*

The boundaries of this allotment area comprise those of RDARAs 12E to 12J inclusive and 13.

S27/209 *World-wide Area V*

The boundaries of this allotment area comprise those of RDARAs 4, 5 and 7.

Section II – Allotment of frequencies in the aeronautical mobile (R) service

ARTICLE 1

S27/210 Frequency allotment Plan by areas

S27/211 NOTE *a)* * = For the exact nature of a restriction on the use of the frequency concerned, refer to column 3 of the frequency allotment Plan in numerical order of frequencies (Nos. **S27**/218-**S27**/231).

S27/212 NOTE *b)* The following list does not include the world-wide common (R) and (OR) frequencies of 3 023 kHz and 5 680 kHz. The allotment of these frequencies is shown in Article 2.

S27/213

Area	Frequency bands (MHz)										
	3	**3.5**	**4.7**	**5.4 (Reg. 2)**	**5.6**	**6.6**	**9**	**10**	**11.3**	**13.3**	**18**
	kHz	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**
AFI	2 851 2 878	3 419 3 425 3 467	4 657		5 493 5 652 5 658	6 559 6 574 6 673	8 894 8 903		11 300 11 330	13 273 13 288 13 294	17 961
CAR	2 887	3 455			5 520 5 550	6 577 6 586	8 846 8 918		11 387 11 396	13 297	17 907
CEP	2 869	3 413	4 657		5 547 5 574	6 673	8 843	10 057	11 282	13 300	17 904
CWP	2 998	3 455	4 666		5 652 5 661	6 532 6 562	8 903	10 081	11 384	13 300	17 904
EA	3 016	3 485 3 491			5 655 5 670	6 571	8 897	10 042	11 396	13 297 13 303 13 309	17 907
EUR		3 479			5 661	6 598		10 084		13 288	17 961
INO		3 476			5 634		8 879			13 306	17 961

(See cont.)

(Cont.)

Area	Frequency bands (MHz)										
	3	**3.5**	**4.7**	**5.4 (Reg. 2)**	**5.6**	**6.6**	**9**	**10**	**11.3**	**13.3**	**18**
	kHz	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**
MID	2 944 2 992	3 467 3 473	4 669		5 658 5 667	6 625 6 631	8 918 8 951	10 018	11 375	13 288 13 312	17 961
NAT	2 872 2 889 2 962 2 971 3 016	3 476	4 675		5 598 5 616 5 649	6 622 6 628	8 825 8 831 8 864 8 879 8 891 8 906		11 279 11 309 11 336	13 291 13 306	17 946
NCA	3 004 3 019		4 678		5 646 5 664	6 592		10 096		13 303 13 315	17 958
NP	2 932				5 628	6 655 6 661		10 048	11 330	13 300	17 904
SAM	2 944	3 479	4 669		5 526	6 649	8 855	10 024 10 096	11 360	13 297	17 907
SAT	2 854 2 935	3 452			5 565	6 535	8 861		11 291	13 315 13 357	17 955
SEA		3 470 3 485			5 649 5 655	6 556	8 942	10 066	11 396	13 309 13 318	17 907
SP		3 467			5 559 5 643		8 867	10 084	11 327	13 300	17 904
1						6 556		10 021	11 363		
1B	2 860* 2 881* 2 890	3 458* 3 473* 3 488*			5 484 5 568	6 550 6 595		10 066			
1C	2 977 2 983	3 464 3 470	4 666		5 577 5 595	6 544	8 840		11 366		
1D	2 974 2 980 2 989	3 410 3 416 3 446	4 651		5 622 5 628 5 637	6 604 6 610	8 828	10 060	11 384		
1E	2 965	3 491			5 583	6 667		10 036			
2	2 938 2 950			4 696	5 556	6 583 6 601	8 846 8 855 8 888	10 015 10 045	11 297 11 360 11 390	13 321 13 357	17 964
2A	2 851* 2 863 2 869 2 875 2 881 2 887* 2 896 2 917 2 926 2 932 2 941	3 416* 3 422 3 434 3 440 3 455	4 657* 4 672 4 690		5 481 5 490 5 496 5 502 5 523 5 547 5 559 5 604	6 526 6 532 6 547 6 553 6 559 6 565 6 574 6 673	8 822* 8 876 8 909 8 939	10 048 10 054	11 276 11 285 11 294		

* See N.º **S27**/211.

(See cont.)

(Cont.)

Area	Frequency bands (MHz)										
	3	3.5	4.7	5.4 (Reg. 2)	5.6	6.6	9	10	11.3	13.3	18
	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz
2B	2 857 2 869 2 875 2 881 2 887* 2 896 2 902 2 908 2 914 2 920 2 929	3 401 3 407 3 416* 3 422 3 428 3 449	4 660 4 672 4 681 4 690 4 693		5 490 5 496 5 502 5 508 5 520 5 526 5 550 5 574 5 595 5 607 5 613 5 619	6 526 6 532 6 562 6 568 6 577 6 655 6 661 6 667	8 819 8 834 8 864	10 009 10 024	11 279 11 333 11 339		
2C	2 857 2 863 2 866 2 884 2 893 2 902 2 908 2 914 2 920 2 926 2 932	3 401 3 407 3 428 3 434 3 440 3 449 3 455	4 657* 4 660 4 681 4 693		5 481 5 487 5 508 5 514 5 520 5 526 5 550 5 562 5 574 5 586 5 604	6 535 6 541 6 547 6 553 6 562 6 568 6 577 6 586	8 819 8 834 8 882 8 939	10 009 10 024 10 054	11 276 11 333 11372		
3	2 893 2 935		4 693		5 556	6 583 6 589	8 846 8 954	10 087	11 318 11 336 11 360	13 267 13 321	17 952
3A	2 854 2 860 2 869 2 875 2 881 2 887* 2 896 2 905 2 911* 2 923* 2 959	3 404 3 416* 3 422 3 431* 3 443 3 452	4 672 4 684 4 690		5 484 5 490 5 496 5 502 5 511 5 517 5 568 5 580 5 601 5 625	6 526 6 532 6 538 6 544 6 550 6 556 6 607 6 613 6 619 6 649	8 837 8 861 8 900 8 942	10 045 10 057	11 309 11 324 11 330		
3B	2 851 2 854 2 872 2 878 2 884* 2 902 2 908 2 914 2 968*	3 401 3 407 3 413 3 419 3 425 3 431* 3 437* 3 443	4 657 4 681		5 493 5 499 5 505 5 514 5 520 5 526 5 550 5 562 5 580 5 601	6 529 6 538 6 544 6 559 6 568 6 577 6 595 6 625 6 631	8 822 8 852 8 861 8 879 8 957	10 024 10 039	11 285 11 291 11 327 11 372		

(See cont.)

(Cont.)

Area	Frequency bands (MHz)										
	3	**3.5**	**4.7**	**5.4 (Reg. 2)**	**5.6**	**6.6**	**9**	**10**	**11.3**	**13.3**	**18**
	kHz	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**
3C	2 851 2 860 2 866* 2 878 2 905 2 950 2 974 2 980 2 986	3 404 3 410 3 419 3 425 3 452	4 684		5 484 5 514 5 562 5 568 5 586 5 637 5 643	6 550 6 556 6 595 6 658 6 664 6 670	8 837 8 852 8 894 8 915	10 039	11 291 11 303 11 324 11 378		
4						6 565	8 873			13 300	17 904
4A	2 926* 2 953	3 437 3 491	4 672*		5 547 5 559	6 526 6 532 6 616	8 816 8 837 8 858	10 039 10 081	11 282 11 318		
4B	2 866 2 893	3 443			5 481 5 574 5 604	6 553 6 577 6 598		10 063	11 324		
5							8 870 8 885	10 012	11 312 11 327	13 354	17 949 17 967
5A	2 986	3 452			5 577 5 583	6 544 6 664	8 822 8 915		11 288		
5B	2 911 2 968	3 431 3 488			5 511 5 568 5 625	6 550 6 595	8 912	10 093			
5C	2 905	3 452			5 583	6 544	8 822				
5D	2 899 2 971	3 482			5 526 5 550	6 535 6 547	8 843	10 048			
6							8 840		11 381	13 291	17 943
6A	2 872 2 923 2 947 3 001	3 479	4 657* 4 675		5 484 5 580 5 601	6 607 6 613 6 658	8 891 8 906 8 948	10 006 10 051 10 081*	11 321 11 357		
6B	2 857 2 920	3 479 3 488			5 502 5 595 5 625	6 607 6 613 6 619	8 864 8 885	10 021 10 093	11 339 11 366		17 955
6C	2 881 2 956	3 473	4 651		5 550 5 580	6 544 6 631	8 834 8 918	10 015			
6D	2 866 2 884	3 416			5 490 5 520 5 568 5 574 5 631	6 550 6 568 6 577 6 595	8 882 8 957		11 309 11 372		

(See cont.)

(Cont.)

Area	Frequency bands (MHz)										
	3	3.5	4.7	5.4 (Reg. 2)	5.6	6.6	9	10	11.3	13.3	18
	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz
6E	2 854 2 872 2 917 3 001	3 443	4 657* 4 675		5 514 5 526 5 550	6 583 6 655 6 661	8 861* 8 906 8 909	10 036 10 051 10 084	11 357 11 363		
6F	2 926 2 941	3 434 3 440			5 496 5 508	6 526 6 667	8 864 8 939	10 060	11 279 11 366		
6G	2 869* 2 875* 2 890 2 896* 2 899 2 902* 2 911* 2 917* 2 938 2 953 2 962 2 968* 2 971 2 977 2 983 2 989 2 995	3 413* 3 422* 3 431* 3 437 3 446 3 449* 3 464 3 482	4 651* 4 663* 4 669* 4 672* 4 690* 4 696*		5 481 5 487 5 493* 5 499* 5 505* 5 511* 5 517* 5 523 5 547 5 553 5 559 5 565 5 571 5 577 5 583 5 592 5 598 5 604 5 610 5 616 5 622 5 628* 5 634* 5 640*	6 529 6 535 6 541 6 547 6 553 6 559 6 565 6 574 6 580 6 586 6 598 6 604 6 610 6 616 6 622 6 628 6 634 6 649 6 652 6 673 6 682	8 816 8 825 8 831 8 843 8 858 8 867 8 870* 8 873 8 888* 8 912* 8 960	10 018* 10 054* 10 063*	11 276* 11 282* 11 288 11 294* 11 300* 11 306 11 315 11 369	13 270 13 276	17 913
7					5 508	6 586	8 888		11 285	13 354	
7B	2 863 2 965	3 455			5 577 5 583	6 652	8 906	10 009			
7C	2 950	3 407			5 592	6 568 6 604	8 834	10 081	11 294		
7D	2 998				5 481			10 096			
7E	2 887	3 485			5 520	6 580 6 628	8 864		11 306		
7F	2 956	3 461			5 547 5 568	6 622	8 846 8 960				
9			4 696		5 583	6 553	8 846 8 852	10 018	11 339		

(See cont.)

(Cont.)

Area	Frequency bands (MHz)										
	3	3.5	4.7	5.4 (Reg. 2)	5.6	6.6	9	10	11.3	13.3	18
	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz
9B	2 860 2 905 2 929*	3 401* 3 419 3 425 3 476*	4 660		5 484 5 508 5 523 5 565	6 538 6 547 6 598 6 622	8 819 8 837 8 861 8 906	10 009 10 024 10 039	11 393		
9C	2 851	3 404 3 461	4 675		5 481	6 580	8 873	10 042	11 279 11 312		
9D	3 016	3 404			5 592	6 535	8 873		11 312		
10			4 696	5 454	5 604	6 553	8 819 8 834	10 006 10 012	11 333 11 390	13 285	17 910
10A	2 866 2 875 2 911 2 944 2 956 2 992	3 449 3 470		5 472 5 475	5 484 5 490 5 496 5 565 5 631	6 535 6 580 6 604	8 855 8 876	10 066	11 357 11 363 11 375		
10B	2 854 2 860	3 404 3 467 3 488	4 651 4 666 4 681 4 690 4 693	5 460 5 466	5 553 5 568 5 583	6 547 6 574 6 598	8 837 8 903 8 939				
10C	2 926 2 965	3 491	4 660 4 669	5 457	5 481 5 487 5 502 5 562 5 595	6 541 6 556 6 568	8 867				
10D	2 893 2 935	3 419 3 425 3 458	4 666 4 669 4 678	5 472 5 475	5 484 5 490 5 496 5 586 5 625	6 535 6 544 6 562	8 858 8 900				
10E	2 869 2 944 2 992	3 446 3 473	4 651 4 666 4 684	5 460	5 481 5 559 5 577	6 547 6 598	8 843 8 954		11 276		
10F	2 950		4 663	5 451	5 526	6 673	8 945	10 042			
11B	2 851 2 878 3 004 3 019	3 410 3 428 3 434 3 443	4 672	5 451 5 463 5 469	5 508 5 514 5 523 5 571	6 538 6 550 6 559 6 565	8 822 8 885 8 912	10 045 10 093	11 288 11 306	13 312	17 964
12		3 440			5 568			10 054			17 901
12A	2 950				5 604						

(See cont.)

(Cont.)

Area	Frequency bands (MHz)										
	3	**3.5**	**4.7**	**5.4 (Reg. 2)**	**5.6**	**6.6**	**9**	**10**	**11.3**	**13.3**	**18**
	kHz	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**
12C	2 920 2 980	3 401 3 464	4 693	5 460	5 484 5 490 5 496 5 502 5 589 5 613	6 535 6 571 6 592 6 622 6 628	8 816 8 948 8 957	10 021 10 039	11 324		
12D		3 407			5 562	6 673	8 876	10 015			
12E	2 860 2 956 2 998	3 461 3 488	4 681	5 454 5 475	5 481 5 487 5 583 5 595 5 604	6 547 6 553 6 598	8 852 8 873	10 063 10 090	11 381 11 393		
12F	2 893 2 956 2 965 2 998	3 461 3 488		5 451 5 475	5 508 5 556 5 583 5 604	6 532 6 553	8 873 8 894	10 090	11 297		
12G	2 875 2 956 2 998	3 461 3 488			5 484 5 523 5 559 5 646	6 526 6 616					
12H	2 956 2 998	3 461 3 488		5 451	5 583						
12J	2 860 2 902 2 926 2 965	3 419			5 481 5 496 5 619	6 535 6 547	8 954		11 381 11 384		
13										13 318	17 913
13A								10 048			17 967
13B								10 048			17 967
13C	2 863 2 869 2 992	3 413 3 458 3 473			5 490 5 514 5 553 5 571 5 577	6 541 6 556 6 562 6 568 6 580	8 819 8 834 8 843 8 939	10 042	11 327 11 375	13 309	
13D	2 914 2 983	3 425 3 467	4 660	5 460	5 562	6 622 6 628 6 673	8 867 8 912 8 957	10 084	11 318		
13E	2 851	3 491	4 651 4 663		5 481 5 583 5 604	6 553 6 577	8 858		11 303		17 967
13F	2 851 2 956 2 998	3 446 3 476	4 651 4 663	5 454	5 481 5 583 5 604	6 547 6 553	8 831 8 858 8 864	10 081	11 321 11 330		17 967

(See cont.)

(Cont.)

Area	Frequency bands (MHz)										
	3	**3.5**	**4.7**	**5.4 (Reg. 2)**	**5.6**	**6.6**	**9**	**10**	**11.3**	**13.3**	**18**
	kHz	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**	**kHz**
13G	2 872 2 971 3 016	3 434 3 470	4 675*	5 469 5 475	5 574	6 586 6 613	8 822 8 885 8 900	10 006 10 021 10 036	11 369		
13H	2 899 2 965	3 455 3 485	4 657	5 463 5 472	5 484 5 547	6 598	8 825 8 906	10 036 10 045	11 282 11 300	13 267	
13I	2 860 2 878 2 887	3 419	4 678 4 693	5 451 5 466	5 496 5 523	6 574	8 873	10 051			
13J	2 857 2 863 2 878 2 890 2 920	3 410 3 428 3 458	4 684 4 696	5 451 5 454	5 559 5 568 5 577	6 550 6 559 6 580	8 816 8 843	10 012 10 018 10 042	11 276		
13K	2 863 2 932 3 004 3 019	3 401 3 458 3 464	4 663 4 672	5 463	5 481 5 547 5 577 5 604	6 547 6 553 6 580	8 843 8 849 8 945	10 009 10 018 10 042 10 060	11 339 11 366	13 309	
13M	2 908 2 977	3 437 3 449	4 660 4 690	5 463	5 502	6 574 6 628	8 837 8 867 8 903	10 066	11 378		
13N	2 986	3 443		5 457	5 508	6 604	8 828	10 093			
14	2 851 2 878	3 446 3 461 3 479			5 526 5 604	6 580 6 628	8 822 8 855 8 870	10 045 10 087	11 360	13 264	17 946
14A	2 950	3 413	4 678*			6 547 6 553	8 816 8 894				
14B		3 488	4 684*			6 535 6 604 6 673	8 900 8 954				
14C	2 887	3 452	4 684*			6 541 6 586	8 885 8 912				
14D	2 950	3 407	4 693*		5 481	6 559 6 574	8 843 8 858				
14E		3 413				6 565 6 616	8 891 8 945				
14F		3 488				6 526 6 610	8 825 8 831				
14G	2 869 2 944		4 678*		5 481 5 550 5 580		8 876 8 957				
VAFI	2 860	3 404			5 499	6 538	8 852	10 057		13 261	
VCAR	2 950				5 580				11 315		

(See cont.)

(Cont.)

Area	Frequency bands (MHz)											
	3	3.5	4.7	5.4 (Reg. 2)	5.6	6.6	9	10	11.3	13.3	18	22
	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz
VEUR	2 998	3 413			5 640	6 580	8 957		11 378	13 264		
VMID	2 956				5 589		8 945			11 393		
VNAT	2 905	3 485			5 592	6 604	8 870	10 051		13 270 13 276		
VNCA		3 461	4 663		5 676			10 090		13 279		
VPAC	2 863					6 679	8 828			13 282		
VSAM	2 881				5 601			10 087		13 279		
VSEA	2 965	3 458			5 673	6 676	8 849		11 387	13 285		
W I	3 010		4 654 4 687		5 529 5 532 5 535 5 541	6 637 6 643	8 921 8 924 8 930 8 936	10 027 10 030 10 069 10 072 10 078	11 345 11 351	13 324 13 327 13 333 13 336 13 342 13 345 13 351	17 916 17 922 17 931	21 940 21 946 21 952 21 958 21 967 21 973 21 979 21 988 21 997
W II	3 007 3 013	3 494 3 497	4 654 4 687		5 529 5 538 5 544	6 637 6 640 6 646	8 927 8 933 8 936	10 027 10 033 10 075	11 342 11 348 11 354	13 330 13 339 13 348	17 919 17 925 17 934 17 940	21 964 21 985
W III	3 007		4 687			6 637	8 921 8 930	10 072 10 078	11 342 11 351	13 324 13 333 13 342 13 351	17 916 17 922 17 928 17 934 17 940	21 949 21 970
W IV	3 010				5 535 5 541	6 643	8 924	10 030 10 069	11 345	13 327 13 336 13345	17 919 17 928 17937	21 955 21 976 21 991
W V	3 013				5 532 5 538 5 544	6 640 6 646	8 927 8 933	10 033 10 075	11 348 11 354	13 330 13 339 13 348	17 925 17 931 17 937	21 943 21 961 21 982 21 994

ARTICLE 2

Frequency allotment Plan
(in numerical order of frequencies)

General Notes:

S27/214 1 Class of stations: FD

Classes of emission: see Nos. **S27**/56-**S27**/59.

Power: Unless otherwise indicated in the Plan, the power values for aeronautical and aircraft stations are those shown in Nos. **S27**/60-**S27**/68.

Hours: H24, unless otherwise indicated.

S27/215 2 A frequency allotted on a “day-time basis” may be used during the period one hour after sunrise to one hour before sunset

S27/216 3 A “common channel” is a channel allotted in common to two or more areas within interference distance of each other and its use is subject to agreement between the administrations concerned.

S27/217 4 The world-wide frequency allotments appearing in the tables at No. **S27**/213 and Nos. **S27**/218 to **S27**/231, except for carrier (reference) frequencies 3 023 kHz and 5 680 kHz, are reserved for assignment by administrations to stations operating under authority granted by the administration concerned, for the purpose of serving one or more aircraft operating agencies. Such assignments are to provide communications between an appropriate aeronautical station and an aircraft station anywhere in the world for exercising control over regularity of flight and for safety of aircraft. World-wide frequencies are not to be assigned by administrations for MWARA, RDARA and VOLMET purposes. Where the operational area of an aircraft lies wholly within a RDARA or Sub-RDARA boundary, frequencies allotted to those RDARAs and Sub-RDARAs shall be used.

S27/218 Band **2 850-3 025 kHz** **3 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	**2**	**3**
2 851	M AFI R 2A 3B 3C 9C 11B 13E 13F 14	CC 3B 3C CC 13E 13F C001/2A
2 854	M SAT R 3A 3B 6E 10B	CC 3A 3B
2 857	R 2B 2C 6B 13J	CC 2B 2C
2 860	R 1B 3A 3C 9B 10B 12E 12J 13I V VAFI	CC 3A 3C CC 12E 12J C001/1B
2 863	R 2A 2C 7B 13C 13J 13K V VPAC	CC 2A 2C CC 13C 13J 13K
2 866	R 2C 3C 4B 6D 10A	C001/3C
2 869	M CEP R 2A 2B 3A 6G 10E 13C 14G	CC 2A 2B 3A C009/6G
2 872	M NAT R 3B 6A 6E 13G	CC 6A 6E
2 875	R 2A 2B 3A 6G 10A 12G	CC 2A 2B 3A C009/6G
2 878	M AFI R 3B 3C 11B 13I 13J 14	CC 3B3C CC 13I 13J
2 881	R 1B 2A 2B 3A 6C V VSAM	CC 2A 2B 3A C001/lB
2 884	R 2C 3B 6D	C001/3B
2 887	M CAR R 2A 2B 3A 7E 13I 14C	CC 2A2B 3A C001/2A 2B 3A
2 890	R 1B 6G 13J	
2 893	R 2C 3 4B 10D 12F	CC 2C 3
2 896	R 2A 2B 3A 6G	CC 2A 2B 3A C009/6G
2 899	M NAT R 5D 6G 13H	
2 902	R 2B 2C 3B 6G 12J	CC 2B 2C 3B C009/6G
2 905	R 3A 3C 5C 9B V VNAT	CC 3A 3C
2 908	R 2B 2C 3B 13M	CC 2B 2C 3B

* See page 358. (See cont.)

Band **2 850-3 025 kHz** **3 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
2 911	R 3A 5B 6G 10A	C001/3A C010/6G
2 914	R 2B 2C 3B 13D	CC 2B 2C 3B
2 917	R 2A 6E 6G	C010/6G
2 920	R 2B 2C 6B 12C 13J	CC 2B 2C
2 923	R 3A 6A	C001/3A
2 926	R 2A 2C 4A 6F 10C 12J	CC 2A 2C C001/4A
2 929	R 2B 9B	C001/9B
2 932	M NP R 2A 2C 13K	CC 2A 2C
2 935	M SAT R 3 l0D	
2 938	R 2 6G	C009/6G
2 941	R 2A 6F	
2 944	M MID SAM R l0A l0E 14G	
2 947	R 6A	
2 950	R 2 3C 7C l0F 12A 14A 14D V VCAR	CC 2 3C CC 14A 14D
2 953	R 4A 6G	
2 956	R 6C 7F 10A 12E 12F 12G 12H 13F V VMID	CC 12E 12F 12G 12H
2 959	R 3A	
2 962	M NAT R 6G	
2 965	R 1E 7B l0C 12F 12J 13H V VSEA	CC 12F 12J
2 968	R 3B 5B 6G	C001/3B C009/6G
2 971	M NAT R 5D 6G 13G	
2 974	R 1D 3C	
2 977	R 1C 6G 13M	

(See cont.)

Band **2 850-3 025 kHz** **3 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
2 980	R 1D 3C 12C	
2 983	R 1C 6G 13D	
2 986	R 3C 5A 13N	
2 989	R 1D 6G	
2 992	M MID R 10A l0E 13C	
2 995	R 6G	
2 998	M CWP R 7D 12E 12F 12G 12H 13F V VEUR	CC 12E 12F 12G 12H
3 001	R 6A 6E	CC 6A 6E
3 004	M NCA R 11B 13K	
3 007	W WORLDWIDE	C100/II III
3 010	W WORLDWIDE	C100/I IV
3 013	W WORLDWIDE	C100/II V
3 016	M EA NAT R 9D 13G	
3 019	M NCA R 11B 13K	

S27/219

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
3 023	W WORLDWIDE (R) and (OR)	See Part II, Section II, article 3

* See page 358.

S27/220 Band **3 400-3 500 kHz** **3.5 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
3 401	R 2B 2C 3B 9B 12C 13K	CC 2B 2C 3B C001/9B
3 404	R 3A 3C 9C 9D 10B V VAFI	CC 3A 3C CC 9C 9D
3 407	R 2B 2C 3B 7C 12D 14D	CC 2B 2C 3B
3 410	R 1D 3C 11B 13J	
3 413	M CEP R 3B 6G 13C 14A 14E V VEUR	CC 14A 14E C009/6G
3 416	R 1D 2A 2B 3A 6D	CC 2A 2B 3A C001/2A 2B 3A
3 419	M AFI R 3B 3C 9B 10D 12J 13I	CC 3B 3C
3 422	R 2A 2B 3A 6G	CC 2A 2B 3A C001/6G C004/6G
3 425	M AFI R 3B 3C 9B 10D 13D	CC 3B 3C
3 428	R 2B 2C 11B 13J	CC 2B 2C
3 431	R 3A 3B 5B 6G	CC 3A 3B C001/3A 3B C009/6G
3 434	R 2A 2C 6F 11B 13G	CC 2A 2C
3 437	R 3B 4A 6G 13M	C001/3B
3 440	R 2A 2C 6F 12	CC 2A 2C
3 443	R 3A 3B 4B 6E 11B 13N	CC 3A 3B
3 446	R 1D 6G 10E 13F 14	
3 449	R 2B 2C 6G 10A 13M	CC 2B 2C C001/6G C004/6G
3 452	M SAT R 3A 3C 5A 5C 14C	CC 3A 3C CC 5A 5C
3 455	M CAR CWP R 2A 2C 7B 13H	CC 2A 2C
3 458	R 1B 10D 13C 13J 13K V VSEA	CC 13C 13J 13K C001/1B
3 461	R 7F 9C 12E 12F 12G 12H 14 V VNCA	CC 12E 12F 12G 12H
3 464	R 1C 6G 12C 13K	

* See page 358. (See cont.)

Band **3 400-3 500 kHz** **3.5 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	**2**	**3**
3 467	M AFI MID SP R 10B 13D	CC AFI MID
3 470	M SEA R 1C 10A 13G	
3 473	M MID R 1B 6C 10E 13C	C001/1B
3 476	M INO NAT R 9B 13F	C001/9B
3 479	M EUR SAM R 6A 6B 14	
3 482	R 5D 6G	
3 485	M EA SEA R 7E 13H V VNAT	CC EA SEA
3 488	R 1B 5B 6B 10B 12E 12F 12G 12H 14B 14F	CC 12E 12F 12G 12H CC 14B 14F C001/lB
3 491	M EA R 1E 4A 10C 13E	CC 1E 4A
3 494	W WORLDWIDE	C100/II
3 497	W WORLDWIDE	C100/II

S27/221 Band **4 650-4 700 kHz** **4.7 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
4 651	R 1D 6C 6G 10B 10E 13E 13F	CC 13E 13F C001/6G
4 654	W WORLDWIDE	C100/I II
4 657	M AFI CEP R 2A 2C 3B 6A 6E 13H	CC 2A 2C C001/2A 2C CC 6A 6E C001/6A 6E
4 660	R 2B 2C 9B 10C 13D 13M	CC 2B 2C CC 13D 13M
4 663	R 6G 10F 13E 13F 13K V VNCA	CC 13E 13F 13K C001/6G
4 666	M CWP R 1C 10B 10D 10E	CC 10B 10D 10E
4 669	M MID SAM R 6G 10C 10D	CC 10C 10D C001/6G
4 672	R 2A 2B 3A 4A 6G 11B 13K	CC 2A 2B 3A C001/4A C001/6G
4 675	M NAT R 6A 6E 9C 13G	CC 6A 6E C001/13G
4 678	M NCA R 10D 13I 14A 14G	CC 14A 14G C001/14A 14G
4 681	R 2B 2C 3B 10B 12E	CC 2B 2C 3B
4 684	R 3A 3C 10E 13J 14B 14C	CC 3A 3C CC 14B 14C C001/14B 14C
4 687	W WORLDWIDE	C100/I II III
4 690	R 2A 2B 3A 6G 10B 13M	CC 2A 2B 3A C001/6G
4 693	R 2B 2C 3 10B 12C 13I 14D	CC 2B 2C 3 C001/14D
4 696	R 2 6G 9 10 13J	C001/6G

* See page 358.

S27/222 Band **5 450-5 480 kHz (Reg. 2)** **5.4 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
5 451	R l0F 11B 12F 12H 13I 13J	CC 12F 12H CC 13I 13J
5 454	R 10 12E 13F 13J	
5 457	R l0C 13N	
5 460	R l0B l0E 12C 13D	
5 463	R 11B 13H 13K 13M	
5 466	R l0B 131	
5 469	R 11B 13G	
5 472	R l0A l0D 13H	
5 475	R l0A l0D 12E 12F 13G	CC 12E 12F

S27/223 Band **5 480-5 680 kHz** **5.6 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
5 481	R 2A 2C 4B 6G 7D 9C l0C l0E 12E 12J 13E 13F 13K 14D 14G	CC 2A 2C CC 10C 10E CC 12E 12J CC 13E 13F CC 14D 14G
5 484	R 1B 3A 3C 6A 9B 10A 10D 12C 12G 13H	CC 3A 3C
5 487	R 2C 6G 10C 12E	
5 490	R 2A 2B 3A 6D 10A 10D 12C 13C	CC 2A 2B 3A
5 493	M AFI R 3B 6G	C002/6G
5 496	R 2A 2B 3A 6F 10A 10D 12C 12J 13I	CC 2A 2B 3A
5 499	R 3B 6G V VAFI	C002/6G
5 502	R 2A 2B 3A 6B 10C 12C 13M	CC 2A 2B 3A
5 505	R 3B 6G	C003/6G
5 508	R 2B 2C 6F 7 9B 11B 12F 13N	CC 2B 2C
5 511	R 3A 5B 6G	C002/6G

* See page 358. (See cont.)

Band **5 480-5 680 kHz** **5.6 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
5 514	R 2C 3B 3C 6E 11B 13C	CC 3B 3C
5 517	R 3A 6G	C002/6G
5 520	M CAR R 2B 2C 3B 6D 7E	CC 2B 2C 3B
5 523	R 2A 6G 9B 11B 12G 13I	
5 526	M SAM R 2B 2C 3B 5D 6E 10F 14	CC 2B 2C 3B
5 529	W WORLDWIDE	C100/I II
5 532	W WORLDWIDE	C100/I V
5 535	W WORLDWIDE	C100/I IV
5 538	W WORLDWIDE	C100/II V
5 541	W WORLDWIDE	C100/I IV
5 544	W WORLDWIDE	C100/II V
5 547	M CEP R 2A 4A 6G 7F 13H 13K	
5 550	M CAR R 2B 2C 3B 5D 6C 6E 14G	CC 2B 2C 3B
5 553	R 6G 10B 13C	
5 556	R 2 3 12F	CC 2 3
5 559	M SP R 2A 4A 6G 10E 12G 13J	
5 562	R 2C 3B 3C 10C 12D 13D	CC 3B 3C
5 565	M SAT R 6G 9B 10A	
5 568	R 1B 3A 3C 5B 6D 7F 10B 12 13J	CC 3A 3C
5 571	R 6G 11B 13C	
5 574	M CEP R 2B 2C 4B 6D 13G	CC 2B 2C
5 577	R 1C 5A 6G 7B 10E 13C 13J 13K	CC 13C 13J 13K
5 580	R 3A 3B 6A 6C 14G V VCAR	CC 3A 3B
5 583	R 1E 5A 5C 6G 7B 9 10B 12E 12F 12H 13E 13F	CC 5A 5C CC 12E 12F 12H CC 13E 13F
5 586	R 2C 3C 10D	

(See cont.)

Band **5 480-5 680 kHz** **5.6 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
5 589	R 12C V VMID	
5 592	R 6G 7C 9D V VNAT	
5 595	R 1C 2B 6B 10C 12E	
5 598	M NAT R 6G	
5 601	R 3A 3B 6A V VSAM	CC 3A 3B
5 604	R 2A 2C 4B 6G 10 12A 12E 12F 13E 13F 13K 14	CC 2A 2C CC 12E 12F CC 13E 13F
5 607	R 2B	
5 610	R 6G	
5 613	R 2B 12C	
5 616	M NAT R 6G	
5 619	R 2B 12J	
5 622	R 1D 6G	
5 625	R 3A 5B 6B 10D	
5 628	M NP R 1D 6G	C003/6G
5 631	R 6D 10A	
5 634	M INO R 6G	C002/6G
5 637	R 1D 3C	
5 640	R 6G V VEUR	C002/6G
5 643	M SP R 3C	
5 646	M NCA R 12G	
5 649	M NAT SEA	
5 652	M AFI CWP	
5 655	M EA SEA	CC EA SEA
5 658	M AFI MID	CC AFI MID

(See cont.)

Band **5 480-5 680 kHz** **5.6 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
5 661	M CWP EUR	
5 664	M NCA	
5 667	M MID	
5 670	M EA	
5 673	V VSEA	
5 676	V VNCA	

S27/224

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
5 680	W WORLDWIDE (R) and (OR)	See Part II, Section II, article 3

S27/225 Band **6 525-6 685 kHz** **6.6 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
6 526	R 2A 2B 3A 4A 6F 12G 14F	CC 2A 2B 3A
6 529	R 3B 6G	
6 532	M CWP R 2A 2B 3A 4A 12F	CC 2A 2B 3A
6 535	M SAT R 2C 5D 6G 9D 10A 10D 12C 12J 14B	
6 538	R 3A 3B 9B 11B V VAFI	CC 3A 3B
6 541	R 2C 6G 10C 13C 14C	
6 544	R 1C 3A 3B 5A 5C 6C 10D	CC 3A 3B CC 5A 5C

* See page 358.

(See cont.)

Band **6 525-6 685 kHz** **6.6 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
6 547	R 2A 2C 5D 6G 9B 10B 10E 12E 12J 13F 13K 14A	CC 2A 2C CC 12E 12J
6 550	R 1B 3A 3C 5B 6D 11B 13J	CC 3A 3C
6 553	R 2A 2C 4B 6G 9 10 12E 12F 13E 13F 13K 14A	CC 2A 2C CC 12E 12F CC 13E 13F
6 556	M SEA R 1 3A 3C 10C 13C	CC 3A 3C
6 559	M AFI R 2A 3B 6G 11B 13J 14D	
6 562	M CWP R 2B 2C 10D 13C	CC 2B 2C
6 565	R 2A 4 6G 11B 14E	
6 568	R 2B 2C 3B 6D 7C 10C 13C	CC 2B 2C 3B
6 571	M EA R 12C	
6 574	M AFI R 2A 6G 10B 13I 13M 14D	
6 577	M CAR R 2B 2C 3B 4B 6D 13E	CC 2B 2C 3B
6 580	R 6G 7E 9C 10A 13C 13J 13K 14 V VEUR	CC 13C 13J 13K
6 583	R 2 3 6E	CC 2 3
6 586	M CAR R 2C 6G 7 13G 14C	
6 589	R 3	
6 592	M NCA R 12C	
6 595	R 1B 3B 3C 5B 6D	CC 3B 3C
6 598	M EUR R 4B 6G 9B 10B 10E 12E 13H	
6 601	R 2	
6 604	R 1D 6G 7C 10A 13N 14B V VNAT	
6 607	R 3A 6A 6B	
6 610	R 1D 6G 14F	
6 613	R 3A 6A 6B 13G	

(See cont.)

Band **6 525-6 685 kHz** **6.6 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
6 616	R 4A 6G 12G 14E	
6 619	R 3A 6B	
6 622	M NAT R 6G 7F 9B 12C 13D	
6 625	M MID R 3B	
6 628	M NAT R 6G 7E 12C 13D 13M 14	CC 13D 13M
6 631	M MID R 3B 6C	
6 634	R 6G	
6 637	W WORLDWIDE	C100/I II III
6 640	W WORLDWIDE	C100/II V
6 643	W WORLDWIDE	C100/I IV
6 646	W WORLDWIDE	C100/II V
6 649	M SAM R 3A 6G	
6 652	R 6G 7B	
6 655	M NP R 2B 6E	
6 658	R 3C 6A	
6 661	M NP R 2B 6E	
6 664	R 3C 5A	
6 667	R 1E 2B 6F	
6 670	R 3C	
6 673	M AFI CEP R 2A 6G 10F 12D 13D 14B	
6 676	V VSEA	
6 679	V VPAC	
6 682	R 6G	

S27/226 Band **8 815-8 965 kHz** **9 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	**2**	**3**
8 816	R 4A 6G 12C 13J 14A	
8 819	R 2B 2C 9B 10 13C	CC 2B 2C
8 822	R 2A 3B 5A 5C 11B 13G 14	CC 5A 5C C005/2A
8 825	M NAT R 6G 13H 14F	
8 828	R 1D 13N V VPAC	
8 831	M NAT R 6G 13F 14F	
8 834	R 2B 2C 6C 7C 10 13C	CC 2B 2C
8 837	R 3A 3C 4A 9B 10B 13M	CC 3A 3C
8 840	R 1C 6	
8 843	M CEP R 5D 6G 10E 13C 13J 13K 14D	CC 13C 13J 13K
8 846	M CAR R 2 3 7F 9	CC 2 3
8 849	R 13K V VSEA	
8 852	R 3B 3C 9 12E V VAFI	CC 3B 3C
8 855	M SAM R 2 10A 14	
8 858	R 4A 6G 10D 13E 13F 14D	CC 13E 13F
8 861	M SAT R 3A 3B 6E 9B	CC 3A 3B C011/6E
8 864	M NAT R 2B 6B 6F 7E 13F	CC 6B 6F
8 867	M SP R 6G 10C 13D 13M	CC 13D 13M
8 870	R 5 6G 14 V VNAT	C004/6G
8 873	R 4 6G 9C 9D 12E 12F 13I	CC 9C 9D CC 12E 12F
8 876	R 2A 10A 12D 14G	

* See page 358. (See cont.)

Band **8 815-8 965 kHz** **9 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
8 879	M INO NAT R 3B	
8 882	R 2C 6D	
8 885	R 5 6B 11B 13G 14C	
8 888	R 2 6G 7	C009/6G
8 891	M NAT R 6A 14E	
8 894	M AFI R 3C 12F 14A	
8 897	M EA	
8 900	R 3A 10D 13G 14B	
8 903	M AFI CWP R 10B 13M	
8 906	M NAT R 6A 6E 7B 9B 13H	CC 6A 6E
8 909	R 2A 6E	
8 912	R 5B 6G 11B 13D 14C	C004/6G
8 915	R 3C 5A	
8 918	M CAR MID R 6C	
8 921	W WORLDWIDE	C100/I III
8 924	W WORLDWIDE	C100/I IV
8 927	W WORLDWIDE	C100/II V
8 930	W WORLDWIDE	C100/I III
8 933	W WORLDWIDE	C100/II V
8 936	W WORLDWIDE	C100/I II
8 939	R 2A 2C 6F 10B 13C	CC 2A 2C
8 942	M SEA R 3A	
8 945	R 10F 13K 14E V VMID	
8 948	R 6A 12C	
8 951	M MID	
8 954	R 3 10E 12J 14B	
8 957	R 3B 6D 12C 13D 14G V VEUR	
8 960	R 6G 7F	

S27/227 Band **10 005-10 100 kHz** **10 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
10 006	R 6A 10 13G	
10 009	R 2B 2C 7B 9B 13K	CC 2B 2C
10 012	R 5 10 13J	
10 015	R 2 6C 12D	
10 018	M MID R 6G 9 13J 13K	CC 13J 13K C003/6G
10 021	R 1 6B 12C 13G	
10 024	M SAM R 2B 2C 3B 9B	CC 2B 2C 3B
10 027	W WORLDWIDE	C100/I II
10 030	W WORLDWIDE	C100/I IV
10 033	W WORLDWIDE	C100/II V
10 036	R 1E 6E 13G 13H	CC 13G 13H
10 039	R 3B 3C 4A 9B 12C	CC 3B 3C
10 042	M EA R 9C 10F 13C 13J 13K	CC 13C 13J 13K
10 045	R 2 3A 11B 13H 14	CC 2 3A
10 048	M NP R 2A 5D 13A 13B	CC 13A 13B
10 051	R 6A 6E 13I V VNAT	CC 6A 6E
10 054	R 2A 2C 6G 12	CC 2A 2C C004/6G
10 057	M CEP R 3A V VAFI	
10 060	R 1D 6F 13K	
10 063	R 4B 6G 12E	C004/6G
10 066	M SEA R 1B 10A 13M	
10 069	W WORLDWIDE	C100/I IV
10 072	W WORLDWIDE	C100/I III
10 075	W WORLDWIDE	C100/II V
10 078	W WORLDWIDE	C100/I III
10 081	M CWP R 4A 6A 7C 13F	C006/6A
10 084	M EUR SP R 6E 13D	

* See page 358. (See cont.)

Band **10 005-10 100 kHz** **10 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	**2**	**3**
10 087	R 3 14 V VSAM	
10 090	R 12E 12F V VNCA	CC 12E 12F
10 093	R 5B 6B 11B 13N	
10 096	M NCA SAM R 7D	

S27/228 Band **11 275-11 400 kHz** **11.3 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	**2**	**3**
11 276	R 2A 2C 6G 10E 13J	CC 2A 2C C002/6G
11 279	M NAT R 2B 6F 9C	
11 282	M CEP R 4A 6G 13H	C003/6G
11 285	R 2A 3B 7	CC 2A 3B
11 288	R 5A 6G 11B	
11 291	M SAT R 3B 3C	CC 3B 3C
11 294	R 2A 6G 7C	C002/6G
11 297	R 2 12F	
11 300	M AFI R 6G 13H	C002/6G
11 303	R 3C 13E	
11 306	R 6G 7E 11B	
11 309	M NAT R 3A 6D	
11 312	R 5 9C 9D	CC 9C 9D
11 315	R 6G V VCAR	
11 318	R 3 4A 13D	

* See page 358.

(See cont.)

Band **11 275-11 400 kHz** **11.3 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
11 321	R 6A 13F	
11 324	R 3A 3C 4B 12C	CC 3A 3C
11 327	M SP R 3B 5 13C	
11 330	M AFI NP R 3A 13F	
11 333	R 2B 2C 10	CC 2B 2C
11 336	M NAT R 3	
11 339	R 2B 6B 9 13K	
11 342	W WORLDWIDE	C100/II III
11 345	W WORLDWIDE	C100/I IV
11 348	W WORLDWIDE	C100/II V
11 351	W WORLDWIDE	C100/I III
11 354	W WORLDWIDE	C100/II V
11 357	R 6A 6E 10A	CC 6A 6E
11 360	M SAM R 2 3 14	CC 2 3
11 363	R 1 6E 10A	
11 366	R 1C 6B 6F 13K	CC 6B 6F
11 369	R 6G 13G	
11 372	R 2C 3B 6D	
11 375	M MID R 10A 13C	
11 378	R 3C 13M V VEUR	
11 381	R 6 12E 12J	CC 12E 12J
11 384	M CWP R 1D 12J	
11 387	M CAR V VSEA	
11 390	R 2 10	
11 393	R 9B 12E V VMID	
11 396	M CAR EA SEA	CC EA SEA

S27/229 Band **13 260-13 360 kHz** **13.3 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
13 261	V VAFI	
13 264	R 14 V VEUR	
13 267	R 3 13H	
13 270	R 6G V VNAT	
13 273	M AFI	
13 276	R 6G V VNAT	
13 279	V VNCA VSAM	
13 282	V VPAC	
13 285	R 10 V VSEA	
13 288	M AFI EUR MID	CC AFI EUR MID
13 291	M NAT R 6	
13 294	M AFI	
13 297	M CAR EA SAM	CC CAR SAM
13 300	M CEP CWP NP SP R 4	CC CEP CWP NP SP
13 303	M EA NCA	CC EA NCA
13 306	M INO NAT	
13 309	M EA SEA R 13C 13K	CC EA SEA CC 13C 13K
13 312	M MID R 11B	
13 315	M NCA SAT	
13 318	M SEA R 13	
13 321	R 2 3	CC 2 3
13 324	W WORLDWIDE	C100/I III
13 327	W WORLDWIDE	C100/I IV
13 330	W WORLDWIDE	C100/II V
13 333	W WORLDWIDE	C100/I III
13 336	W WORLDWIDE	C100/I IV
13 339	W WORLDWIDE	C100/II V
13 342	W WORLDWIDE	C100/I III

* See page 358.

(See cont.)

Band **13 260-13 360 kHz** | **13.3 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
13 345	W WORLDWIDE	C100/I IV
13 348	W WORLDWIDE	C100/II V
13 351	W WORLDWIDE	C100/I III
13 354	R 5 7	CC 5 7
13 357	M SAT R 2	

S27/230 Band **17 900-17 970 kHz** | **18 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
17 901	R 12	
17 904	M CEP CWP NP SP R 4	CC CEP CWP NP SP
17 907	M CAR EA SAM SEA	CC CAR SAM CC EA SEA
17 910	R 10	
17 913	R 6G 13	
17 916	W WORLDWIDE	C100/I III
17 919	W WORLDWIDE	C100/II IV
17 922	W WORLDWIDE	C100/I III
17 925	W WORLDWIDE	C100/II V
17 928	W WORLDWIDE	C100/III IV
17 931	W WORLDWIDE	C100/I V
17 934	W WORLDWIDE	C100/II III
17 937	W WORLDWIDE	C100/IV V
17 940	W WORLDWIDE	C100/II III
17 943	R 6	
17 946	M NAT R 14	
17 949	R 5	

* See page 358. (See cont.)

Band **17 900-17 970 kHz** **18 MHz**

(Cont.)

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
17 952	R 3	
17 955	M SAT R 6B	
17 958	M NCA	
17 961	M AFI EUR INO MID	CC AFI EUR INO MID
17 964	R 2 11B	
17 967	R 5 13A 13B 13E 13F	CC 13A 13B 13E 13F

S27/231 Band **21 924-22 000** **22 MHz**

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
21 940	W WORLDWIDE	C100/I
21 943	W WORLDWIDE	C100/V
21 946	W WORLDWIDE	C100/I
21 949	W WORLDWIDE	C100/III
21 952	W WORLDWIDE	C100/I
21 955	W WORLDWIDE	C100/IV
21 958	W WORLDWIDE	C100/I
21 961	W WORLDWIDE	C100/V
21 964	W WORLDWIDE	C100/II
21 967	W WORLDWIDE	C100/I
21 970	W WORLDWIDE	C100/III
21 973	W WORLDWIDE	C100/I
21 976	W WORLDWIDE	C100/IV
21 979	W WORLDWIDE	C100/I
21 982	W WORLDWIDE	C100/V
21 985	W WORLDWIDE	C100/II
21 988	W WORLDWIDE	C100/I
21 991	W WORLDWIDE	C100/IV
21 994	W WORLDWIDE	C100/V
21 997	W WORLDWIDE	C100/I

* See page 358.

Explanation of symbols and abbreviations

Column 2	M = MWARA R = RDARA V = VOLMET W = worldwide
Column 3	CC = common channel to
C001/...	Restricted to daytime only, in the area indicated after the slant stroke
C002/6G	In area 6G, operation is restricted to east of 95° E
C003/6G	In area 6G, operation is restricted to west of 95° E
C004/6G	Use limited to east of 110° E
C005/2A	Use limited to north of 60° N
C006/6A	Use limited to east of 75° E
C007	Not used
C008	Not used
C009/6G	In area 6G, use limited to east of 110° E and south of 25° N
C010/6G	In area 6G, use limited to east of 118° E and north of 40° N
C011/6E	In area 6E, use is limited to south of 20° N
C100/...	Worldwide Allotment Area is indicated after the symbol. For assignment procedure see No. **S27**/217.

ARTICLE 3

Frequencies for common use

S27/232 1 The carrier (reference) frequencies 3 023 kHz and 5 680 kHz are intended for common use on a world-wide basis.

S27/233 2 The use of these frequencies in any part of the world is authorized:

2.1 aboard aircraft for:

a) communications with approach and aerodrome control;

b) communication with an aeronautical station when other frequencies of the station are either unavailable or unknown;

2.2 at aeronautical stations for aerodrome and approach control under the following conditions:

a) with mean power limited to a value of not more than 20 W in the antenna circuit;

b) special attention must be given in each case to the type of antenna used in order to avoid harmful interference;

c) the power of aeronautical stations which use these frequencies in accordance with the above conditions may be increased to the extent necessary to meet certain operational requirements subject to coordination between the administrations directly concerned and those whose services may be adversely affected.

S27/234 3 Notwithstanding these provisions, the frequency 5 680 kHz may also be used at aeronautical stations for communication with aircraft stations when other frequencies of the aeronautical stations are either unavailable or unknown. However, this use shall be restricted to such areas and conditions that harmful interference cannot be caused to other authorized operations of stations in the aeronautical mobile service.

S27/235 4 Additional particulars regarding the use of these channels for the above purposes may be recommended by the meetings of ICAO.

S27/236 5 Frequencies 3 023 kHz and 5 680 kHz may also be used by stations of other mobile services participating in coordinated air-surface search and rescue operations, including communications between these stations and participating land stations. Aeronautical stations are authorized to use these frequencies to establish communications with such stations.

S27/237 6 These channels may be used for AlA, A1B or A3E emissions, in accordance with special arrangements. Such channels shall not be subdivided.

S27/238 7 All stations participating directly in coordinated search and rescue operations and using frequencies 3 023 kHz and 5 680 kHz shall transmit solely on the upper sideband except in the cases provided for in No. **S27**/57.

APPENDIX S30

Provisions for all services and associated Plans for the broadcasting-satellite service in the frequency bands 11.7-12.2 GHz (in Region 3), 11.7-12.5 GHz (in Region 1) and 12.2-12.7 GHz (in Region 2)

(See Article **S9**)

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ANNEXES

ARTICLE 1

General definitions

1 For the purposes of this Appendix the following terms shall have the meanings defined below:

1.1 *1977 Conference:* World Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in the Frequency Bands 11.7-12.2 GHz (in Regions 2 and 3) and 11.7-12.5 GHz (in Region 1), called in short World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

1.2 *1983 Conference:* Regional Administrative Radio Conference for the Planning in Region 2 of the Broadcasting-Satellite Service in the Frequency Band 12.2-12.7 GHz and Associated Feeder Links in the Frequency Band 17.3-17.8 GHz, called in short Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2 (RARC Sat-R2), Geneva, 1983.

1.3 *1985 Conference:* First Session of the Word Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985, called in short WARC Orb-85.

1.4 *Regions 1 and 3 Plan:* The Plan for the Broadcasting-Satellite Service in the Frequency Bands 11.7-12.2 GHz in Region 3 and 11.7-12.5 GHz in Region 1 contained in this Appendix, together with any modifications resulting from the successful application of the procedures of Article 4 of this Appendix.

1.5 *Region 2 Plan:* The Plan for the Broadcasting-Satellite Service in the Frequency Band 12.2-12.7 GHz in Region 2 contained in this Appendix, together with any modifications resulting from the successful application of the procedures of Article 4 of this Appendix.

1.6 *Frequency assignment in conformity with the Plan:* Any frequency assignment which appears in the Regions 1 and 3 Plan or the Region 2 Plan or for which the procedure of Article 4 of this Appendix has been successfully applied.

ARTICLE 2

Frequency bands

2.1 The provisions of this Appendix apply to the broadcasting-satellite service in the frequency bands between 11.7 GHz and 12.2 GHz in Region 3, between 11.7 GHz and 12.5 GHz in Region 1 and between 12.2 GHz and 12.7 GHz in Region 2 and to the other services to which these bands are allocated in Regions 1, 2 and 3, insofar as their relationship to the broadcasting-satellite service in these bands is concerned.

ARTICLE 3

Execution of the provisions and associated Plans

3.1 The Member States in Regions 1, 2 and 3 shall adopt, for their broadcasting-satellite space stations[1] operating in the frequency bands referred to in this Appendix, the characteristics specified in the appropriate Regional Plan and the associated provisions.

3.2 The Member States shall not change the characteristics specified in the Region 1 and Region 3 Plans or in the Region 2 Plan, or bring into use assignments to broadcasting-satellite space stations or to stations in the other services to which these frequency bands are allocated, except as provided for in the Radio Regulations and the appropriate Articles and Annexes of this Appendix.

ARTICLE 4

Procedure for modifications to the Plans

4.1 When an administration intends to make a modification[2] to one of the Regional Plans, i.e.:

a) to modify the characteristics of any of its frequency assignments to a space station[3] in the broadcasting-satellite service which are shown in the appropriate Regional Plan, or for which the procedure in this Article has been successfully applied, whether or not the station has been brought into use; *or*

b) to include in the appropriate Regional Plan a new frequency assignment to a space station in the broadcasting-satellite service; *or*

c) to cancel a frequency assignment to a space station in the broadcasting-satellite service;

the following procedure shall be applied before any notification of the frequency assignment is made to the Radiocommunication Bureau (see Article 5 of this Appendix);

4.1.1 Before an administration proposes to include in the Plan, under the provisions of § 4.1 *b)*, a new frequency assignment to a space station or to include in the Plan new frequency assignments to a space station whose orbital position is not designated in the Plan for this administration, all the assignments to the service area involved should have been brought into service or have been notified to the Bureau in accordance with the relevant provisions of the Plan.

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[1] In Region 2, such stations may also be used for transmissions in the fixed-satellite service (space-to-Earth) in accordance with No. **S5.492** of the Radio Regulations.

[2] The intention not to employ energy dispersal in accordance with § 3.18 of Annex 5 shall be treated as a modification and thus subject to the appropriate provisions of this Article.

[3] The expression “frequency assignment to a space station”, wherever it appears in this Article, shall be understood to refer to a frequency assignment associated with a given orbital position. See also Annex 7 for the orbital limitations.

4.2 The term “frequency assignment in conformity with the Plan” used in this and the following Articles is defined in Article 1.

4.3 Proposed modifications to a frequency assignment in conformity with one of the Regional Plans or inclusion in that Plan of a new frequency assignment

For Regions 1 and 3:

4.3.1 An administration proposing a modification to the characteristics of a frequency assignment in conformity with the Regions 1 and 3 Plan, or the inclusion of a new frequency assignment in that Plan, shall seek the agreement of those administrations:

4.3.1.1 of Regions 1 and 3 having a frequency assignment to a space station in the broadcasting-satellite service in the same or adjacent channel which is in conformity with the Regions 1 and 3 Plan, or in respect of which proposed modifications to that Plan have already been published by the Bureau in accordance with the provisions of § 4.3.5.1 or 4.3.6 of this Article; *or*

4.3.1.2 of Region 2 having a frequency assignment to a space station in the broadcasting-satellite service with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment, which is in conformity with the Region 2 Plan, or in respect of which proposed modifications to that Plan have already been published by the Bureau in accordance with the provisions of § 4.3.5.1 or 4.3.6 of this Article; *or*

4.3.1.3 (SUP - WRC-97)

4.3.1.4 having no frequency assignment in the broadcasting-satellite service in the channel concerned but in whose territory the power flux-density value exceeds the prescribed limit as a result of the proposed modification or having an assignment whose associated service area does not cover the whole of the territory of the administration, and in whose territory outside that service area the power flux-density from the broadcasting-satellite space station subject to this modification exceeds the prescribed limit as a result of the proposed modification; *or*

4.3.1.5 having a frequency assignment in the band 11.7-12.2 GHz in Region 2 or 12.2-12.5 GHz in Region 3 to a space station in the fixed-satellite service which is recorded in the Master International Frequency Register (Master Register) or which has been coordinated or is being coordinated under the provisions of No. **S9.7**, or those of § 7.2.1 of this Appendix;

4.3.1.6 whose services are considered to be affected.

4.3.2 The services of an administration are considered to be affected when the limits shown in Annex 1 are exceeded.

For Region 2:

4.3.3 An administration proposing a modification to the characteristics of a frequency assignment in conformity with the Region 2 Plan, or the inclusion of a new frequency assignment in that Plan, shall seek the agreement of those administrations:

4.3.3.1 of Region 2 having a frequency assignment in the Region 2 Plan to a space station in the broadcasting-satellite service in the same or adjacent channel which is in conformity with that Plan, or in respect of which proposed modifications to that Plan have already been published by the Bureau in accordance with the provisions of § 4.3.5.1 or 4.3.6 of this Article; *or*

4.3.3.2 of Regions 1 and 3 having a frequency assignment to a space station in the broadcasting-satellite service with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment, which is in conformity with the Regions 1 and 3 Plan, or in respect of which proposed modifications to that Plan have already been published by the Bureau in accordance with the provisions of § 4.3.5.1 or 4.3.6 of this Article; *or*

4.3.3.3 (SUP - WRC-97)

4.3.3.4 having no frequency assignment in the broadcasting-satellite service in the channel concerned but in whose territory the power flux-density value exceeds the prescribed limit as a result of the proposed modification or having an assignment whose associated service area does not cover the whole of the territory of the administration, and in whose territory outside that service area the power flux-density from the broadcasting-satellite space station subject to this modification exceeds the prescribed limit as a result of the proposed modification; *or*

4.3.3.5 having a frequency assignment in the band 12.5-12.7 GHz in Region 1 or 12.2-12.7 GHz in Region 3 to a space station in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. **S9.7** or those of § 7.2.1 of this Appendix; *or*

4.3.3.6 having a frequency assignment to a space station in the broadcasting-satellite service in the band 12.5-12.7 GHz in Region 3 with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment and which

a) is recorded in the Master Register, *or*

b) has been coordinated or is being coordinated under the provisions of Resolution **33 (Rev.WRC-97)**, *or*

c) appears in a Region 3 Plan to be adopted at a future radiocommunication conference, taking account of modifications to that Plan which may be introduced in accordance with the Final Acts of the Conference;

4.3.3.7 whose services are considered to be affected.

4.3.4 The services of an administration are considered to be affected when the limits shown in Annex 1 are exceeded.

For all Regions:

4.3.5 An administration intending to modify characteristics in one of the Regional Plans shall send to the Bureau, not earlier than five years but preferably not later than eighteen months before the date on which the assignment is to be brought into use, the relevant information listed in Annex 2. Modifications to that Plan involving additions under § 4.1 *b)* shall lapse if the assignment is not brought into use by that date.

4.3.5.1 Where as a result of the intended modification the limits defined in Annex 1 are not exceeded, this fact shall be indicated when submitting to the Bureau the information required by § 4.3.5. The Bureau shall then publish this information in a special section of its Weekly Circular.

4.3.5.2 In all other cases the administration shall notify the Bureau of the names of the administrations whose agreement it considers should be sought in order to arrive at the agreement referred to in § 4.3.1 or § 4.3.3, as well as of those with which agreement has already been reached.

4.3.6 The Bureau shall determine on the basis of Annex 1 the administrations whose frequency assignments are considered to be affected within the meaning of § 4.3.1 or § 4.3.3. The Bureau shall include the names of those administrations with the information received under § 4.3.5.2 and shall publish the complete information in a special section of its Weekly Circular. The Bureau shall immediately send the results of its calculations to the administration proposing the modification to the appropriate Regional Plan.

4.3.7 The Bureau shall send a telegram to the administrations listed in the special section of the Weekly Circular drawing their attention to the information it contains and shall send them the results of its calculations.

4.3.8 An administration which feels that it should have been included in the list of administrations whose services are considered to be affected may, giving the technical reasons for so doing, request the Bureau to include its name. The Bureau shall study this request on the basis of Annex 1 and shall send a copy of the request with an appropriate recommendation to the administration proposing the modification to the appropriate Regional Plan.

4.3.9 Any modification to a frequency assignment which is in conformity with the appropriate Regional Plan or any inclusion in that Plan of a new frequency assignment which would have the effect of exceeding the limits specified in Annex 1 shall be subject to the agreement of all administrations whose services are considered to be affected.

4.3.10 The administration seeking agreement or the administration with which agreement is sought may request any additional technical information it considers necessary. The administrations shall inform the Bureau of such requests.

4.3.11 Comments from administrations on the information published pursuant to § 4.3.6 should be sent either directly to the administration proposing the modification or through the Bureau. In any event the Bureau shall be informed that comments have been made.

4.3.12 An administration that has not notified its comments either to the administration seeking agreement or to the Bureau within a period of four months following the date of the Weekly Circular referred to in § 4.3.5.1 or § 4.3.6 shall be understood to have agreed to the proposed assignment. This time limit may be extended by up to three months for an administration that has requested additional information under § 4.3.10 or for an administration that has requested the assistance of the Bureau under § 4.3.20. In the latter case the Bureau shall inform the administrations concerned of this request.

4.3.13 If, in seeking agreement, an administration modifies its initial proposal, it shall again apply the provisions of § 4.3.5 and the consequent procedure with respect to any other administration whose services might be affected as a result of modifications to the initial proposal.

4.3.14 If no comments have been received on the expiry of the periods specified in § 4.3.12, or if agreement has been reached with the administrations which have made comments and with which agreement is necessary, the administration proposing the modification may continue with the appropriate procedure in Article 5 and shall inform the Bureau, indicating the final characteristics of the frequency assignment together with the names of the administrations with which agreement has been reached.

4.3.15 The agreement of the administrations affected may also be obtained in accordance with this Article, for a specified period.

4.3.16 When the proposed modification to the appropriate Regional Plan involves developing countries, administrations shall seek all practicable solutions conducive to the economical development of the broadcasting-satellite systems of these countries.

4.3.17 The Bureau shall publish in a special section of its weekly circular the information received under § 4.3.14 together with the names of any administrations with which the provisions of this Article have been successfully applied. The frequency assignment concerned shall enjoy the same status as those appearing in the appropriate Regional Plan and will be considered as a frequency assignment in conformity with the Plan.

4.3.18 When an administration proposing to modify the characteristics of a frequency assignment or to make a new frequency assignment receives notice of disagreement from an administration whose agreement it has sought, it should first endeavour to solve the problem by exploring all possible means of meeting its requirement. If the problem still cannot be solved by such means, the administration whose agreement has been sought should endeavour to overcome the difficulties as far as possible, and shall state the technical reasons for any disagreement if the administration seeking the agreement requests it to do so.

4.3.19 If no agreement is reached between the administrations concerned, the Bureau shall carry out any study that may be requested by these administrations; the Bureau shall inform them of the result of the study and shall make such recommendations as it may be able to offer for the solution of the problem.

4.3.20 An administration may at any stage in the procedure described, or before applying it, request the assistance of the Bureau, particularly in seeking the agreement of another administration.

4.3.21 The relevant provisions of Article 5 of this Appendix shall be applied when frequency assignments are notified to the Bureau.

4.4 Cancellation of frequency assignments

When a frequency assignment in conformity with one of the Regional Plans is no longer required, whether or not as a result of a modification, the administration concerned shall immediately so inform the Bureau. The Bureau shall publish this information in a special section of its weekly circular and delete the assignment from the appropriate Regional Plan.

4.5 Master copy of the Plans

4.5.1 *a)* The Bureau shall maintain an up-to-date master copy of the Regions 1 and 3 Plan taking account of the application of the procedure specified in this Article. The Bureau shall publish a document listing the amendments to be made to the Plan as a result of modifications made in accordance with the procedure in this Article.

b) The Bureau shall maintain an up-to-date master copy of the Region 2 Plan, including the overall equivalent protection margins of each assignment, taking account of the application of the procedure specified in this Article. This master copy shall contain the overall equivalent protection margins derived from the Plan as established by the 1983 Conference and those derived from all modifications to the Plan as a result of the successful completion of the modification procedure described in this Article. The Bureau shall prepare a document listing the amendments to be made to the Plan as a result of modifications made in accordance with the procedure described in this Article.

4.5.2 The Secretary-General shall be informed by the Bureau of any modifications made to the Regional Plans and shall publish an up-to-date version of those Plans in an appropriate form when justified by the circumstances.

ARTICLE 5

Notification, examination and recording in the Master International Frequency Register of frequency assignments to space stations in the broadcasting-satellite service

5.1 Notification

5.1.1 Whenever an administration intends to bring into use a frequency assignment to a space station in the broadcasting-satellite service, it shall notify this frequency assignment to the Bureau. For this purpose, the notifying administration shall apply the following provisions.

5.1.2 For any notification under § 5.1.1, an individual notice for each frequency assignment shall be drawn up as prescribed in Annex 2, the various sections of which specify the basic characteristics to be provided as appropriate. It is recommended that the notifying administration should also supply any other data it may consider useful.

5.1.3 Each notice must reach the Bureau not earlier than three years before the date on which the frequency assignment is to be brought into use. In any case, the notice must reach the Bureau not later than three months before that date[4].

5.1.4 Any frequency assignment the notice of which reaches the Bureau after the applicable period specified in § 5.1.3 shall, where it is to be recorded, bear a remark in the Master Register to indicate that it is not in conformity with § 5.1.3.

5.1.5 Any notice made under § 5.1.1 which does not contain the characteristics specified in Annex 2 shall be returned by the Bureau immediately by airmail to the notifying administration with the relevant reasons.

5.1.6 Upon receipt of a complete notice, the Bureau shall include its particulars, with the date of receipt, in its Weekly Circular, which shall contain the particulars of all such notices received since the publication of the previous Circular.

5.1.7 The circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

5.1.8 Complete notices shall be considered by the Bureau in order of receipt. The Bureau shall not postpone its finding unless it lacks sufficient data to reach a decision; moreover, the Bureau shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Bureau until it has reached a finding with respect to such earlier notice.

5.2 Examination and recording

5.2.1 The Bureau shall examine each notice:

a) with respect to its conformity with the Constitution, the Convention and the relevant provisions of the Radio Regulations (with the exception of those relating to § *b)*, *c)* and *d)* below);

b) with respect to its conformity with the appropriate Regional Plan; *or*

c) with respect to its conformity with the appropriate Regional Plan, however, having characteristics differing from those in the appropriate Regional Plan in one or more of the following aspects:

- use of a reduced e.i.r.p.,
- use of a reduced coverage area entirely situated within the coverage area appearing in the appropriate Regional Plan,
- use of other modulating signals in accordance with the provisions of § 3.1.3 of Annex 5,

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[4] Where appropriate, the notifying administration shall initiate the procedure for modifying the Plan concerned in sufficient time to ensure that this limit is observed. For Region 2, see also Resolution **42 (Rev.Orb-88)** and paragraph B of Annex 7.

– use of the assignment for transmission in the fixed-satellite service in accordance with No. **S5.492**,

– use of an orbital position under the conditions specified in paragraph B of Annex 7; *or*

d) with respect to its conformity with the provisions of Resolution **42 (Rev.Orb-88)**.

5.2.2 Where the Bureau reaches a favourable finding with respect to § 5.2.1 *a)* and 5.2.1 *b)*, the frequency assignment of an administration shall be recorded in the Master Register. The date of receipt of the notice by the Bureau shall be entered in Column 2d. In relations between administrations, all frequency assignments brought into use in conformity with the appropriate Regional Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments.

5.2.2.1 Where the Bureau reaches a favourable finding with respect to § 5.2.1 *a)* and 5.2.1 *c)*, the frequency assignment shall be recorded in the Master Register. The date of receipt of the notice by the Bureau shall be entered in Column 2d. In relations between administrations, all frequency assignments brought into use in conformity with the appropriate Regional Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments. When recording these assignments, the Bureau shall indicate by an appropriate symbol the characteristics having a value different from that appearing in the appropriate Regional Plan.

5.2.2.2 Where the Bureau reaches a favourable finding with respect to § 5.2.1 *a)* but an unfavourable finding with respect to § 5.2.1 *b)* and 5.2.1 *c)*, it shall examine the notice with respect to the successful application of the provisions of Resolution **42 (Rev.Orb-88)**. A frequency assignment for which the provisions of Resolution **42 (Rev.Orb-88)** have been successfully applied shall be recorded in the Master Register with an appropriate symbol to indicate its interim status. The date of receipt of the notice by the Bureau shall be entered in Column 2d. In relations between administrations all frequency assignments brought into use following the successful application of the provisions of Resolution **42 (Rev.Orb-88)** and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments.

5.2.3 Whenever a frequency assignment is recorded in the Master Register, the finding reached by the Bureau shall be indicated by a symbol in Column 13a.

5.2.4 Where the Bureau reaches an unfavourable finding with respect to § 5.2.1 *a)*, 5.2.1 *b)* and 5.2.1 *c)*, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Bureau for this finding and with such suggestions as the Bureau may be able to offer with a view to a satisfactory solution of the problem.

5.2.5 Where the notifying administration resubmits the notice and the finding of the Bureau becomes favourable with respect to the appropriate parts of § 5.2.1, the notice shall be treated as in § 5.2.2, 5.2.2.1 or 5.2.2.2, as appropriate.

5.2.6 If the notifying administration resubmits the notice without modification and insists on its reconsideration, and if the Bureau’s finding with respect to § 5.2.1 remains unfavourable, the notice is returned to the notifying administration in accordance with § 5.2.4. In this case, the

notifying administration undertakes not to bring into use the frequency assignment until the condition specified in § 5.2.5 is fulfilled. For Regions 1, 2 and 3, in the event that the Bureau has been informed of agreement to modification of the Plan for a specified period of time in accordance with Article 4, the frequency assignment shall be recorded in the Master Register with a note indicating that the frequency assignment is valid only for the period specified. The notifying administration using the frequency assignment over a specified period shall not subsequently invoke this fact to justify the continued use of the frequency beyond the period specified unless it obtains the agreement of the administration(s) concerned.

5.2.7 If a frequency assignment notified in advance of bringing into use in conformity with § 5.1.3 has received a favourable finding by the Bureau with respect to the provisions of § 5.2.1, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

5.2.8 When the Bureau has received confirmation that the frequency assignment has been brought into use, the Bureau shall remove the symbol in the Master Register.

5.2.9 The date in Column 2c shall be the date of bringing into use notified by the administration concerned. It is given for information only.

5.3 Cancellation of entries in the Master Register

5.3.1 If an administration has not confirmed the bringing into use of a frequency assignment under § 5.2.8, the Bureau will make inquiries of the administration not earlier than six months after the expiry of the period specified in § 5.1.3. On receipt of the relevant information, the Bureau will either modify the date of coming into use or cancel the entry.

5.3.2 If the use of any recorded frequency assignment is permanently discontinued, the notifying administration shall so inform the Bureau within three months, whereupon the entry shall be removed from the Master Register.

ARTICLE 6

Coordination, notification and recording in the Master International Frequency Register of frequency assignments to terrestrial stations affecting broadcasting-satellite frequency assignments in the frequency bands 11.7-12.2 GHz (in Region 3), 11.7-12.5 GHz (in Region 1) and 12.2-12.7 GHz (in Region 2)[5]

Section I – Coordination procedure to be applied

6.1.1 Before notifying to the Bureau a frequency assignment to a terrestrial transmitting station, an administration shall initiate coordination with any other administration having a frequency assignment to a broadcasting-satellite station in conformity with the appropriate Regional Plan if:

– the necessary bandwidths of the two transmissions overlap; *and*

– the power flux-density which would be produced by the proposed terrestrial transmitting station exceeds the value derived in accordance with Annex 3 at one or more points on the edge of the service area which is within the coverage area of the broadcasting-satellite station of that administration.

6.1.2 For the purpose of effecting coordination, the administration responsible for the terrestrial station shall send to the administrations concerned, by the fastest possible means, a diagram drawn to an appropriate scale indicating the location of the terrestrial station and all other data of the proposed frequency assignment and the approximate date on which it is planned to bring the station into use.

6.1.3 An administration with which coordination is sought shall acknowledge receipt of the coordination data immediately by telegram. If no acknowledgement is received within fifteen days of dispatch, the administration seeking coordination may dispatch a telegram requesting acknowledgement of receipt of the coordination data, to which the receiving administration shall reply. Upon receipt of the coordination data, an administration with which coordination is sought shall promptly examine the matter with regard to interference[6] which would be caused to its frequency assignments in conformity with the appropriate Regional Plan and shall, within an overall period of two months from dispatch of the coordination data, either notify the administration requesting coordination of its agreement to the proposed assignment or, if this is impossible, indicate the reasons therefor and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem.

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[5] These procedures do not replace the procedures prescribed for terrestrial stations in Articles **S9** and **S11**.

[6] The criteria to be employed in evaluating interference levels shall be based on the relevant ITU-R Recommendations or, in the absence of such Recommendations, shall be agreed between the administrations concerned.

6.1.4 No coordination is required when an administration proposes to change the characteristics of an existing assignment in such a way as not to increase the level of interference to the service to be rendered by the broadcasting-satellite stations of other administrations.

6.1.5 An administration seeking coordination may request the Bureau to endeavour to effect coordination where:

a) an administration with which coordination is sought fails to acknowledge receipt under § 6.1.3 within one month of dispatch of the coordination data;

b) an administration which has acknowledged receipt under § 6.1.3 fails to give a decision within three months of dispatch of the coordination data;

c) the administration seeking coordination and an administration with which coordination is sought disagree on the acceptable level of interference; *or*

d) coordination is impossible for any other reason.

In so doing, the administration concerned shall provide the Bureau with the necessary information to enable it to endeavour to effect such coordination.

6.1.6 Either the administration seeking coordination or an administration with which coordination is sought, or the Bureau, may request any additional information which they may require to assess the level of interference to the services concerned.

6.1.7 Where the Bureau receives a request under § 6.1.5 *a)*, it shall forthwith send a telegram to the administration concerned requesting immediate acknowledgement.

6.1.8 Where the Bureau receives an acknowledgement following its action under § 6.1.7 or receives a request under § 6.1.5 *b)*, it shall forthwith send a telegram to the administration concerned requesting an early decision on the matter.

6.1.9 Where the Bureau receives a request under § 6.1.5 *d)*, it shall endeavour to effect coordination in accordance with the provisions of § 6.1.2. Where the Bureau receives no acknowledgement of its request for coordination within the period specified in § 6.1.3, it shall act in accordance with § 6.1.7.

6.1.10 Where an administration fails to reply within one month of dispatch of the Bureau's telegram sent under § 6.1.7 requesting an acknowledgement or fails to give a decision on the matter within two months of dispatch of the Bureau's telegram of request sent under § 6.1.8, the administration with which coordination was sought shall be considered to have undertaken that no complaint will be made in respect of any harmful interference which may be caused by the terrestrial station being coordinated to the service rendered or to be rendered by its satellite-broadcasting station.

6.1.11 Where necessary, as part of the procedure under § 6.1.5, the Bureau shall assess the level of interference. In any case, the Bureau shall inform the administrations concerned of the results obtained.

6.1.12 In the event of continuing disagreement between one administration seeking to effect coordination and one with which coordination has been sought, the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

Section II – Notification procedure for frequency assignments

6.2.1 Any frequency assignment to a fixed, land or broadcasting station shall be notified to the Bureau if the use of the frequency concerned is capable of causing harmful interference to the service rendered or to be rendered by a broadcasting-satellite station of any other administration, or if it is desired to obtain international recognition of the use of the frequency[7].

6.2.2 For this notification, an individual notice for each frequency assignment shall be drawn up as prescribed in Appendix **S4**, Annexes 1A and 1B, which specifies the basic characteristics to be furnished as required. It is recommended that the notifying administration should also supply the additional data called for in that Appendix, together with such further data as it may consider appropriate.

6.2.3 Whenever practicable, each notice should reach the Bureau before the date on which the assignment is brought into use. The notice made in accordance with § 6.2.2 must reach the Bureau not earlier than three years and not later than three months before the date on which the assignment is to be brought into use.

6.2.4 Any frequency assignment, the notice of which reaches the Bureau less than three months before it is brought into use shall, where it is to be recorded, bear a remark in the Master Register to indicate that it is not in conformity with § 6.2.3.

Section III – Procedure for the examination of notices and the recording of frequency assignments in the Master Register

6.3.1 Whatever the means of communication, including telegram, by which a notice is transmitted to the Bureau, it shall be considered complete if it contains at least the appropriate basic characteristics specified in Appendix **S4**, Annexes 1A and 1B.

6.3.2 Complete notices shall be considered by the Bureau in the order of their receipt.

6.3.3 Any incomplete notice shall be returned by the Bureau immediately, by airmail, to the notifying administration with the reasons therefor.

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[7] The attention of administrations is specifically drawn to the provisions of Section I of this Article.

6.3.4 Upon receipt of a complete notice, the Bureau shall include the particulars thereof, with the date of receipt, in its weekly circular; this Circular shall contain the particulars of all such notices received since publication of the previous Circular.

6.3.5 The Circular shall constitute the Bureau's acknowledgement to the notifying administration of the receipt of a complete notice.

6.3.6 Complete notices shall be considered by the Bureau in the order specified in § 6.3.2. The Bureau may not postpone the formulation of a finding unless it lacks sufficient data to reach a decision; moreover, the Bureau shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Bureau until it has reached a finding with respect to such earlier notice.

6.3.7 The Bureau shall examine each notice:

6.3.8 – with respect to its conformity with the Constitution, the Convention, the relevant provisions of the Radio Regulations and the provisions of this Appendix (with the exception of those relating to the coordination procedure and the probability of harmful interference);

6.3.9 – with respect to its conformity with the provisions of § 6.1.1 relating to coordination of the use of the frequency assignment with the other administrations concerned;

6.3.10 – where appropriate, with respect to the probability of harmful interference to a broadcasting-satellite station whose frequency assignment is in conformity with the appropriate Regional Plan.

6.3.11 Depending upon the findings of the Bureau subsequent to the examination prescribed in § 6.3.8, 6.3.9 and 6.3.10, further action shall be as follows:

6.3.12 Finding unfavourable with respect to § 6.3.8

6.3.13 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. **S4.4**, it shall be examined immediately with respect to § 6.3.9 and 6.3.10.

6.3.14 If the finding is favourable with respect to § 6.3.9 or 6.3.10, as appropriate, the assignment shall be recorded in the Master Register. The date of receipt of the notice by the Bureau shall be entered in Column 2d.

6.3.15 If the finding is unfavourable with respect to § 6.3.9 or 6.3.10, as appropriate, the notice shall be returned immediately by airmail to the notifying administration with the Bureau's reasons for this finding. In such case the notifying administration shall undertake not to bring into use the frequency assignment until the condition specified in § 6.3.14 can be fulfilled. However, the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

6.3.16 Where the notice does not include a specific reference to the fact that the station will be operated in accordance with the provisions of No. **S4.4**, it shall be returned immediately by airmail to the notifying administration with the Bureau's reasons for this finding and with such suggestions as the Bureau may be able to offer with a view to a satisfactory solution of the problem.

6.3.17 If the notifying administration resubmits the notice unchanged, it shall be treated in accordance with the provisions of § 6.3.16.

6.3.18 If the notifying administration resubmits the notice with a specific reference to the fact that the station will be operated in accordance with the provisions of No. **S4.4**, it shall be treated in accordance with the provisions of § 6.3.13 and 6.3.14 or 6.3.15, as appropriate.

6.3.19 If the notifying administration resubmits the notice with modifications which, after re-examination, result in a favourable finding by the Bureau with respect to § 6.3.8, the notice shall be treated in accordance with the provisions of § 6.3.20 to 6.3.32. However, in any subsequent recording of the assignment, the date of receipt of the resubmitted notice by the Bureau shall be entered in Column 2d.

6.3.20 Finding favourable with respect to § 6.3.8

6.3.21 Where the Bureau finds that the coordination procedure mentioned in § 6.3.9 has been successfully applied with all administrations whose broadcasting-satellite services may be affected, the assignment shall be recorded in the Master Register. The date of receipt of the notice by the Bureau shall be entered in Column 2d.

6.3.22 Where the Bureau finds that the coordination procedure mentioned in § 6.3.9 has not been applied, and the notifying administration requests the Bureau to effect the required coordination, the Bureau shall take the appropriate action and shall inform the administrations concerned of the results obtained. If the Bureau's efforts are successful, the notice shall be treated in accordance with the provisions of § 6.3.21. If the Bureau's efforts are unsuccessful, the notice shall be examined by the Bureau with respect to the provisions of § 6.3.10.

6.3.23 Where the Bureau finds that the coordination procedure mentioned in § 6.3.9 has not been applied and the notifying administration does not request the Bureau to effect the required coordination, the notice shall be returned immediately by airmail to the notifying administration with the Bureau's reasons for this action and with such suggestions as the Bureau may be able to offer with a view to a satisfactory solution of the problem.

6.3.24 Where the notifying administration resubmits the notice and the Bureau finds that the coordination procedure mentioned in § 6.3.9 has been successfully applied with all administrations whose broadcasting-satellite services may be affected, the assignment shall be recorded in the Master Register. The date of receipt of the original notice by the Bureau shall be entered in Column 2d. The date of the receipt of the resubmitted notice by the Bureau shall be entered in the Remarks Column.

6.3.25 Where the notifying administration resubmits the notice, requesting the Bureau to effect the required coordination, it shall be treated in accordance with the provisions of § 6.3.22. However, in any subsequent recording of the assignment, the date of receipt of the resubmitted notice by the Bureau shall be entered in the Remarks Column.

6.3.26 Where the notifying administration resubmits the notice and states that it has been unsuccessful in its efforts to effect coordination, it shall be examined by the Bureau with respect to the provisions of § 6.3.10. However, in any subsequent recording of the assignment, the date of receipt of the resubmitted notice by the Bureau shall be entered in the Remarks Column.

6.3.27 Finding favourable with respect to § 6.3.8 and 6.3.10

6.3.28 The assignment shall be recorded in the Master Register. The date of receipt by the Bureau of the notice shall be entered in Column 2d.

6.3.29 Finding favourable with respect to § 6.3.8 but unfavourable with respect to § 6.3.10

6.3.30 The notice shall be returned immediately by airmail to the notifying administration with the Bureau’s reasons for this finding and with such suggestions as the Bureau may be able to offer with a view to a satisfactory solution of the problem.

6.3.31 Should the notifying administration resubmit the notice with modifications which result, after re-examination, in a favourable finding by the Bureau with respect to § 6.3.10, the assignment shall be recorded in the Master Register. The date of receipt of the original notice by the Bureau shall be entered in Column 2d. The date of receipt of the resubmitted notice by the Bureau shall be indicated in the Remarks Column.

6.3.32 Should the notifying administration resubmit the notice, either unchanged or with modifications which reduce the probability of harmful interference, but insufficiently to permit the provisions of § 6.3.31 to be applied and should that administration insist upon reconsideration of the notice but the Bureau’s finding remain unchanged, the notification shall again be returned to the notifying administration in accordance with § 6.3.30. In such case, the notifying administration shall undertake not to bring into use the proposed frequency assignment until the condition specified in § 6.3.31 can be fulfilled. However, the administrations concerned may explore the possibility of reaching an agreement on the use of the frequency assignment for a specified period. In that event the Bureau shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note indicating that the assignment is valid only for the specified period. The notifying administration using the frequency assignment during a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond this period unless it obtains the agreement of the administration or administrations concerned.

6.3.33 Change in the basic characteristics of assignments already recorded in the Master Register

6.3.34 Any notice of a change in the basic characteristics of an assignment already recorded in the Master Register, as specified in Appendix **S4**, Annexes 1A and 1B (except those entered in Columns 2c, 3 and 4a of the Master Register), shall be examined by the Bureau in accordance with the provisions of § 6.3.8 and 6.3.9 and, where appropriate, § 6.3.10 and the provisions of § 6.3.12 to 6.3.32 inclusive shall be applied. Where the change should be recorded, the original assignment shall be amended according to the notice.

6.3.35 However, in the event of a change in the basic characteristics of an assignment which is in conformity with § 6.3.8, should the Bureau reach a favourable finding with respect to § 6.3.9 and, if applicable, § 6.3.10, or find that the change does not increase the probability of harmful interference to assignments already recorded, the amended assignment shall retain the original date in Column 2d. In addition, the date of receipt by the Bureau of the notice relating to the change shall be entered in the Remarks Column.

6.3.36 The planned date of bringing into use of a frequency assignment may be extended on request of the notifying administration by three months. Where the administration states that, due to exceptional circumstances, it needs a further extension of this period, such extension may be granted, but it shall in no case exceed six months from the original planned date of bringing into use.

6.3.37 In applying the provisions of this Section, any resubmitted notice which is received by the Bureau more than two years after the date of its return by the Bureau shall be considered as a new notice.

6.3.38 Recording of frequency assignments notified before being brought into use

6.3.39 If a frequency assignment notified prior to its bringing into use has received a favourable finding by the Bureau with respect to § 6.3.8 and 6.3.9, and, where appropriate, § 6.3.10, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

6.3.40 Within one month after the date of bringing into use, either as originally notified or as modified in application of § 6.3.36, the notifying administration shall confirm that the frequency assignment has been brought into use. When the Bureau is informed that the assignment has been brought into use, the special symbol shall be deleted from the Remarks Column.

6.3.41 If the Bureau fails to receive this confirmation within the period referred to in § 6.3.40, the entry concerned shall be cancelled. The Bureau shall consult the administration concerned before taking such action.

ARTICLE 7

Procedures for coordination, notification and recording in the Master International Frequency Register of frequency assignments to stations in the fixed-satellite service in the frequency bands 11.7-12.2 GHz (in Region 2), 12.2-12.7 GHz (in Region 3) and 12.5-12.7 GHz (in Region 1), when frequency assignments to broadcasting-satellite stations in conformity with the Regions 1 and 3 Plan, or the Region 2 Plan, respectively, are involved[8]

Section I – Procedure for the advance publication of information on planned fixed-satellite systems

Publication of information

7.1.1 An administration which intends to establish a fixed-satellite system shall, prior to the procedure described in § 7.2.1, where applicable, send to the Bureau, not earlier than five years and preferably not later than two years before the date of bringing into service each satellite network of the planned system, the information listed in Appendix **S4**, Annexes 2A and 2B.

7.1.2 Any amendments to the information concerning a planned satellite system sent in accordance with § 7.1.1 shall also be sent to the Bureau as soon as they become available.

7.1.3 The Bureau shall publish the information sent under § 7.1.1 and 7.1.2 in a special section of its Weekly Circular and shall also, when the Weekly Circular contains such information, so advise all administrations by circular telegram. The circular telegram shall include the frequency bands to be used and, in the case of a geostationary satellite, the orbital location of the space station.

7.1.3.1 If the information is found to be incomplete, the Bureau shall publish it under § 7.1.3 and immediately seek, from the administration concerned, any clarification and information not provided. In such cases, the period of three months specified in § 7.1.4 shall count from the date of publication, under § 7.1.3, of the complete information.

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[8] These provisions do not replace the procedures prescribed in Articles **S9** and **S11** when stations other than those of the broadcasting-satellite service are involved.

Comments on published information

7.1.4 If, after studying the information published under § 7.1.3, any administration is of the opinion that interference which may be unacceptable may be caused to its frequency assignments in conformity with the appropriate Regional Plan, it shall, within three months after the date of the Weekly Circular publishing the information listed in Appendix **S4**, Annexes 2A and 2B, send its comments to the administration concerned. A copy of these comments shall also be sent to the Bureau. If no such comments are received from an administration within the period mentioned above, it may be assumed that that administration has no basic objections to the planned fixed-satellite network(s) of that system of which details have been published.

Resolution of difficulties

7.1.5 An administration receiving comments sent in accordance with § 7.1.4 shall endeavour to resolve any difficulties that may arise without considering the possibility of adjustment to broadcasting-satellite stations of other administrations. If no such means can be found, the administration concerned is then free to apply to other administrations concerned in order to solve these difficulties, provided that any modifications which may result to the appropriate Regional Plan are in accordance with Article 4.

7.1.6 In their attempts to resolve the difficulties mentioned above, administrations may seek the assistance of the Bureau.

Results of advance publication

7.1.7 An administration, on behalf of which details of planned satellite networks have been published in accordance with the provisions of § 7.1.1 and 7.1.2 shall, after the period of three months specified in § 7.1.4, inform the Bureau whether or not comments provided for in § 7.1.4 have been received and of the progress made in resolving any remaining difficulties. Additional information on the progress made in resolving any remaining difficulties shall be sent to the Bureau at intervals not exceeding six months prior to the commencement of coordination or the sending in of notices to the Bureau. The Bureau shall publish this information in a special section of its Weekly Circular and shall also, when the Weekly Circular contains such information, so inform all administrations by circular telegram.

Commencement of coordination or notification procedure

7.1.8 In complying with the provisions of § 7.1.5 and 7.1.6, an administration responsible for a planned fixed-satellite system shall, if necessary, defer its commencement of the coordination procedure of § 7.2.1 or, where this is not applicable, the sending of its notices to the Bureau until five months after the date of the Weekly Circular containing the information listed in Appendix **S4**, Annexes 2A and 2B on the relevant satellite network. However, in respect of those administrations with which difficulties have been resolved or which have responded favourably, the coordination procedure, where applicable, may be commenced prior to the expiry of the five months mentioned above.

Section II – Coordination procedures to be applied in appropriate cases

7.2.1 Before an administration notifies to the Bureau or brings into use any frequency assignment to a space station in the fixed-satellite service, it shall seek the agreement of any other administration having a frequency assignment in conformity with the appropriate Regional Plan, if:

a) any portion of the necessary bandwidth proposed for the space station in the fixed-satellite service falls within the necessary bandwidth associated with the frequency assignment to the broadcasting-satellite station; *and*

b) the power flux-density which would be produced by the proposed fixed-satellite assignment exceeds the value specified in Annex 4.

For this purpose, the administration seeking agreement shall send to any other such administration the information listed in Appendix **S4**, Annexes 2A and 2B.

7.2.2 No additional agreement is necessary when an administration proposes to change the characteristics of an existing assignment in such a way as will, in respect of the broadcasting-satellite service of another administration, meet the requirements of § 7.2.1 above, or when this assignment has previously been the subject of an agreement and when the change will not cause any increase in the interference potential specified in that agreement.

7.2.3 An administration seeking coordination under § 7.2.1 shall at the same time send to the Bureau a copy of the request for coordination together with the information listed in Appendix **S4**, Annexes 2A and 2B and the name(s) of the administration(s) whose agreement is sought. The Bureau shall determine on the basis of Annex 4 which frequency assignments in conformity with the appropriate Regional Plan are considered to be affected. The Bureau shall include the names of those administrations with the information received from the administration seeking coordination and shall publish this information in a special section of its Weekly Circular, together with a reference to the Weekly Circular in which details of the satellite system were published in accordance with Section I of this Article. When the Weekly Circular contains such information, the Bureau shall so inform all administrations by circular telegram.

7.2.4 An administration believing that it should have been included in the procedure under § 7.2.1 shall have the right to request that it be brought into the procedure.

7.2.5 An administration whose agreement is sought under § 7.2.1 shall acknowledge receipt of the coordination data immediately by telegram. If no acknowledgement is received within one month after the date of the Weekly Circular publishing the information under § 7.2.3, the administration seeking coordination shall dispatch a telegram requesting acknowledgement, to which the receiving administration shall reply within a further period of one month. Upon receipt of the coordination data, an administration shall, having regard to the proposed date of bringing into use of the assignment for which agreement was requested, promptly examine the

matter with regard to interference[9] which would be caused to the service rendered by its stations in respect of which agreement is sought under § 7.2.1, and shall, within three months from the date of the relevant Weekly Circular, notify its agreement to the requesting administration. If the administration with which coordination is sought does not agree, it shall, within the same period, send to the administration seeking coordination the technical details upon which its disagreement is based, and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem. A copy of these comments shall also be sent to the Bureau.

7.2.6 An administration seeking coordination may request the Bureau to endeavour to effect coordination in those cases where:

a) an administration whose agreement is sought under § 7.2.1 fails to acknowledge receipt, under § 7.2.5, within two months after the date of the weekly circular publishing the information relating to the request for coordination;

b) an administration has acknowledged receipt under § 7.2.5, but fails to give a decision within three months from the date of the relevant Weekly Circular;

c) there is disagreement between the administration seeking coordination and an administration whose agreement is sought as to the acceptable level of interference; *or*

d) agreement between administrations is not possible for any other reason.

In so doing, it shall furnish the Bureau with the necessary information to enable it to endeavour to effect such coordination.

7.2.7 Either the administration seeking coordination or an administration whose agreement is sought, or the Bureau, may request additional information which they may require to assess the level of interference to the services concerned.

7.2.8 Where the Bureau receives a request under § 7.2.6 *a)*, it shall forthwith send a telegram to the administration whose agreement is sought requesting immediate acknowledgement.

7.2.9 Where the Bureau receives an acknowledgement following its action under § 7.2.8, or where the Bureau receives a request under § 7.2.6 *b)*, it shall forthwith send a telegram to the administration whose agreement is sought requesting an early decision on the matter.

7.2.10 Where the Bureau receives a request under § 7.2.6 *d)*, it shall endeavour to effect coordination in accordance with the provisions of § 7.2.1. The Bureau shall also, where appropriate, act in accordance with § 7.2.3. Where the Bureau receives no acknowledgement to its request for coordination within the periods specified in § 7.2.5, it shall act in accordance with § 7.2.8.

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[9] The criteria to be employed in evaluating interference levels shall be based upon the technical information contained in this Appendix or upon relevant ITU-R Recommendations and shall be agreed between the administrations concerned.

7.2.11 Where an administration fails to reply within one month of dispatch of the Bureau's telegram requesting an acknowledgement sent under § 7.2.8, or fails to give a decision on the matter within one month of dispatch of the Bureau's telegram of request under § 7.2.9, it shall be deemed that the administration whose agreement was sought has undertaken:

a) that no complaint will be made in respect of any harmful interference which may be caused to the services rendered by its broadcasting-satellite stations by the use of the assignment for which coordination was requested;

b) that its broadcasting-satellite stations will not cause harmful interference to the use of the assignment for which coordination was requested.

7.2.12 Where necessary, as part of the procedure under § 7.2.6, the Bureau shall assess the level of interference. In any case, the Bureau shall inform the administrations concerned of the results obtained.

7.2.13 In the event of continuing disagreement between one administration seeking to effect coordination and one whose agreement has been sought, provided that the assistance of the Bureau has been requested, the administration seeking coordination may, after five months from the date of the request for coordination, taking into consideration the provisions of § 7.3.4, send its notice concerning the proposed assignment to the Bureau. In those circumstances the notifying administration shall undertake not to bring the frequency assignment into use until the condition in § 7.4.11.2 can be fulfilled. But the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

Section III – Notification of frequency assignments

7.3.1 Any frequency assignment to a space station in the fixed-satellite service shall be notified to the Bureau:

a) if the use of the frequency concerned is capable of causing harmful interference to a frequency assignment of another administration which is in conformity with the appropriate Regional Plan[10]; *or*

b) if it is desired to obtain international recognition of the use of the frequency.

7.3.2 Similar notice shall be given for any frequency to be used for reception by an earth station where one or more of the conditions specified in § 7.3.1 are applicable.

7.3.3 For any notification under § 7.3.1 or 7.3.2, an individual notice for each frequency assignment shall be drawn up as prescribed in Appendix **S4**, Annexes 2A and 2B, the various Sections of which specify the basic characteristics to be furnished according to the case. The notifying administration shall furnish such further data as it considers appropriate.

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[10] The attention of administrations is specifically drawn to the application of § 7.2.1 above.

7.3.4 Each notice must reach the Bureau not earlier than three years before the date on which the assignment is to be brought into use. The notice must reach the Bureau in any case not later than three months[11] before this date.

7.3.5 Any frequency assignment to an earth or space station, the notice of which reaches the Bureau after the applicable period specified in § 7.3.4, shall, where it is to be recorded, bear a mark in the Master Register to indicate that it is not in conformity with § 7.3.4.

Section IV – Procedure for the examination of notices and the recording of frequency assignments in the Master Register

7.4.1 Any notice which does not contain at least those basic characteristics specified in Appendix **S4**, Annexes 2A and 2B shall be returned by the Bureau immediately, by airmail, to the notifying administration with the reasons therefor.

7.4.2 Upon receipt of a complete notice, the Bureau shall include the particulars thereof, with the date of receipt, in its Weekly Circular which shall contain the particulars of all such notices received since the publication of the previous Circular.

7.4.3 The Circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

7.4.4 Complete notices shall be considered by the Bureau in the order of their receipt. The Bureau shall not postpone the formulation of a finding unless it lacks sufficient data to render a decision in connection therewith; moreover, the Bureau shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Bureau, until it has reached a finding with respect to such earlier notice.

7.4.5 The Bureau shall examine each notice:

7.4.5.1 with respect to its conformity with the Constitution, the Convention, the relevant provisions of the Radio Regulations and the provisions of this Appendix (with the exception of those relating to the coordination procedures and the probability of harmful interference);

7.4.5.2 where appropriate, with respect to its conformity with the provisions of § 7.2.1, relating to the coordination of the use of the frequency assignment with the other administrations concerned having a frequency assignment in conformity with the appropriate Regional Plan;

7.4.5.3 where appropriate, with respect to the probability of harmful interference to the service rendered or to be rendered by a broadcasting-satellite station whose frequency assignment is in conformity with the appropriate Regional Plan.

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[11] The notifying administration shall take this limit into account when deciding, where appropriate, to initiate the coordination procedure(s).

7.4.6 Depending upon the findings of the Bureau subsequent to the examination prescribed in § 7.4.5.1, 7.4.5.2 and 7.4.5.3, as appropriate, further action shall be as follows:

7.4.7 Finding favourable with respect to § 7.4.5.1 in cases where the provisions of § 7.4.5.2 are not applicable

7.4.7.1 The assignment shall be recorded in the Master Register. The date of receipt by the Bureau of the notice shall be entered in Column 2d.

7.4.8 Finding unfavourable with respect to § 7.4.5.1

7.4.8.1 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. **S4.4** and the finding is favourable with respect to § 7.4.5.2 and 7.4.5.3, as appropriate, the assignment shall be recorded in the Master Register. The date of receipt of notice by the Bureau shall be entered in Column 2d.

7.4.8.2 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. **S4.4** and the finding is unfavourable with respect to § 7.4.5.2 or 7.4.5.3, as appropriate, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Bureau for this finding. In those circumstances the notifying administration shall undertake not to bring into use the frequency assignment until the condition in § 7.4.8.1 can be fulfilled. The agreement of the administrations affected can also be obtained in accordance with this Article for a specified period. In that event the Bureau shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note indicating that the frequency assignment is valid only for the period specified. The notifying administration using the frequency assignment over a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration(s) concerned. The date of receipt by the Bureau of the original notice shall be entered in Column 2d.

7.4.8.3 Where the notice does not include a specific reference to the fact that the station will be operated in accordance with the provisions of No. **S4.4**, it shall be returned immediately by airmail to the notifying administration with the reasons of the Bureau for this finding and with such suggestions as the Bureau may be able to offer with a view to the satisfactory solution of the problem.

7.4.8.4 If the notifying administration resubmits the notice unchanged, it shall be treated in accordance with the provisions of § 7.4.8.3. If it is resubmitted with a specific reference to the fact that the station will be operated in accordance with the provisions of No. **S4.4**, it shall be treated in accordance with the provisions of § 7.4.8.1 or 7.4.8.2, as appropriate. If it is resubmitted with modifications which, after re-examination, result in a favourable finding by the Bureau with respect to § 7.4.5.1, it shall be treated as a new notice.

7.4.9 Finding favourable with respect to § 7.4.5.1 in cases where the provisions of § 7.4.5.2 are applicable

7.4.9.1 Where the Bureau finds that the coordination procedures mentioned in § 7.4.5.2 have been successfully completed with all administrations whose frequency assignments in conformity with the appropriate Regional Plan may be affected, the frequency assignment shall be recorded in the Master Register. The date of receipt by the Bureau of the notice shall be entered in Column 2d.

7.4.9.2 Where the Bureau finds that the coordination procedure mentioned in § 7.4.5.2 has not been applied, and the notifying administration requests the Bureau to effect the required coordination, the Bureau shall take appropriate action and shall inform the administrations concerned of the results obtained. If the Bureau's efforts are successful, the notice shall be treated in accordance with § 7.4.9.1. If the Bureau's efforts are unsuccessful, the notice shall be examined by the Bureau with respect to the provisions of § 7.4.5.3.

7.4.9.3 Where the Bureau finds that the coordination procedure mentioned in § 7.4.5.2 has not been applied, and the notifying administration does not request the Bureau to effect the required coordination, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Bureau for this action and with such suggestions as the Bureau may be able to offer with a view to the satisfactory solution of the problem.

7.4.9.4 Where the notifying administration resubmits the notice and the Bureau finds that the coordination procedure mentioned in § 7.4.5.2 has been successfully completed with all administrations whose frequency assignments in conformity with the appropriate Regional Plan may be affected, the frequency assignment shall be recorded in the Master Register. The date of receipt of the original notice by the Bureau shall be entered in Column 2d. The date of receipt by the Bureau of the resubmitted notice shall be entered in the Remarks Column.

7.4.9.5 Where the notifying administration resubmits the notice with a request that the Bureau effect the required coordination under § 7.2.1, it shall be treated in accordance with the provisions of § 7.4.9.2. However, in any subsequent recording of the assignment, the date of receipt by the Bureau of the resubmitted notice shall be entered in the Remarks Column.

7.4.9.6 Where the notifying administration resubmits the notice and states it has been unsuccessful in effecting the coordination, the Bureau shall inform the administrations concerned thereof. The notice shall be examined by the Bureau with respect to the provisions of § 7.4.5.3. However, in any subsequent recording of the assignment, the date of receipt by the Bureau of the resubmitted notice shall be entered in the Remarks Column.

7.4.10 Finding favourable with respect to § 7.4.5.1 and 7.4.5.3

7.4.10.1 The assignment shall be recorded in the Master Register. The date of receipt by the Bureau of the notice shall be entered in Column 2d.

7.4.11 Finding favourable with respect to § 7.4.5.1, but unfavourable with respect to § 7.4.5.3

7.4.11.1 The notice shall be returned immediately by airmail to the notifying administration with the reasons of the Bureau for this finding and with such suggestions as the Bureau may be able to offer with a view to the satisfactory solution of the problem.

7.4.11.2 Should the notifying administration resubmit the notice with modifications which result, after re-examination, in a favourable finding by the Bureau with respect to § 7.4.5.3, the assignment shall be recorded in the Master Register. The date of receipt by the Bureau of the original notice shall be entered in Column 2d. The date of receipt by the Bureau of the resubmitted notice shall be indicated in the Remarks Column.

7.4.11.3 Should the notifying administration resubmit the notice, either unchanged, or with modifications which decrease the probability of harmful interference, but not sufficiently to permit the provisions of § 7.4.11.2 to be applied, and should that administration insist upon reconsideration of the notice, but should the Bureau's finding remain unchanged, the notification shall again be returned to the notifying administration in accordance with § 7.4.11.1. In those circumstances, the notifying administration shall undertake not to bring into use the proposed frequency assignment until the condition in § 7.4.11.2 can be fulfilled. The agreement of the administrations affected can also be obtained in accordance with this Article for a specified period. In that event the Bureau shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note in the Remarks Column indicating that the assignment is valid only for the specified period. The notifying administration using the frequency assignment over a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration(s) concerned. The date of receipt by the Bureau of the original notice shall be entered in Column 2d.

7.4.12 Change in the basic characteristics of assignments already recorded in the Master Register

7.4.12.1 A notice of a change in the basic characteristics of an assignment in the fixed-satellite service already recorded, as specified in Appendix **S4**, Annexes 2A and 2B (except the name of the station or the name of the locality in which it is situated or the date of bringing into use), shall be examined by the Bureau in conformity with § 7.4.5.1 and, where appropriate, § 7.4.5.2 and 7.4.5.3, and the provisions of § 7.4.7 to 7.4.11.3 inclusive shall apply. Where the change should be recorded, the original assignment shall be amended accordingly.

7.4.12.2 However, in the case of a change in the characteristics of an assignment which is in conformity with § 7.4.5.1, should the Bureau reach a favourable finding with respect to § 7.4.5.2 and 7.4.5.3, where appropriate, or find that the changes do not increase the probability of harmful interference to frequency assignments in conformity with the appropriate Regional Plan,

the amended assignment shall retain the original date in Column 2d. The date of receipt of the notice by the Bureau relating to the change shall be entered in the Remarks Column.

7.4.12.3 The projected date of bringing into use of a frequency assignment may be extended by four months at the request of the notifying administration. If the administration states that, due to exceptional circumstances, it needs a further extension of this period, such extension may be provided but it shall in no case exceed eighteen months from the original projected date of bringing into use.

7.4.12.4 In applying the provisions of this Section IV, any resubmitted notice which is received by the Bureau more than two years after the date of its return by the Bureau shall be considered as a new notice.

7.4.13 Recording of frequency assignments in the fixed-satellite service notified before being brought into use

7.4.13.1 If a frequency assignment notified in advance of bringing into use has received a favourable finding by the Bureau with respect to § 7.4.5.1 and, where appropriate, § 7.4.5.2 and 7.4.5.3, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

7.4.13.2 Within one month after the date of bringing into use, either as originally notified or as modified in application of § 7.4.12.3, the notifying administration shall confirm that the frequency assignment has been brought into use. When the Bureau is informed that the assignment has been brought into use, the special symbol shall be deleted from the Remarks Column.

7.4.13.3 If the Bureau does not receive this confirmation within the period referred to in § 7.4.13.2, the entry concerned shall be cancelled. The Bureau shall advise the administration concerned before taking such action.

Section V – Recording of findings in the Master Register

7.5 In any case where a frequency assignment is recorded in the Master Register, the finding reached by the Bureau shall be indicated by a symbol in Column 13a. In addition, a remark indicating the reasons for any unfavourable finding shall be inserted in the Remarks Column.

Section VI – Categories of frequency assignments

7.6.1 The date in Column 2c shall be the date of putting into use notified by the administration concerned. It is given for information only.

7.6.2 If harmful interference is actually caused to the reception of any broadcasting-satellite station whose frequency assignment is in conformity with the appropriate Regional Plan, by the use of a frequency assignment to a space radiocommunication station subsequently recorded in the Master Register in accordance with the provisions of § 7.4.11.3, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

7.6.3 If harmful interference to the reception of any broadcasting-satellite station whose frequency assignment is in conformity with the appropriate Regional Plan, is actually caused by the use of a frequency assignment which is not in conformity with § 7.4.5.1, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

Section VII – Review of findings

7.7.1 The review of a finding by the Bureau may be undertaken:

a) at the request of the notifying administration;

b) at the request of any other administration interested in the question, but only on the grounds of actual harmful interference;

c) on the initiative of the Bureau itself when it considers this is justified.

7.7.2 The Bureau, in the light of all the data at its disposal, shall review the matter, taking into account § 7.4.5.1 and, where appropriate, § 7.4.5.2 and 7.4.5.3, and shall render an appropriate finding, informing the notifying administration prior either to the promulgation of its finding or to any recording action.

7.7.3 If the finding of the Bureau is then favourable it shall enter in the Master Register the changes that are required so that the entry shall appear in the future as if the original finding had been favourable.

7.7.4 If the finding with regard to the probability of harmful interference remains unfavourable, no change shall be made in the original entry.

Section VIII – Modification, cancellation and review of entries in the Master Register

7.8 The Bureau shall at intervals not exceeding two years request confirmation from the notifying administration that its assignment has been and will continue to be in regular use in accordance with its recorded characteristics.

7.8.1 Where the use of a recorded assignment to a station in the fixed-satellite service is suspended for a period of eighteen months, the notifying administration shall, within this eighteen-month period, inform the Bureau of the date on which such use was suspended and of the date on which the assignment is to be brought back into regular use.

7.8.2 Whenever it appears to the Bureau, whether or not as a result of action under § 7.8.1, that a recorded assignment to a space station in the fixed-satellite service has not been in regular use for more than eighteen months, the Bureau shall inquire of the notifying administration as to when the assignment is to be brought back into regular use.

7.8.3 If no reply is received within six months of action by the Bureau under § 7.8.2, or if the reply does not confirm that the assignment to a space station in the fixed-satellite service is to be brought back into regular use within this six-month limit, a mark should be entered against the entry in the Master Register.

7.8.4 In case of permanent discontinuance of the use of any recorded frequency assignment, the notifying administration shall inform the Bureau within three months of such discontinuance, whereupon the entry shall be removed from the Master Register.

7.8.5 Whenever it appears to the Bureau from the information available that a recorded assignment has not been brought into regular operation in accordance with the notified basic characteristics, or is not being used in accordance with those basic characteristics, the Bureau shall consult the notifying administration and, subject to its agreement, shall either cancel or suitably modify or retain the basic characteristics of the entry.

7.8.6 If, in connection with an inquiry by the Bureau under § 7.8.5, the notifying administration has failed to supply the Bureau within three months with the necessary or pertinent information, the Bureau shall make suitable entries in the Remarks Column of the Master Register to indicate the situation.

ARTICLE 8

Miscellaneous provisions relating to the procedures*

8.1 If so requested by any administration, the Board, using such means at its disposal as are appropriate in the circumstances, shall conduct a study of cases of alleged contravention or non-observance of these provisions or of harmful interference.

8.2 The Board shall thereupon prepare and forward to the administration or administrations concerned a report containing its findings and recommendations for the solution of the problem.

8.3 On receiving the Board's recommendations for the solution of the problem, an administration shall promptly acknowledge their receipt by telegram and shall indicate the action it intends to take. Where the Board's suggestions or recommendations are unacceptable to the administrations concerned, further efforts should be made by the Board to find an acceptable solution to the problem.

8.4 Where, as a result of a study, the Board submits to one or more administrations suggestions or recommendations for the solution of a problem, and where no reply has been received from one or more of these administrations within a period of three months, the Board shall consider that the suggestions or recommendations concerned are unacceptable to the

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* *Note by the Secretariat:* WRC-97 did not review this Article. The subject matter is also dealt with in Articles **S13** and **S14**, which were reviewed by WRC-97.

administrations which did not answer. If it was the requesting administration which failed to answer within this period, the Board shall discontinue the study.

8.5 If so requested by any administration, particularly by an administration of a country in need of special assistance, the Board, using such means at its disposal as are appropriate in the circumstances, shall render the following assistance:

a) computation necessary in the application of Annexes 1, 3 and 4;

b) any other assistance of a technical nature for completion of the procedures in this Appendix.

8.6 In making a request to the Board under § 8.5, the administration shall provide the Board with the necessary information.

ARTICLE 9

Power flux-density limits between 12.2 GHz and 12.7 GHz to protect terrestrial services in Regions 1 and 3 from interference from Region 2 broadcasting-satellite space stations

9.1 The power flux-density at the Earth's surface in Regions 1 and 3, produced by emissions from a space station in the broadcasting-satellite service in Region 2 for all conditions and for all methods of modulation shall not exceed the values given in Section 5 of Annex 1 on the territory of any country unless the administration of that country so agrees.

ARTICLE 10

The Plan for the broadcasting-satellite service in the frequency band 12.2-12.7 GHz in Region 2

10.1 COLUMN HEADINGS OF THE PLAN

Col. 1 *Beam identification* (Column 1 contains the symbol designating the country or the geographical area taken from Table B.1 of the Preface to the International Frequency List followed by the symbol designating the service area).

Col. 2 *Nominal orbital position*, in degrees and hundredths of a degree.

Col. 3 *Channel number* (see Table 4 showing channel numbers and corresponding assigned frequencies).

Col. 4 *Boresight* geographical coordinates, in degrees and hundredths of a degree.

Col. 5 *Antenna beamwidth*. This column contains two figures corresponding to the major axis and the minor axis respectively of the elliptical cross-section half-power beam, in degrees and hundredths of a degree.

Col. 6 *Orientation of the ellipse* determined as follows: in a plane normal to the beam axis, the direction of a major axis of the ellipse is specified as the angle measured anti-clockwise from a line parallel to the equatorial plane to the major axis of the ellipse to the nearest degree.

Col. 7 *Polarization* (1 = direct, 2 = indirect)[12].

Col. 8 *e.i.r.p.* in the direction of maximum radiation, in dBW.

Col. 9 *Remarks*.

10.2 TEXT FOR NOTES IN REMARKS COLUMN OF THE PLAN

1 Fast roll-off space station transmitting antenna as defined in Annex 5 (item 3.13.3).

2 Television standard with 625 lines using greater video bandwidth and necessary bandwidth of 27 MHz.

3 Not used

4 This assignment may be utilized in the geographical area of Anguilla (AIA) (which is in the beam area).

5 Feeder-link earth stations for this assignment may also be located in the territories of Puerto Rico and the United States Virgin Islands. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

6 Feeder-link earth stations for this assignment may also be located in the States of Alaska and Hawaii. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

7 The feeder-link earth station for this assignment may also be located at the point with geographical coordinates 3° 31′ West, 48° 46′ North. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

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[12] See Annex 5 (§ 3.2) of this Appendix.

8 Feeder-link earth stations for this assignment may also be located at the points with the following geographical coordinates:

47° 55′ West	15° 47′ South	34° 53′ West	08° 04′ South
43° 13′ West	22° 55′ South	60° 02′ West	03° 06′ South
46° 38′ West	23° 33′ South	38° 31′ West	12° 56′ South
51° 13′ West	30° 02′ South	49° 15′ West	16° 40′ South

Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

9/GR . . . This assignment is part of a group, the number of which follows the symbol. The group consists of the beams and has the number of channels assigned to it as indicated in Table 1 below.

a) The overall equivalent protection margin to be used for the application of Article 4 and Resolution **42 (Rev.Orb-88)** shall be calculated on the following basis:

– for the calculation of interference to assignments that are part of a group, only the interference contributions from assignments that are not part of the same group are to be included; and

– for the calculation of interference from assignments belonging to a group to assignments that are not part of that same group, only the worst interference contribution from that group shall be used on a test point to test point basis.

b) If an administration notifies the same frequency in more than one beam of a group for use at the same time, the aggregated *C*/*I* produced by all emissions from that group shall not exceed the *C*/*I* calculated on the basis of *a)* above.

10 This assignment shall be brought into use only when the limits given in Table 2 are not exceeded or with the agreement of the affected administration identified in Table 3.

These administrations shall be informed by the notifying administration of changes in characteristics before these beams are brought into use.

TABLE 1

Group	Beams in the group	Number of channels assigned to the group
GR1	ALS00002 HWA00002 USAPSA02	32 channels
GR2	ALS00003 HWA00003 USAPSA03	32 channels
GR3	ARGINSU4 ARGSUR04	16 channels
GR4	ARGINSU5 ARGSUR05	12 channels
GR5	BOLAND01 CLMAND01 EQACAND1 EQAGAND1 PRUAND02 VENAND03	16 channels
GR6	B SU111 B SU211	32 channels
GR7	B CE311 B CE411 B CE511	32 channels
GR8	B NO611 B NO711 B NO811	32 channels
GR9	B SU112 B SU212 B CE312 B CE412	32 channels
GR10	CAN01101 CAN01201	32 channels
GR11	*Not used*	
GR12	CAN01203 CAN01303 CAN01403	32 channels
GR13	CAN01304 CAN01404 CAN01504	32 channels
GR14	CAN01405 CAN01505 CAN01605	32 channels
GR15	*Not used*	
GR16	CHLCONT4 CHLCONT6	16 channels
GR17	CHLCONT5 PAQPAC01 CHLPAC02	16 channels
GR18	CRBBER01 CRBBLZ01 CRBJMC01 CRBBAH01 CRBECO01	16 channels
GR19	EQACOO01 EQAGOO01	16 channels
GR20	PTRVIR01 USAEHO02	32 channels
GR21	PTRVIR02 USAEHO03	32 channels
GR22	VEN02VEN VEN11VEN	4 channels

TABLE 2

Applicable criteria

Symbol	pfd limit criteria
a	§ 3, Annex 1
b	§ 5 *b)*, Annex 1
c	§ 5 *c)*, Annex 1
d	§ 5 *d)*, Annex 1

11 This assignment shall be brought into use only when the e.i.r.p. in the direction of all points situated within the service area and within the –3 dB contour of the “Metropole” beam (space-to-Earth) in the VIDEOSAT-3 network as described in ex-IFRB special section AR11/C/766 to Weekly Circular No. 1678 of 2 July 1985 does not exceed the limit 26.8 dBW.

12 This assignment shall be brought into use only when the e.i.r.p. in the direction of all points situated within the service area and within the –3 dB contour of the “Metropole”

beam (space-to-Earth) in the VIDEOSAT-3 network as described in ex-IFRB special section AR11/C/766 to Weekly Circular No. 1678 of 2 July 1985 does not exceed the limit 26.8 dBW, and when the e.i.r.p. in the direction of all points situated within the service area and also between the –3 dB and –6 dB contours of the same beam does not exceed the limit 29.5 dBW.

TABLE 3

Beam name	Channels	Limit criteria ref. Table 2	Countries or geographical areas affected*
ALS00002	1, 4, 5, 6, 9, 10, 11, 14, 15, 16 All channels For channels 20 to 32	a c d	URS MNG/URS URS
ALS00003	1, 4, 5, 6, 9, 10, 11, 14, 15, 16 All channels For channels 20 to 32	a c d	URS URS URS
ARGINSU5	3, 7, 11, 15, 17, 19	b	NOR
ARGNORT4	2, 4, 6, 8, 10, 12, 14, 16, 18, 20	b	AOE/ASC/AZR/CPV/E/GMB/GNB/GUI/MRC/MTN/POR/SEN
ARGNORT5	2, 4, 6, 8, 10, 12, 14, 16, 18, 20	b	AFS/AGL/BOT/NMB/NOR/OCE/PTC/TKL/COD/ZMB/ZWE
ARGSUR04	1, 3, 5, 7, 9, 11, 13, 15, 17, 19	b	ASC
ARGSUR05	3, 7, 11, 15, 17, 19	b	NOR
B CE311	For channels 1 to 20	b	AGL/ALG/CAF/CME/COG/GAB/GNE/NGR/NIG/NMB/STP/TCD/COD
B CE312	For channels 1 to 20 For channels 1 to 20 All channels	b c c	AFS/BDI/BOT/LSO/RRW/TZA/UGA/ZMB/ZWE MOZ/MWI/TZA ETH/KEN/SDN
B CE411	For channels 1 to 20	b	AGL/ALG/CAF/CME/COG/CVA/E/GAB/GNE/I/LBY/MLT/NGR/NIG/SMR/STP/TCD/TUN/COD
B CE412	For channels 1 to 20 All channels	c c	CYP/TUR ARS/EGY/ISR/SDN/URS
B CE511	For channels 1 to 20	b	CAF/CME/COG/GAB/GNE/NIG/NMB/NOR/STP/COD
B NO611	For channels 1 to 20	b	BEN/GHA/TGO
B NO711	For channels 1 to 20	b	BEN
B SE911	2, 4, 6, 8, 10, 12, 14, 16, 18, 20	b	CPV
B SU111	For channels 1 to 20	b	BFA/CTI/GHA/GUI/LBR/MTN/SHN/TRC

* *Note by the Secretariat:* This Table was not modified by WRC-97. As such, the references to ETH, TCH, URS and YUG in this column refer to the countries or geographical areas described by these symbols when the Plan was established.

TABLE 3 *(continued)*

Beam name	Channels	Limit criteria ref. Table 2	Countries or geographical areas affected*
B SU211	For channels 1 to 20	b	ALG/BFA/CTI/GHA/GUI/LBR/MLI/ MRC/MTN/SHN/TRC
BERBER02	1, 5, 17 5, 9, 13	a a	CNR/E ISL
BOL00001	3, 7, 11, 15, 19	b	ALG/AOE/ASC/E/GMB/GNB/GUI/LBR/ MLI/MRC/MTN/POR/SEN/SRL/TRC
CAN01101	All channels For channels 20 to 32	c d	URS URS
CAN01201	All channels	c	URS
CAN01203	All channels	c	URS
CAN01303	All channels	c	URS
CAN01403	All channels	c	URS
CAN01404	For channels 1 to 20	b	ISL/POR
CAN01405	For channels 1 to 20	b	F/G/IRL/ISL
CAN01504	For channels 1 to 20	b	AOE/AZR/E/ISL/MRC/MTN/POR
CAN01505	For channels 1 to 20	b	ALG/E/F/G/IRL/ISL/MRC/POR
CAN01605	For channels 1 to 20	b	E/F/G/IRL/ISL/MRC/POR
CAN01606	For channels 1 to 20	b	BEL/F/G/HOL/IRL/ISL/LUX/NOR
CLMAND01	21, 23, 25, 27, 29, 31	c	URS
CLM00001	1, 3, 5, 7, 9, 11, 13, 15, 17, 19 21, 23, 25, 27, 29, 31	b c	AZR/CPV URS
CRBEC001	2, 4, 6, 8, 10, 12, 14, 16, 18, 20	b	ASC/AZR/GMB/GNB/GUI/ISL/MTN/ SEN/SRL
FLKANT01	1, 5, 9, 13	b	NOR
GRLDNK01	3, 7, 11, 15, 19	b	D/DNK/G/HOL/ISL/NOR/POL/S/TCH
GUFMGG02	4, 8, 12, 16, 20	b	NOR
HWA00002	For channels 1 to 20 All channels	b c	CHN/KRE MNG/URS
HWA00003	For channels 1 to 20 All channels	b c	CHN MNG/URS
MEX02NTE	All channels	c	URS
MEX01SUR	1, 3, 5, 7, 9, 11, 13, 15, 17, 19	b	KIR

TABLE 3 *(end)*

Beam name	Channels	Limit criteria ref. Table 2	Countries or geographical areas affected*
MEX02SUR	All channels	c	URS
PRU00004	2, 4, 6, 8, 10, 12, 14, 16, 18, 20	b	ALG/AOE/ASC/BFA/CTI/E/G/GMB/ GUI/ISL/LBR/MLI/MRC/MTN/POR/ SEN/SHN/SRL/TRC
SPMFRAN3	1, 5, 9, 13, 17	b	D/DNK/ISL/NOR/S
USAEH001	For channels 1 to 20	b	ALG/AUT/BEL/CVA/D/DNK/E/F/G/ HOL/I/ISL/LBY/LIE/LUX/MCO/MLT/ NGR/NIG/NOR/OCE/SMR/SUI/TCH/ TUN/YUG
USAEH002	For channels 1 to 20 All channels	b c	AZR/CPV/HWL URS
USAEH003	For channels 1 to 20 All channels	b c	MHL URS
USAEH004	For channels 1 to 20 All channels For channels 20 to 32	b c d	WAK URS URS
USAWH101	All channels	c	URS
USAWH102	All channels	c	URS
VENAND03	21, 23, 25, 27, 29, 31	c	URS
VEN11VEN	2, 4, 6, 8, 10, 12, 14, 16, 18, 20 20, 22, 24, 26, 28, 30, 32	b c	AZR/CPV URS

Country symbols

1 For the explanation of symbols designating countries or geographical areas in Region 2, see the Preface to the International Frequency List.

2 One additional symbol, CRB, has been created for the purposes of the 1983 Conference only, to designate to geographical area in the Caribbean Area. The five Caribbean beams are identified as follows:

CRBBAH01, CRBBER01, CRBBLZ01, CRBEC001 and CRBJMC01

and are intended collectively to provide coverage for the following countries or geographical areas: AIA, ATG, BAH, BER, BLZ, BRB, CYM, DMA, GRD, GUY, JMC, LCA, MSR, SCN, SUR, TCA, TRD, VCT and VRG to be so used if approved by them.

TABLE 4

Table showing correspondence between channel numbers and assigned frequencies

Channel No.	Assigned frequency (MHz)	Channel No.	Assigned frequency (MHz)
1	12 224.00	17	12 457.28
2	12 238.58	18	12 471.86
3	12 253.16	19	12 486.44
4	12 267.74	20	12 501.02
5	12 282.32	21	12 515.60
6	12 296.90	22	12 530.18
7	12 311.48	23	12 544.76
8	12 326.06	24	12 559.34
9	12 340.64	25	12 573.92
10	12 355.22	26	12 588.50
11	12 369.80	27	12 603.08
12	12 384.38	28	12 617.66
13	12 398.96	29	12 632.24
14	12 413.54	30	12 646.82
15	12 428.12	31	12 661.40
16	12 442.70	32	12 675.98

12 224.00 MHz (1)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	1	−149.66	58.37	3.76	1.24	170	1	59.7	9/GR1	10
ALS00003	−175.20	1	−150.98	58.53	3.77	1.11	167	1	60.0	9/GR2	10
ARGINSU4	−94.20	1	−52.98	−59.81	3.40	0.80	19	1	59.9	9/GR3	
ARGSUR04	−94.20	1	−65.04	−43.33	3.32	1.50	40	1	60.7	9/GR3	10
B CE311	−64.20	1	−40.60	−6.07	3.04	2.06	174	1	61.6	8 9/GR7	10
B CE312	−45.20	1	−40.27	−6.06	3.44	2.09	174	1	61.0	8 9/GR9	10
B CE411	−64.20	1	−50.97	−15.27	3.86	1.38	49	1	62.6	8 9/GR7	10
B CE412	−45.20	1	−50.71	−15.30	3.57	1.56	52	1	62.7	8 9/GR9	10
B CE511	−64.20	1	−53.10	−2.90	2.44	2.13	104	1	63.0	8 9/GR7	10
B NO611	−74.20	1	−59.60	−11.62	2.85	1.69	165	2	62.8	8 9/GR8	10
B NO711	−74.20	1	−60.70	−1.78	3.54	1.78	126	2	62.8	8 9/GR8	10
B NO811	−74.20	1	−68.76	−4.71	2.37	1.65	73	2	62.8	8 9/GR8	
B SU111	−81.20	1	−51.12	−25.63	2.76	1.05	50	1	62.8	8 9/GR6	10
B SU112	−45.20	1	−50.75	−25.62	2.47	1.48	56	1	62.2	8 9/GR9	
B SU211	−81.20	1	−44.51	−16.95	3.22	1.36	60	1	62.5	8 9/GR6	10
B SU212	−45.20	1	−44.00	−16.87	3.20	1.96	58	1	61.3	8 9/GR9	
BAHIFRB1	−87.20	1	−76.06	24.16	1.81	0.80	142	1	61.6		
BERBERMU	−96.20	1	−64.77	32.32	0.80	0.80	90	2	56.8		
BERBER02	−31.00	1	−64.77	32.32	0.80	0.80	90	1	56.9	2	10
BOLAND01	−115.20	1	−65.04	−16.76	2.49	1.27	76	1	67.9	9/GR5	
CAN01101	−138.20	1	−125.63	57.24	3.45	1.27	157	1	59.5	9/GR10	10
CAN01201	−138.20	1	−112.04	55.95	3.35	0.97	151	1	59.6	9/GR10	10
CAN01202	−72.70	1	−107.70	55.63	2.74	1.12	32	1	59.6		
CAN01203	−129.20	1	−111.48	55.61	3.08	1.15	151	1	59.5	9/GR12	10
CAN01303	−129.20	1	−102.42	57.12	3.54	0.91	154	1	60.0	9/GR12	10
CAN01304	−91.20	1	−99.12	57.36	1.98	1.72	2	1	59.8	9/GR13	
CAN01403	−129.20	1	−89.75	52.02	4.68	0.80	148	1	61.8	9/GR12	10
CAN01404	−91.20	1	−84.82	52.42	3.10	2.05	152	1	60.4	9/GR13	10
CAN01405	−82.20	1	−84.00	52.39	2.84	2.29	172	1	60.3	9/GR14	10
CAN01504	−91.20	1	−72.66	53.77	3.57	1.67	156	1	60.2	9/GR13	10
CAN01505	−82.20	1	−71.77	53.79	3.30	1.89	162	1	60.1	9/GR14	10
CAN01605	−82.20	1	−61.50	49.55	2.65	1.40	143	1	60.3	9/GR14	10
CAN01606	−70.70	1	−61.30	49.55	2.40	1.65	148	1	60.2	10	
CHLCONT5	−106.20	1	−72.23	−35.57	2.60	0.80	55	1	59.4	9/GR17	
CHLPAC02	−106.20	1	−80.06	−30.06	1.36	0.80	69	1	59.2	9/GR17	
CLMAND01	−115.20	1	−74.72	5.93	3.85	1.63	114	1	64.9	9/GR5	
CLM00001	−103.20	1	−74.50	5.87	3.98	1.96	118	1	63.5	10	
EQACAND1	−115.20	1	−78.40	−1.61	1.37	0.95	75	1	64.0	9/GR5	
EQAGAND1	−115.20	1	−90.34	−0.62	0.90	0.81	89	1	61.3	9/GR5	
FLKANT01	−57.20	1	−44.54	−60.13	3.54	0.80	12	1	59.3	2	10
FLKFALKS	−31.00	1	−59.90	−51.64	0.80	0.80	90	1	58.1	2	
GRD00002	−42.20	1	−61.58	12.29	0.80	0.80	90	1	58.8		
HWA00002	−166.20	1	−165.79	23.42	4.20	0.80	160	1	58.8	9/GR1	10
HWA00003	−175.20	1	−166.10	23.42	4.25	0.80	159	1	58.8	9/GR2	10
MEX01NTE	−78.20	1	−105.81	26.01	2.89	2.08	155	1	60.5	1	
MEX01SUR	−69.20	1	−94.84	19.82	3.05	2.09	4	1	62.2	1	10
MEX02NTE	−136.20	1	−107.21	26.31	3.84	1.55	148	1	61.2	1	10
MEX02SUR	−127.20	1	−96.39	19.88	3.18	1.87	157	1	62.5	1	10
PAQPAC01	−106.20	1	−109.18	−27.53	0.80	0.80	90	1	56.2	9/GR17	
PRG00002	−99.20	1	−58.66	−23.32	1.45	1.04	76	1	60.2		
PRUAND02	−115.20	1	−74.69	−8.39	3.41	1.79	95	1	63.9	9/GR5	
PTRVIR01	−101.20	1	−65.85	18.12	0.80	0.80	90	1	60.5	1 6 9/GR20	
PTRVIR02	−110.20	1	−65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21	
SPMFRAN3	−53.20	1	−67.24	47.51	3.16	0.80	7	1	60.4	2 7	10
TRD00001	−84.70	1	−61.23	10.70	0.80	0.80	90	1	59.4		
URG00001	−71.70	1	−56.22	−32.52	1.02	0.89	11	1	60.0		
USAEH001	−61.70	1	−85.19	36.21	5.63	3.33	22	1	61.8	1 5 6	10
USAEH002	−101.20	1	−89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20	10
USAEH003	−110.20	1	−90.14	36.11	5.55	3.55	161	1	62.0	1 6 9/GR21	10
USAEH004	−119.20	1	−91.16	36.05	5.38	3.24	152	1	62.6	1 5 6	10
USAPSA02	−166.20	1	−117.80	40.58	4.03	0.82	135	1	63.2	9/GR1	
USAPSA03	−175.20	1	−118.27	40.12	3.62	0.80	136	1	65.0	9/GR2	
USAWH101	−148.20	1	−109.65	38.13	5.53	1.95	142	1	62.1	10	
USAWH102	−157.20	1	−111.41	38.57	5.51	1.54	138	1	63.2	10	
VENAND03	−115.20	1	−67.04	6.91	2.37	1.43	111	1	67.2	9/GR5	
VRG00001	−79.70	1	−64.37	18.48	0.80	0.80	90	1	58.3	4	

12 238.58 MHz (2)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	2	−149.63	58.52	3.81	1.23	171	2	59.7	9/GR1	10
ALS00003	−174.80	2	−150.95	58.54	3.77	1.11	167	2	60.0	9/GR2	10
ARGNORT4	−93.80	2	−63.96	−30.01	3.86	1.99	48	2	65.6	10	
ARGNORT5	−54.80	2	−62.85	−29.80	3.24	2.89	47	2	63.5	10	
ATNBEAM1	−52.80	2	−66.44	14.87	1.83	0.80	39	2	61.0		
B CE311	−63.80	2	−40.60	−6.07	3.04	2.06	174	2	61.6	8 9/GR7	10
B CE312	−44.80	2	−40.26	−6.06	3.44	2.09	174	2	61.0	8 9/GR9	10
B CE411	−63.80	2	−50.97	−15.26	3.86	1.38	49	2	62.6	8 9/GR7	10
B CE412	−44.80	2	−50.71	−15.30	3.57	1.56	52	2	62.7	8 9/GR9	10
B CE511	−63.80	2	−53.11	−2.98	2.42	2.15	107	2	63.1	8 9/GR7	10
B NO611	−73.80	2	−59.60	−11.62	2.86	1.69	165	1	62.8	8 9/GR8	10
B NO711	−73.80	2	−60.70	−1.78	3.54	1.78	126	1	62.8	8 9/GR8	10
B NO811	−73.80	2	−68.75	−4.71	2.37	1.65	73	1	62.8	8 9/GR8	
B SE911	−101.80	2	−45.99	−19.09	2.22	0.80	62	2	65.3	8	10
B SU111	−80.80	2	−51.10	−25.64	2.76	1.06	50	2	62.8	8 9/GR6	10
B SU112	−44.80	2	−50.76	−25.62	2.47	1.48	56	2	62.3	8 9/GR9	
B SU211	−80.80	2	−44.51	−16.94	3.22	1.37	60	2	62.5	8 9/GR6	10
B SU212	−44.80	2	−43.99	−16.97	3.27	1.92	59	2	61.3	8 9/GR9	
CAN01101	−137.80	2	−125.60	57.24	3.45	1.27	157	2	59.5	9/GR10	10
CAN01201	−137.80	2	−111.92	55.89	3.33	0.98	151	2	59.6	9/GR10	10
CAN01202	−72.30	2	−107.64	55.62	2.75	1.11	32	2	59.6		
CAN01203	−128.80	2	−111.43	55.56	3.07	1.15	151	2	59.5	9/GR12	10
CAN01303	−128.80	2	−102.39	57.12	3.54	0.92	154	2	60.0	9/GR12	10
CAN01304	−90.80	2	−99.00	57.33	1.96	1.73	1	2	59.8	9/GR13	
CAN01403	−128.80	2	−89.70	52.02	4.67	0.80	148	2	61.8	9/GR12	10
CAN01404	−90.80	2	−84.78	52.41	3.09	2.06	153	2	60.4	9/GR13	10
CAN01405	−81.80	2	−84.02	52.34	2.82	2.30	172	2	60.3	9/GR14	10
CAN01504	−90.80	2	−72.68	53.78	3.57	1.67	157	2	60.2	9/GR13	10
CAN01505	−81.80	2	−71.76	53.76	3.30	1.89	162	2	60.1	9/GR14	10
CAN01605	−81.80	2	−61.54	49.50	2.66	1.39	144	2	60.3	9/GR14	10
CAN01606	−70.30	2	−61.32	49.51	2.41	1.65	148	2	60.2	10	
CHLCONT4	−105.80	2	−69.59	−23.20	2.21	0.80	68	2	59.1	9/GR16	
CHLCONT6	−105.80	2	−73.52	−55.52	3.65	1.31	39	2	59.6	9/GR16	
CRBBAH01	−92.30	2	−76.09	24.13	1.83	0.80	141	1	61.7	9/GR18	
CRBBER01	−92.30	2	−64.76	32.13	0.80	0.80	90	1	56.7	9/GR18	
CRBBLZ01	−92.30	2	−88.61	17.26	0.80	0.80	90	1	58.6	9/GR18	
CRBEC001	−92.30	2	−60.07	8.26	4.20	0.86	115	1	64.2	9/GR18	10
CRBJMC01	−92.30	2	−79.45	17.97	0.99	0.80	151	1	61.1	9/GR18	
CTR00201	−130.80	2	−84.33	9.67	0.82	0.80	119	2	65.6		
EQAC0001	−94.80	2	−78.31	−1.52	1.48	1.15	65	1	63.0	9/GR19	
EQAG0001	−94.80	2	−90.36	−0.57	0.94	0.89	99	1	61.0	9/GR19	
GUY00302	−33.80	2	−59.07	4.77	1.43	0.85	91	2	63.5		
HNDIFRB2	−107.30	2	−86.23	15.16	1.14	0.85	8	1	63.4		
HTI00002	−83.30	2	−73.28	18.96	0.82	0.80	11	2	60.9		
HWA00002	−165.80	2	−165.79	23.32	4.20	0.80	160	2	58.8	9/GR1	10
HWA00003	−174.80	2	−166.10	23.42	4.25	0.80	159	2	58.8	9/GR2	10
MEX01NTE	−77.80	2	−105.80	25.99	2.88	2.07	155	2	60.5	1	
MEX02NTE	−135.80	2	−107.36	26.32	3.80	1.57	149	2	61.2	1	10
MEX02SUR	−126.80	2	−96.39	19.88	3.19	1.87	158	2	62.5	1	10
PRU00004	−85.80	2	−74.19	−8.39	3.74	2.45	112	2	62.8	10	
PTRVIR01	−100.80	2	−65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20	
PTRVIR02	−109.80	2	−65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21	
TCA00001	−115.80	2	−71.79	21.53	0.80	0.80	90	2	60.4		
USAEH001	−61.30	2	−85.16	36.21	5.63	3.32	22	2	61.8	1 5 6	10
USAEH002	−100.80	2	−89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20	10
USAEH003	−109.80	2	−90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21	10
USAEH004	−118.80	2	−91.16	36.05	5.38	3.24	153	2	62.6	1 5 6	10
USAPSA02	−165.80	2	−117.79	40.58	4.04	0.82	135	2	63.2	9/GR1	
USAPSA03	−174.80	2	−118.20	40.15	3.63	0.80	136	2	64.9	9/GR2	
USAWH101	−147.80	2	−109.70	38.13	5.52	1.96	142	2	62.1	10	
USAWH102	−156.80	2	−111.40	38.57	5.51	1.55	138	2	63.2	10	
VCT00001	−79.30	2	−61.18	13.23	0.80	0.80	90	2	58.4		
VEN11VEN	−103.80	2	−66.79	6.90	2.50	1.77	122	2	65.1	10	

12 253.16 MHz (3)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	3	−149.66	58.37	3.76	1.24	170	1	59.8	9/GR1	10
ALS00003	−175.20	3	−150.98	58.53	3.77	1.11	167	1	60.0	9/GR2	10
ARGINSU4	−94.20	3	−52.98	−59.81	3.40	0.80	19	1	59.9	9/GR3	
ARGINSU5	−55.20	3	−44.17	−59.91	3.77	0.80	13	1	59.3	9/GR4	10
ARGSUR04	−94.20	3	−65.04	−43.33	3.32	1.50	40	1	60.7	9/GR3	10
ARGSUR05	−55.20	3	−63.68	−43.01	2.54	2.38	152	1	60.1	9/GR4	10
ATGSJN01	−79.70	3	−61.79	17.07	0.80	0.80	90	1	58.4		
B CE311	−64.20	3	−40.60	−6.07	3.04	2.06	174	1	61.6	8 9/GR7	10
B CE312	−45.20	3	−40.27	−6.06	3.44	2.09	174	1	61.0	8 9/GR9	10
B CE411	−64.20	3	−50.97	−15.27	3.86	1.38	49	1	62.6	8 9/GR7	10
B CE412	−45.20	3	−50.71	−15.30	3.57	1.56	52	1	62.7	8 9/GR9	10
B CE511	−64.20	3	−53.10	−2.90	2.44	2.13	104	1	63.1	8 9/GR7	10
B NO611	−74.20	3	−59.60	−11.62	2.85	1.69	165	2	62.9	8 9/GR8	10
B NO711	−74.20	3	−60.70	−1.78	3.54	1.78	126	2	62.8	8 9/GR8	10
B NO811	−74.20	3	−68.76	−4.71	2.37	1.65	73	2	62.8	8 9/GR8	
B SU111	−81.20	3	−51.12	−25.63	2.76	1.05	50	1	62.9	8 9/GR6	10
B SU112	−45.20	3	−50.75	−25.62	2.47	1.48	56	1	62.3	8 9/GR9	
B SU211	−81.20	3	−44.51	−16.95	3.22	1.36	60	1	62.5	8 9/GR6	10
B SU212	−45.20	3	−44.00	−16.87	3.20	1.96	58	1	61.3	8 9/GR9	
BERBERMU	−96.20	3	−64.77	32.32	0.80	0.80	90	2	56.8		
BOLAND01	−115.20	3	−65.04	−16.76	2.49	1.27	76	1	67.9	9/GR5	
BOL00001	−87.20	3	−64.61	−16.71	2.52	2.19	85	1	63.8	10	
BRB00001	−92.70	3	−59.85	12.93	0.80	0.80	90	2	59.1		
CAN01101	−138.20	3	−125.63	57.24	3.45	1.27	157	1	59.5	9/GR10	10
CAN01201	−138.20	3	−112.04	55.95	3.35	0.97	151	1	59.6	9/GR10	10
CAN01202	−72.70	3	−107.70	55.63	2.74	1.12	32	1	59.6		
CAN01203	−129.20	3	−111.48	55.61	3.08	1.15	151	1	59.5	9/GR12	10
CAN01303	−129.20	3	−102.42	57.12	3.54	0.91	154	1	60.1	9/GR12	10
CAN01304	−91.20	3	−99.12	57.36	1.98	1.72	2	1	59.8	9/GR13	
CAN01403	−129.20	3	−89.75	52.02	4.68	0.80	148	1	61.8	9/GR12	10
CAN01404	−91.20	3	−84.82	52.42	3.10	2.05	152	1	60.4	9/GR13	10
CAN01405	−82.20	3	−84.00	52.39	2.84	2.29	172	1	60.3	9/GR14	10
CAN01504	−91.20	3	−72.66	53.77	3.57	1.67	156	1	60.2	9/GR13	10
CAN01505	−82.20	3	−71.77	53.79	3.30	1.89	162	1	60.1	9/GR14	10
CAN01605	−82.20	3	−61.50	49.55	2.65	1.40	143	1	60.3	9/GR14	10
CAN01606	−70.70	3	−61.30	49.55	2.40	1.65	148	1	60.2	10	
CHLCONT5	−106.20	3	−72.23	−35.57	2.60	0.80	55	1	59.4	9/GR17	
CHLPAC02	−106.20	3	−80.06	−30.06	1.36	0.80	69	1	59.2	9/GR17	
CLMAND01	−115.20	3	−74.72	5.93	3.85	1.63	114	1	65.0	9/GR5	
CLM00001	−103.20	3	−74.50	5.87	3.98	1.96	118	1	63.6	10	
CUB00001	−89.20	3	−79.81	21.62	2.24	0.80	168	1	61.1		
EQACAND1	−115.20	3	−78.40	−1.61	1.37	0.95	75	1	64.1	9/GR5	
EQAGAND1	−115.20	3	−90.34	−0.62	0.90	0.81	89	1	61.3	9/GR5	
GRD00002	−42.20	3	−61.58	12.29	0.80	0.80	90	1	58.8		
GRD00059	−57.20	3	−61.58	12.29	0.80	0.80	90	1	58.5		
GRLDNK01	−53.20	3	−44.89	66.56	2.70	0.82	173	1	60.0	2	10
HWA00002	−166.20	3	−165.79	23.42	4.20	0.80	160	1	58.8	9/GR1	10
HWA00003	−175.20	3	−166.10	23.42	4.25	0.80	159	1	58.8	9/GR2	10
MEX01NTE	−78.20	3	−105.81	26.01	2.89	2.08	155	1	60.5	1	
MEX01SUR	−69.20	3	−94.84	19.82	3.05	2.09	4	1	62.3	1	10
MEX02NTE	−136.20	3	−107.21	26.31	3.84	1.55	148	1	61.2	1	10
MEX02SUR	−127.20	3	−96.39	19.88	3.18	1.87	157	1	62.6	1	10
PAQPAC01	−106.20	3	−109.18	−27.53	0.80	0.80	90	1	56.2	9/GR17	
PRG00002	−99.20	3	−58.66	−23.32	1.45	1.04	76	1	60.2		
PRUAND02	−115.20	3	−74.69	−8.39	3.41	1.79	95	1	64.0	9/GR5	
PTRVIR01	−101.20	3	−65.85	18.12	0.80	0.80	90	1	60.6	1 6 9/GR20	
PTRVIR02	−110.20	3	−65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21	
SURINAM2	−84.70	3	−55.69	4.35	1.00	0.80	86	1	63.2		
URG00001	−71.70	3	−56.22	−32.52	1.02	0.89	11	1	60.0		
USAEH001	−61.70	3	−85.19	36.21	5.63	3.33	22	1	61.8	1 5 6	10
USAEH002	−101.20	3	−89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20	10
USAEH003	−110.20	3	−90.14	36.11	5.55	3.55	161	1	62.1	1 6 9/GR21	10
USAEH004	−119.20	3	−91.16	36.05	5.38	3.24	152	1	62.6	1 5 6	10
USAPSA02	−166.20	3	−117.80	40.58	4.03	0.82	135	1	63.3	9/GR1	
USAPSA03	−175.20	3	−118.27	40.12	3.62	0.80	136	1	65.0	9/GR2	
USAWH101	−148.20	3	−109.65	38.13	5.53	1.95	142	1	62.1	10	
USAWH102	−157.20	3	−111.41	38.57	5.51	1.54	138	1	63.2	10	
VENAND03	−115.20	3	−67.04	6.91	2.37	1.43	111	1	67.3	9/GR5	

12 267.74 MHz (4)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	4	−149.63	58.52	3.81	1.23	171	2	59.8	9/GR1	10
ALS00003	−174.80	4	−150.95	58.54	3.77	1.11	167	2	60.0	9/GR2	10
ARGNORT4	−93.80	4	−63.96	−30.01	3.86	1.99	48	2	65.7	10	
ARGNORT5	−54.80	4	−62.85	−29.80	3.24	2.89	47	2	63.5	10	
B CE311	−63.80	4	−40.60	−6.07	3.04	2.06	174	2	61.6	8 9/GR7	10
B CE312	−44.80	4	−40.26	−6.06	3.44	2.09	174	2	61.0	8 9/GR9	10
B CE411	−63.80	4	−50.97	−15.26	3.86	1.38	49	2	62.6	8 9/GR7	10
B CE412	−44.80	4	−50.71	−15.30	3.57	1.56	52	2	62.8	8 9/GR9	10
B CE511	−63.80	4	−53.11	−2.98	2.42	2.15	107	2	63.1	8 9/GR7	10
B NO611	−73.80	4	−59.60	−11.62	2.86	1.69	165	1	62.9	8 9/GR8	10
B NO711	−73.80	4	−60.70	−1.78	3.54	1.78	126	1	62.8	8 9/GR8	10
B NO811	−73.80	4	−68.75	−4.71	2.37	1.65	73	1	62.8	8 9/GR8	
B SE911	−101.80	4	−45.99	−19.09	2.22	0.80	62	2	65.3	8	10
B SU111	−80.80	4	−51.10	−25.64	2.76	1.06	50	2	62.9	8 9/GR6	10
B SU112	−44.80	4	−50.76	−25.62	2.47	1.48	56	2	62.3	8 9/GR9	
B SU211	−80.80	4	−44.51	−16.94	3.22	1.37	60	2	62.5	8 9/GR6	10
B SU212	−44.80	4	−43.99	−16.97	3.27	1.92	59	2	61.3	8 9/GR9	
CAN01101	−137.80	4	−125.60	57.24	3.45	1.27	157	2	59.5	9/GR10	10
CAN01201	−137.80	4	−111.92	55.89	3.33	0.98	151	2	59.6	9/GR10	10
CAN01202	−72.30	4	−107.64	55.62	2.75	1.11	32	2	59.6		
CAN01203	−128.80	4	−111.43	55.56	3.07	1.15	151	2	59.5	9/GR12	10
CAN01303	−128.80	4	−102.39	57.12	3.54	0.92	154	2	60.1	9/GR12	10
CAN01304	−90.80	4	−99.00	57.33	1.96	1.73	1	2	59.8	9/GR13	
CAN01403	−128.80	4	−89.70	52.02	4.67	0.80	148	2	61.8	9/GR12	10
CAN01404	−90.80	4	−84.78	52.41	3.09	2.06	153	2	60.4	9/GR13	10
CAN01405	−81.80	4	−84.02	52.34	2.82	2.30	172	2	60.3	9/GR14	10
CAN01504	−90.80	4	−72.68	53.78	3.57	1.67	157	2	60.2	9/GR13	10
CAN01505	−81.80	4	−71.76	53.76	3.30	1.89	162	2	60.2	9/GR14	10
CAN01605	−81.80	4	−61.54	49.50	2.66	1.39	144	2	60.3	9/GR14	10
CAN01606	−70.30	4	−61.32	49.51	2.41	1.65	148	2	60.2	10	
CHLCONT4	−105.80	4	−69.59	−23.20	2.21	0.80	68	2	59.1	9/GR16	
CHLCONT6	−105.80	4	−73.52	−55.52	3.65	1.31	39	2	59.6	9/GR16	
CRBBAH01	−92.30	4	−76.09	24.13	1.83	0.80	141	1	61.7	9/GR18	
CRBBER01	−92.30	4	−64.76	32.13	0.80	0.80	90	1	56.8	9/GR18	
CRBBLZ01	−92.30	4	−88.61	17.26	0.80	0.80	90	1	58.7	9/GR18	
CRBEC001	−92.30	4	−60.07	8.26	4.20	0.86	115	1	64.3	9/GR18	10
CRBJMC01	−92.30	4	−79.45	17.97	0.99	0.80	151	1	61.1	9/GR18	
CYM00001	−115.80	4	−80.58	19.57	0.80	0.80	90	2	59.6		
DOMIFRB2	−83.30	4	−70.51	18.79	0.98	0.80	167	2	61.1		
EQAC0001	−94.80	4	−78.31	−1.52	1.48	1.15	65	1	63.0	9/GR19	
EQAG0001	−94.80	4	−90.36	−0.57	0.94	0.89	99	1	61.0	9/GR19	
GUFMGG02	−52.80	4	−56.42	8.47	4.16	0.81	123	2	62.7	2 7	10
HWA00002	−165.80	4	−165.79	23.32	4.20	0.80	160	2	58.8	9/GR1	10
HWA00003	−174.80	4	−166.10	23.42	4.25	0.80	159	2	58.8	9/GR2	10
JMC00005	−33.80	4	−77.27	18.12	0.80	0.80	90	2	60.6		
LCAIFRB1	−79.30	4	−61.15	13.90	0.80	0.80	90	2	58.4		
MEX01NTE	−77.80	4	−105.80	25.99	2.88	2.07	155	2	60.5	1	
MEX02NTE	−135.80	4	−107.36	26.32	3.80	1.57	149	2	61.2	1	10
MEX02SUR	−126.80	4	−96.39	19.88	3.19	1.87	158	2	62.5	1	10
PRU00004	−85.80	4	−74.19	−8.39	3.74	2.45	112	2	62.9	10	
PTRVIR01	−100.80	4	−65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20	
PTRVIR02	−109.80	4	−65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21	
SLVIFRB2	−107.30	4	−88.91	13.59	0.80	0.80	90	1	61.7		
USAEH001	−61.30	4	−85.16	36.21	5.63	3.32	22	2	61.9	1 5 6	10
USAEH002	−100.80	4	−89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20	10
USAEH003	−109.80	4	−90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21	10
USAEH004	−118.80	4	−91.16	36.05	5.38	3.24	153	2	62.6	1 5 6	10
USAPSA02	−165.80	4	−117.79	40.58	4.04	0.82	135	2	63.3	9/GR1	
USAPSA03	−174.80	4	−118.20	40.15	3.63	0.80	136	2	65.0	9/GR2	
USAWH101	−147.80	4	−109.70	38.13	5.52	1.96	142	2	62.1	10	
USAWH102	−156.80	4	−111.40	38.57	5.51	1.55	138	2	63.2	10	
VEN11VEN	−103.80	4	−66.79	6.90	2.50	1.77	122	2	65.2	10	

12 282.32 MHz (5)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	5	−149.66	58.37	3.76	1.24	170	1	59.7	9/GR1	10
ALS00003	−175.20	5	−150.98	58.53	3.77	1.11	167	1	60.0	9/GR2	10
ARGINSU4	−94.20	5	−52.98	−59.81	3.40	0.80	19	1	59.9	9/GR3	
ARGSUR04	−94.20	5	−65.04	−43.33	3.32	1.50	40	1	60.7	9/GR3	10
B CE311	−64.20	5	−40.60	−6.07	3.04	2.06	174	1	61.6	89/GR7	10
B CE312	−45.20	5	−40.27	−6.06	3.44	2.09	174	1	61.0	89/GR9	10
B CE411	−64.20	5	−50.97	−15.27	3.86	1.38	49	1	62.6	89/GR7	10
B CE412	−45.20	5	−50.71	−15.30	3.57	1.56	52	1	62.7	89/GR9	10
B CE511	−64.20	5	−53.10	−2.90	2.44	2.13	104	1	63.0	89/GR7	10
B NO611	−74.20	5	−59.60	−11.62	2.85	1.69	165	2	62.8	89/GR8	10
B NO711	−74.20	5	−60.70	−1.78	3.54	1.78	126	2	62.8	89/GR8	10
B NO811	−74.20	5	−68.76	−4.71	2.37	1.65	73	2	62.8	89/GR8	
B SU111	−81.20	5	−51.12	−25.63	2.76	1.05	50	1	62.8	89/GR6	10
B SU112	−45.20	5	−50.75	−25.62	2.47	1.48	56	1	62.2	89/GR9	
B SU211	−81.20	5	−44.51	−16.95	3.22	1.36	60	1	62.5	89/GR6	10
B SU212	−45.20	5	−44.00	−16.87	3.20	1.96	58	1	61.3	89/GR9	
BAHIFRB1	−87.20	5	−76.06	24.16	1.81	0.80	142	1	61.6		
BERBERMU	−96.20	5	−64.77	32.32	0.80	0.80	90	2	56.8		
BERBER02	−31.00	5	−64.77	32.32	0.80	0.80	90	1	56.9	2	10
BOLAND01	−115.20	5	−65.04	−16.76	2.49	1.27	76	1	67.9	9/GR5	
CAN01101	−138.20	5	−125.63	57.24	3.45	1.27	157	1	59.5	9/GR10	10
CAN01201	−138.20	5	−112.04	55.95	3.35	0.97	151	1	59.6	9/GR10	10
CAN01202	−72.70	5	−107.70	55.63	2.74	1.12	32	1	59.6		
CAN01203	−129.20	5	−111.48	55.61	3.08	1.15	151	1	59.5	9/GR12	10
CAN01303	−129.20	5	−102.42	57.12	3.54	0.91	154	1	60.0	9/GR12	10
CAN01304	−91.20	5	−99.12	57.36	1.98	1.72	2	1	59.8	9/GR13	
CAN01403	−129.20	5	−89.75	52.02	4.68	0.80	148	1	61.8	9/GR12	10
CAN01404	−91.20	5	−84.82	52.42	3.10	2.05	152	1	60.4	9/GR13	10
CAN01405	−82.20	5	−84.00	52.39	2.84	2.29	172	1	60.3	9/GR14	10
CAN01504	−91.20	5	−72.66	53.77	3.57	1.67	156	1	60.2	9/GR13	10
CAN01505	−82.20	5	−71.77	53.79	3.30	1.89	162	1	60.1	9/GR14	10
CAN01605	−82.20	5	−61.50	49.55	2.65	1.40	143	1	60.3	9/GR14	10
CAN01606	−70.70	5	−61.30	49.55	2.40	1.65	148	1	60.2	10	
CHLCONT5	−106.20	5	−72.23	−35.57	2.60	0.80	55	1	59.4	9/GR17	
CHLPAC02	−106.20	5	−80.06	−30.06	1.36	0.80	69	1	59.2	9/GR17	
CLMAND01	−115.20	5	−74.72	5.93	3.85	1.63	114	1	64.9	9/GR5	
CLM00001	−103.20	5	−74.50	5.87	3.98	1.96	118	1	63.5	10	
EQACAND1	−115.20	5	−78.40	−1.61	1.37	0.95	75	1	64.0	9/GR5	
EQAGAND1	−115.20	5	−90.34	−0.62	0.90	0.81	89	1	61.3	9/GR5	
FLKANT01	−57.20	5	−44.54	−60.13	3.54	0.80	12	1	59.3	2	10
FLKFALKS	−31.00	5	−59.90	−51.64	0.80	0.80	90	1	58.1	2	
GRD00002	−42.20	5	−61.58	12.29	0.80	0.80	90	1	58.8		
HWA00002	−166.20	5	−165.79	23.42	4.20	0.80	160	1	58.8	9/GR1	10
HWA00003	−175.20	5	−166.10	23.42	4.25	0.80	159	1	58.8	9/GR2	10
MEX01NTE	−78.20	5	−105.81	26.01	2.89	2.08	155	1	60.5	1	
MEX01SUR	−69.20	5	−94.84	19.82	3.05	2.09	4	1	62.2	1	10
MEX02NTE	−136.20	5	−107.21	26.31	3.84	1.55	148	1	61.2	1	10
MEX02SUR	−127.20	5	−96.39	19.88	3.18	1.87	157	1	62.5	1	10
PAQPAC01	−106.20	5	−109.18	−27.53	0.80	0.80	90	1	56.2	9/GR17	
PRG00002	−99.20	5	−58.66	−23.32	1.45	1.04	76	1	60.2		
PRUAND02	−115.20	5	−74.69	−8.39	3.41	1.79	95	1	63.9	9/GR5	
PTRVIR01	−101.20	5	−65.85	18.12	0.80	0.80	90	1	60.5	169/GR20	
PTRVIR02	−110.20	5	−65.86	18.12	0.80	0.80	90	1	61.0	169/GR21	
SPMFRAN3	−53.20	5	−67.24	47.51	3.16	0.80	7	1	60.4	27	10
TRD00001	−84.70	5	−61.23	10.70	0.80	0.80	90	1	59.4		
URG00001	−71.70	5	−56.22	−32.52	1.02	0.89	11	1	60.0		
USAEH001	−61.70	5	−85.19	36.21	5.63	3.33	22	1	61.8	156	10
USAEH002	−101.20	5	−89.24	36.16	5.67	3.76	170	1	61.7	169/GR20	10
USAEH003	−110.20	5	−90.14	36.11	5.55	3.55	161	1	62.0	169/GR21	10
USAEH004	−119.20	5	−91.16	36.05	5.38	3.24	152	1	62.6	156	10
USAPSA02	−166.20	5	−117.80	40.58	4.03	0.82	135	1	63.2	9/GR1	
USAPSA03	−175.20	5	−118.27	40.12	3.62	0.80	136	1	65.0	9/GR2	
USAWH101	−148.20	5	−109.65	38.13	5.53	1.95	142	1	62.1	10	
USAWH102	−157.20	5	−111.41	38.57	5.51	1.54	138	1	63.2	10	
VENAND03	−115.20	5	−67.04	6.91	2.37	1.43	111	1	67.2	9/GR5	
VRG00001	−79.70	5	−64.37	18.48	0.80	0.80	90	1	58.3	4	

12 296.90 MHz (6)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	6	−149.63	58.52	3.81	1.23	171	2	59.7	9/GR1	10
ALS00003	−174.80	6	−150.95	58.54	3.77	1.11	167	2	60.0	9/GR2	10
ARGNORT4	−93.80	6	−63.96	−30.01	3.86	1.99	48	2	65.6	10	
ARGNORT5	−54.80	6	−62.85	−29.80	3.24	2.89	47	2	63.5	10	
ATNBEAM1	−52.80	6	−66.44	14.87	1.83	0.80	39	2	61.0		
B CE311	−63.80	6	−40.60	−6.07	3.04	2.06	174	2	61.6	8 9/GR7	10
B CE312	−44.80	6	−40.26	−6.06	3.44	2.09	174	2	61.0	8 9/GR9	10
B CE411	−63.80	6	−50.97	−15.26	3.86	1.38	49	2	62.6	8 9/GR7	10
B CE412	−44.80	6	−50.71	−15.30	3.57	1.56	52	2	62.7	8 9/GR9	10
B CE511	−63.80	6	−53.11	−2.98	2.42	2.15	107	2	63.1	8 9/GR7	10
B NO611	−73.80	6	−59.60	−11.62	2.86	1.69	165	1	62.8	8 9/GR8	10
B NO711	−73.80	6	−60.70	−1.78	3.54	1.78	126	1	62.8	8 9/GR8	10
B NO811	−73.80	6	−68.75	−4.71	2.37	1.65	73	1	62.8	8 9/GR8	
B SE911	−101.80	6	−45.99	−19.09	2.22	0.80	62	2	65.3	8	10
B SU111	−80.80	6	−51.10	−25.64	2.76	1.06	50	2	62.8	8 9/GR6	10
B SU112	−44.80	6	−50.76	−25.62	2.47	1.48	56	2	62.3	8 9/GR9	
B SU211	−80.80	6	−44.51	−16.94	3.22	1.37	60	2	62.5	8 9/GR6	10
B SU212	−44.80	6	−43.99	−16.97	3.27	1.92	59	2	61.3	8 9/GR9	
CAN01101	−137.80	6	−125.60	57.24	3.45	1.27	157	2	59.5	9/GR10	10
CAN01201	−137.80	6	−111.92	55.89	3.33	0.98	151	2	59.6	9/GR10	10
CAN01202	−72.30	6	−107.64	55.62	2.75	1.11	32	2	59.6		
CAN01203	−128.80	6	−111.43	55.56	3.07	1.15	151	2	59.5	9/GR12	10
CAN01303	−128.80	6	−102.39	57.12	3.54	0.92	154	2	60.0	9/GR12	10
CAN01304	−90.80	6	−99.00	57.33	1.96	1.73	1	2	59.8	9/GR13	
CAN01403	−128.80	6	−89.70	52.02	4.67	0.80	148	2	61.8	9/GR12	10
CAN01404	−90.80	6	−84.78	52.41	3.09	2.06	153	2	60.4	9/GR13	10
CAN01405	−81.80	6	−84.02	52.34	2.82	2.30	172	2	60.3	9/GR14	10
CAN01504	−90.80	6	−72.68	53.78	3.57	1.67	157	2	60.2	9/GR13	10
CAN01505	−81.80	6	−71.76	53.76	3.30	1.89	162	2	60.1	9/GR14	10
CAN01605	−81.80	6	−61.54	49.50	2.66	1.39	144	2	60.3	9/GR14	10
CAN01606	−70.30	6	−61.32	49.51	2.41	1.65	148	2	60.2	10	
CHLCONT4	−105.80	6	−69.59	−23.20	2.21	0.80	68	2	59.1	9/GR16	
CHLCONT6	−105.80	6	−73.52	−55.52	3.65	1.31	39	2	59.6	9/GR16	
CRBBAH01	−92.30	6	−76.09	24.13	1.83	0.80	141	1	61.7	9/GR18	
CRBBER01	−92.30	6	−64.76	32.13	0.80	0.80	90	1	56.7	9/GR18	
CRBBLZ01	−92.30	6	−88.61	17.26	0.80	0.80	90	1	58.6	9/GR18	
CRBEC001	−92.30	6	−60.07	8.26	4.20	0.86	115	1	64.2	9/GR18	10
CRBJMC01	−92.30	6	−79.45	17.97	0.99	0.80	151	1	61.1	9/GR18	
CTR00201	−130.80	6	−84.33	9.67	0.82	0.80	119	2	65.6		
EQAC0001	−94.80	6	−78.31	−1.52	1.48	1.15	65	1	63.0	9/GR19	
EQAG0001	−94.80	6	−90.36	−0.57	0.94	0.89	99	1	61.0	9/GR19	
GUY00302	−33.80	6	−59.07	4.77	1.43	0.85	91	2	63.5		
HNDIFRB2	−107.30	6	−86.23	15.16	1.14	0.85	8	1	63.4		
HTI00002	−83.30	6	−73.28	18.96	0.82	0.80	11	2	60.9		
HWA00002	−165.80	6	−165.79	23.32	4.20	0.80	160	2	58.8	9/GR1	10
HWA00003	−174.80	6	−166.10	23.42	4.25	0.80	159	2	58.8	9/GR2	10
MEX01NTE	−77.80	6	−105.80	25.99	2.88	2.07	155	2	60.5	1	
MEX02NTE	−135.80	6	−107.36	26.32	3.80	1.57	149	2	61.2	1	10
MEX02SUR	−126.80	6	−96.39	19.88	3.19	1.87	158	2	62.5	1	10
PRU00004	−85.80	6	−74.19	−8.39	3.74	2.45	112	2	62.8	10	
PTRVIR01	−100.80	6	−65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20	
PTRVIR02	−109.80	6	−65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21	
TCA00001	−115.80	6	−71.79	21.53	0.80	0.80	90	2	60.4		
USAEH001	−61.30	6	−85.16	36.21	5.63	3.32	22	2	61.8	1 5 6	10
USAEH002	−100.80	6	−89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20	10
USAEH003	−109.80	6	−90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21	10
USAEH004	−118.80	6	−91.16	36.05	5.38	3.24	153	2	62.6	1 5 6	10
USAPSA02	−165.80	6	−117.79	40.58	4.04	0.82	135	2	63.2	9/GR1	
USAPSA03	−174.80	6	−118.20	40.15	3.63	0.80	136	2	64.9	9/GR2	
USAWH101	−147.80	6	−109.70	38.13	5.52	1.96	142	2	62.1	10	
USAWH102	−156.80	6	−111.40	38.57	5.51	1.55	138	2	63.2	10	
VCT00001	−79.30	6	−61.18	13.23	0.80	0.80	90	2	58.4		
VEN11VEN	−103.80	6	−66.79	6.90	2.50	1.77	122	2	65.1	10	

12 311.48 MHz (7)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	7	−149.66	58.37	3.76	1.24	170	1	59.8	9/GR1	10
ALS00003	−175.20	7	−150.98	58.53	3.77	1.11	167	1	60.0	9/GR2	10
ARGINSU4	−94.20	7	−52.98	−59.81	3.40	0.80	19	1	59.9	9/GR3	
ARGINSU5	−55.20	7	−44.17	−59.91	3.77	0.80	13	1	59.3	9/GR4	10
ARGSUR04	−94.20	7	−65.04	−43.33	3.32	1.50	40	1	60.7	9/GR3	10
ARGSUR05	−55.20	7	−63.68	−43.01	2.54	2.38	152	1	60.1	9/GR4	10
ATGSJN01	−79.70	7	−61.79	17.07	0.80	0.80	90	1	58.4		
B CE311	−64.20	7	−40.60	−6.07	3.04	2.06	174	1	61.6	8 9/GR7	10
B CE312	−45.20	7	−40.27	−6.06	3.44	2.09	174	1	61.0	8 9/GR9	10
B CE411	−64.20	7	−50.97	−15.27	3.86	1.38	49	1	62.6	8 9/GR7	10
B CE412	−45.20	7	−50.71	−15.30	3.57	1.56	52	1	62.7	8 9/GR9	10
B CE511	−64.20	7	−53.10	−2.90	2.44	2.13	104	1	63.1	8 9/GR7	10
B NO611	−74.20	7	−59.60	−11.62	2.85	1.69	165	2	62.9	8 9/GR8	10
B NO711	−74.20	7	−60.70	−1.78	3.54	1.78	126	2	62.8	8 9/GR8	10
B NO811	−74.20	7	−68.76	−4.71	2.37	1.65	73	2	62.8	8 9/GR8	
B SU111	−81.20	7	−51.12	−25.63	2.76	1.05	50	1	62.9	8 9/GR6	10
B SU112	−45.20	7	−50.75	−25.62	2.47	1.48	56	1	62.3	8 9/GR9	
B SU211	−81.20	7	−44.51	−16.95	3.22	1.36	60	1	62.5	8 9/GR6	10
B SU212	−45.20	7	−44.00	−16.87	3.20	1.96	58	1	61.3	8 9/GR9	
BERBERMU	−96.20	7	−64.77	32.32	0.80	0.80	90	2	56.8		
BOLAND01	−115.20	7	−65.04	−16.76	2.49	1.27	76	1	67.9	9/GR5	
BOL00001	−87.20	7	−64.61	−16.71	2.52	2.19	85	1	63.8	10	
BRB00001	−92.70	7	−59.85	12.93	0.80	0.80	90	2	59.1		
CAN01101	−138.20	7	−125.63	57.24	3.45	1.27	157	1	59.5	9/GR10	10
CAN01201	−138.20	7	−112.04	55.95	3.35	0.97	151	1	59.6	9/GR10	10
CAN01202	−72.70	7	−107.70	55.63	2.74	1.12	32	1	59.6		
CAN01203	−129.20	7	−111.48	55.61	3.08	1.15	151	1	59.5	9/GR12	10
CAN01303	−129.20	7	−102.42	57.12	3.54	0.91	154	1	60.1	9/GR12	10
CAN01304	−91.20	7	−99.12	57.36	1.98	1.72	2	1	59.8	9/GR13	
CAN01403	−129.20	7	−89.75	52.02	4.68	0.80	148	1	61.8	9/GR12	10
CAN01404	−91.20	7	−84.82	52.42	3.10	2.05	152	1	60.4	9/GR13	10
CAN01405	−82.20	7	−84.00	52.39	2.84	2.29	172	1	60.3	9/GR14	10
CAN01504	−91.20	7	−72.66	53.77	3.57	1.67	156	1	60.2	9/GR13	10
CAN01505	−82.20	7	−71.77	53.79	3.30	1.89	162	1	60.1	9/GR14	10
CAN01605	−82.20	7	−61.50	49.55	2.65	1.40	143	1	60.3	9/GR14	10
CAN01606	−70.70	7	−61.30	49.55	2.40	1.65	148	1	60.2	10	
CHLCONT5	−106.20	7	−72.23	−35.57	2.60	0.80	55	1	59.4	9/GR17	
CHLPAC02	−106.20	7	−80.06	−30.06	1.36	0.80	69	1	59.2	9/GR17	
CLMAND01	−115.20	7	−74.72	5.93	3.85	1.63	114	1	65.0	9/GR5	
CLM00001	−103.20	7	−74.50	5.87	3.98	1.96	118	1	63.6	10	
CUB00001	−89.20	7	−79.81	21.62	2.24	0.80	168	1	61.1		
EQACAND1	−115.20	7	−78.40	−1.61	1.37	0.95	75	1	64.1	9/GR5	
EQAGAND1	−115.20	7	−90.34	−0.62	0.90	0.81	89	1	61.3	9/GR5	
GRD00002	−42.20	7	−61.58	12.29	0.80	0.80	90	1	58.8		
GRD00059	−57.20	7	−61.58	12.29	0.80	0.80	90	1	58.5		
GRLDNK01	−53.20	7	−44.89	66.56	2.70	0.82	173	1	60.0	2	10
HWA00002	−166.20	7	−165.79	23.42	4.20	0.80	160	1	58.8	9/GR1	10
HWA00003	−175.20	7	−166.10	23.42	4.25	0.80	159	1	58.8	9/GR2	10
MEX01NTE	−78.20	7	−105.81	26.01	2.89	2.08	155	1	60.5	1	
MEX01SUR	−69.20	7	−94.84	19.82	3.05	2.09	4	1	62.3	1	10
MEX02NTE	−136.20	7	−107.21	26.31	3.84	1.55	148	1	61.2	1	10
MEX02SUR	−127.20	7	−96.39	19.88	3.18	1.87	157	1	62.6	1	10
PAQPAC01	−106.20	7	−109.18	−27.53	0.80	0.80	90	1	56.2	9/GR17	
PRG00002	−99.20	7	−58.66	−23.32	1.45	1.04	76	1	60.2		
PRUAND02	−115.20	7	−74.69	−8.39	3.41	1.79	95	1	64.0	9/GR5	
PTRVIR01	−101.20	7	−65.85	18.12	0.80	0.80	90	1	60.6	1 6 9/GR20	
PTRVIR02	−110.20	7	−65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21	
SURINAM2	−84.70	7	−55.69	4.35	1.00	0.80	86	1	63.2		
URG00001	−71.70	7	−56.22	−32.52	1.02	0.89	11	1	60.0		
USAEH001	−61.70	7	−85.19	36.21	5.63	3.33	22	1	61.8	1 5 6	10
USAEH002	−101.20	7	−89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20	10
USAEH003	−110.20	7	−90.14	36.11	5.55	3.55	161	1	62.1	1 6 9/GR21	10
USAEH004	−119.20	7	−91.16	36.05	5.38	3.24	152	1	62.6	1 5 6	10
USAPSA02	−166.20	7	−117.80	40.58	4.03	0.82	135	1	63.3	9/GR1	
USAPSA03	−175.20	7	−118.27	40.12	3.62	0.80	136	1	65.0	9/GR2	
USAWH101	−148.20	7	−109.65	38.13	5.53	1.95	142	1	62.1	10	
USAWH102	−157.20	7	−111.41	38.57	5.51	1.54	138	1	63.2	10	
VENAND03	−115.20	7	−67.04	6.91	2.37	1.43	111	1	67.3	9/GR5	

12 326.06 MHz (8)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	8	−149.63	58.52	3.81	1.23	171	2	59.8	9/GR1	10
ALS00003	−174.80	8	−150.95	58.54	3.77	1.11	167	2	60.0	9/GR2	10
ARGNORT4	−93.80	8	−63.96	−30.01	3.86	1.99	48	2	65.7	10	
ARGNORT5	−54.80	8	−62.85	−29.80	3.24	2.89	47	2	63.5	10	
B CE311	−63.80	8	−40.60	−6.07	3.04	2.06	174	2	61.6	8 9/GR7	10
B CE312	−44.80	8	−40.26	−6.06	3.44	2.09	174	2	61.0	8 9/GR9	10
B CE411	−63.80	8	−50.97	−15.26	3.86	1.38	49	2	62.6	8 9/GR7	10
B CE412	−44.80	8	−50.71	−15.30	3.57	1.56	52	2	62.8	8 9/GR9	10
B CE511	−63.80	8	−53.11	−2.98	2.42	2.15	107	2	63.1	8 9/GR7	10
B NO611	−73.80	8	−59.60	−11.62	2.86	1.69	165	1	62.9	8 9/GR8	10
B NO711	−73.80	8	−60.70	−1.78	3.54	1.78	126	1	62.8	8 9/GR8	10
B NO811	−73.80	8	−68.75	−4.71	2.37	1.65	73	1	62.8	8 9/GR8	
B SE911	−101.80	8	−45.99	−19.09	2.22	0.80	62	2	65.3	8	10
B SU111	−80.80	8	−51.10	−25.64	2.76	1.06	50	2	62.9	8 9/GR6	10
B SU112	−44.80	8	−50.76	−25.62	2.47	1.48	56	2	62.3	8 9/GR9	
B SU211	−80.80	8	−44.51	−16.94	3.22	1.37	60	2	62.5	8 9/GR6	10
B SU212	−44.80	8	−43.99	−16.97	3.27	1.92	59	2	61.3	8 9/GR9	
CAN01101	−137.80	8	−125.60	57.24	3.45	1.27	157	2	59.5	9/GR10	10
CAN01201	−137.80	8	−111.92	55.89	3.33	0.98	151	2	59.6	9/GR10	10
CAN01202	−72.30	8	−107.64	55.62	2.75	1.11	32	2	59.6		
CAN01203	−128.80	8	−111.43	55.56	3.07	1.15	151	2	59.5	9/GR12	10
CAN01303	−128.80	8	−102.39	57.12	3.54	0.92	154	2	60.1	9/GR12	10
CAN01304	−90.80	8	−99.00	57.33	1.96	1.73	1	2	59.8	9/GR13	
CAN01403	−128.80	8	−89.70	52.02	4.67	0.80	148	2	61.8	9/GR12	10
CAN01404	−90.80	8	−84.78	52.41	3.09	2.06	153	2	60.4	9/GR13	10
CAN01405	−81.80	8	−84.02	52.34	2.82	2.30	172	2	60.3	9/GR14	10
CAN01504	−90.80	8	−72.68	53.78	3.57	1.67	157	2	60.2	9/GR13	10
CAN01505	−81.80	8	−71.76	53.76	3.30	1.89	162	2	60.2	9/GR14	10
CAN01605	−81.80	8	−61.54	49.50	2.66	1.39	144	2	60.3	9/GR14	10
CAN01606	−70.30	8	−61.32	49.51	2.41	1.65	148	2	60.2	10	
CHLCONT4	−105.80	8	−69.59	−23.20	2.21	0.80	68	2	59.1	9/GR16	
CHLCONT6	−105.80	8	−73.52	−55.52	3.65	1.31	39	2	59.6	9/GR16	
CRBBAH01	−92.30	8	−76.09	24.13	1.83	0.80	141	1	61.7	9/GR18	
CRBBER01	−92.30	8	−64.76	32.13	0.80	0.80	90	1	56.8	9/GR18	
CRBBLZ01	−92.30	8	−88.61	17.26	0.80	0.80	90	1	58.7	9/GR18	
CRBEC001	−92.30	8	−60.07	8.26	4.20	0.86	115	1	64.3	9/GR18	10
CRBJMC01	−92.30	8	−79.45	17.97	0.99	0.80	151	1	61.1	9/GR18	
CYM00001	−115.80	8	−80.58	19.57	0.80	0.80	90	2	59.6		
DOMIFRB2	−83.30	8	−70.51	18.79	0.98	0.80	167	2	61.1		
EQAC0001	−94.80	8	−78.31	−1.52	1.48	1.15	65	1	63.0	9/GR19	
EQAG0001	−94.80	8	−90.36	−0.57	0.94	0.89	99	1	61.0	9/GR19	
GUFMGG02	−52.80	8	−56.42	8.47	4.16	0.81	123	2	62.7	2 7	10
HWA00002	−165.80	8	−165.79	23.32	4.20	0.80	160	2	58.8	9/GR1	10
HWA00003	−174.80	8	−166.10	23.42	4.25	0.80	159	2	58.8	9/GR2	10
JMC00005	−33.80	8	−77.27	18.12	0.80	0.80	90	2	60.6		
LCAIFRB1	−79.30	8	−61.15	13.90	0.80	0.80	90	2	58.4		
MEX01NTE	−77.80	8	−105.80	25.99	2.88	2.07	155	2	60.5	1	
MEX02NTE	−135.80	8	−107.36	26.32	3.80	1.57	149	2	61.2	1	10
MEX02SUR	−126.80	8	−96.39	19.88	3.19	1.87	158	2	62.5	1	10
PRU00004	−85.80	8	−74.19	−8.39	3.74	2.45	112	2	62.9	10	
PTRVIR01	−100.80	8	−65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20	
PTRVIR02	−109.80	8	−65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21	
SLVIFRB2	−107.30	8	−88.91	13.59	0.80	0.80	90	1	61.7		
USAEH001	−61.30	8	−85.16	36.21	5.63	3.32	22	2	61.9	1 5 6	10
USAEH002	−100.80	8	−89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20	10
USAEH003	−109.80	8	−90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21	10
USAEH004	−118.80	8	−91.16	36.05	5.38	3.24	153	2	62.6	1 5 6	10
USAPSA02	−165.80	8	−117.79	40.58	4.04	0.82	135	2	63.3	9/GR1	
USAPSA03	−174.80	8	−118.20	40.15	3.63	0.80	136	2	65.0	9/GR2	
USAWH101	−147.80	8	−109.70	38.13	5.52	1.96	142	2	62.1	10	
USAWH102	−156.80	8	−111.40	38.57	5.51	1.55	138	2	63.2	10	
VEN11VEN	−103.80	8	−66.79	6.90	2.50	1.77	122	2	65.2	10	

12 340.64 MHz (9)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	9	−149.66	58.37	3.76	1.24	170	1	59.7	9/GR1	10
ALS00003	−175.20	9	−150.98	58.53	3.77	1.11	167	1	60.0	9/GR2	10
ARGINSU4	−94.20	9	−52.98	−59.81	3.40	0.80	19	1	59.9	9/GR3	
ARGSUR04	−94.20	9	−65.04	−43.33	3.32	1.50	40	1	60.7	9/GR3	10
B CE311	−64.20	9	−40.60	−6.07	3.04	2.06	174	1	61.6	8 9/GR7	10
B CE312	−45.20	9	−40.27	−6.06	3.44	2.09	174	1	61.0	8 9/GR9	10
B CE411	−64.20	9	−50.97	−15.27	3.86	1.38	49	1	62.6	8 9/GR7	10
B CE412	−45.20	9	−50.71	−15.30	3.57	1.56	52	1	62.7	8 9/GR9	10
B CE511	−64.20	9	−53.10	−2.90	2.44	2.13	104	1	63.0	8 9/GR7	10
B NO611	−74.20	9	−59.60	−11.62	2.85	1.69	165	2	62.8	8 9/GR8	10
B NO711	−74.20	9	−60.70	−1.78	3.54	1.78	126	2	62.8	8 9/GR8	10
B NO811	−74.20	9	−68.76	−4.71	2.37	1.65	73	2	62.8	8 9/GR8	
B SU111	−81.20	9	−51.12	−25.63	2.76	1.05	50	1	62.8	8 9/GR6	10
B SU112	−45.20	9	−50.75	−25.62	2.47	1.48	56	1	62.2	8 9/GR9	
B SU211	−81.20	9	−44.51	−16.95	3.22	1.36	60	1	62.5	8 9/GR6	10
B SU212	−45.20	9	−44.00	−16.87	3.20	1.96	58	1	61.3	8 9/GR9	
BAHIFRB1	−87.20	9	−76.06	24.16	1.81	0.80	142	1	61.6		
BERBERMU	−96.20	9	−64.77	32.32	0.80	0.80	90	2	56.8		
BERBER02	−31.00	9	−64.77	32.32	0.80	0.80	90	1	56.9	2	10
BOLAND01	−115.20	9	−65.04	−16.76	2.49	1.27	76	1	67.9	9/GR5	
CAN01101	−138.20	9	−125.63	57.24	3.45	1.27	157	1	59.5	9/GR10	10
CAN01201	−138.20	9	−112.04	55.95	3.35	0.97	151	1	59.6	9/GR10	10
CAN01202	−72.70	9	−107.70	55.63	2.74	1.12	32	1	59.6		
CAN01203	−129.20	9	−111.48	55.61	3.08	1.15	151	1	59.5	9/GR12	10
CAN01303	−129.20	9	−102.42	57.12	3.54	0.91	154	1	60.0	9/GR12	10
CAN01304	−91.20	9	−99.12	57.36	1.98	1.72	2	1	59.8	9/GR13	
CAN01403	−129.20	9	−89.75	52.02	4.68	0.80	148	1	61.8	9/GR12	10
CAN01404	−91.20	9	−84.82	52.42	3.10	2.05	152	1	60.4	9/GR13	10
CAN01405	−82.20	9	−84.00	52.39	2.84	2.29	172	1	60.3	9/GR14	10
CAN01504	−91.20	9	−72.66	53.77	3.57	1.67	156	1	60.2	9/GR13	10
CAN01505	−82.20	9	−71.77	53.79	3.30	1.89	162	1	60.1	9/GR14	10
CAN01605	−82.20	9	−61.50	49.55	2.65	1.40	143	1	60.3	9/GR14	10
CAN01606	−70.70	9	−61.30	49.55	2.40	1.65	148	1	60.2	10	
CHLCONT5	−106.20	9	−72.23	−35.57	2.60	0.80	55	1	59.4	9/GR17	
CHLPAC02	−106.20	9	−80.06	−30.06	1.36	0.80	69	1	59.2	9/GR17	
CLMAND01	−115.20	9	−74.72	5.93	3.85	1.63	114	1	64.9	9/GR5	
CLM00001	−103.20	9	−74.50	5.87	3.98	1.96	118	1	63.5	10	
EQACAND1	−115.20	9	−78.40	−1.61	1.37	0.95	75	1	64.0	9/GR5	
EQAGAND1	−115.20	9	−90.34	−0.62	0.90	0.81	89	1	61.3	9/GR5	
FLKANT01	−57.20	9	−44.54	−60.13	3.54	0.80	12	1	59.3	2	10
FLKFALKS	−31.00	9	−59.90	−51.64	0.80	0.80	90	1	58.1	2	
GRD00002	−42.20	9	−61.58	12.29	0.80	0.80	90	1	58.8		
HWA00002	−166.20	9	−165.79	23.42	4.20	0.80	160	1	58.8	9/GR1	10
HWA00003	−175.20	9	−166.10	23.42	4.25	0.80	159	1	58.8	9/GR2	10
MEX01NTE	−78.20	9	−105.81	26.01	2.89	2.08	155	1	60.5	1	
MEX01SUR	−69.20	9	−94.84	19.82	3.05	2.09	4	1	62.2	1	10
MEX02NTE	−136.20	9	−107.21	26.31	3.84	1.55	148	1	61.2	1	10
MEX02SUR	−127.20	9	−96.39	19.88	3.18	1.87	157	1	62.5	1	10
PAQPAC01	−106.20	9	−109.18	−27.53	0.80	0.80	90	1	56.2	9/GR17	
PRG00002	−99.20	9	−58.66	−23.32	1.45	1.04	76	1	60.2		
PRUAND02	−115.20	9	−74.69	−8.39	3.41	1.79	95	1	63.9	9/GR5	
PTRVIR01	−101.20	9	−65.85	18.12	0.80	0.80	90	1	60.5	1 6 9/GR20	
PTRVIR02	−110.20	9	−65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21	
SPMFRAN3	−53.20	9	−67.24	47.51	3.16	0.80	7	1	60.4	2 7	10
TRD00001	−84.70	9	−61.23	10.70	0.80	0.80	90	1	59.4		
URG00001	−71.70	9	−56.22	−32.52	1.02	0.89	11	1	60.0		
USAEH001	−61.70	9	−85.19	36.21	5.63	3.33	22	1	61.8	1 5 6	10
USAEH002	−101.20	9	−89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20	10
USAEH003	−110.20	9	−90.14	36.11	5.55	3.55	161	1	62.0	1 6 9/GR21	10
USAEH004	−119.20	9	−91.16	36.05	5.38	3.24	152	1	62.6	1 5 6	10
USAPSA02	−166.20	9	−117.80	40.58	4.03	0.82	135	1	63.2	9/GR1	
USAPSA03	−175.20	9	−118.27	40.12	3.62	0.80	136	1	65.0	9/GR2	
USAWH101	−148.20	9	−109.65	38.13	5.53	1.95	142	1	62.1	10	
USAWH102	−157.20	9	−111.41	38.57	5.51	1.54	138	1	63.2	10	
VENAND03	−115.20	9	−67.04	6.91	2.37	1.43	111	1	67.2	9/GR5	
VRG00001	−79.70	9	−64.37	18.48	0.80	0.80	90	1	58.3	4	

12 355.22 MHz (10)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	10	−149.63	58.52	3.81	1.23	171	2	59.7	9/GR1	10
ALS00003	−174.80	10	−150.95	58.54	3.77	1.11	167	2	60.0	9/GR2	10
ARGNORT4	−93.80	10	−63.96	−30.01	3.86	1.99	48	2	65.6	10	
ARGNORT5	−54.80	10	−62.85	−29.80	3.24	2.89	47	2	63.5	10	
ATNBEAM1	−52.80	10	−66.44	14.87	1.83	0.80	39	2	61.0		
B CE311	−63.80	10	−40.60	−6.07	3.04	2.06	174	2	61.6	8 9/GR7	10
B CE312	−44.80	10	−40.26	−6.06	3.44	2.09	174	2	61.0	8 9/GR9	10
B CE411	−63.80	10	−50.97	−15.26	3.86	1.38	49	2	62.6	8 9/GR7	10
B CE412	−44.80	10	−50.71	−15.30	3.57	1.56	52	2	62.7	8 9/GR9	10
B CE511	−63.80	10	−53.11	−2.98	2.42	2.15	107	2	63.1	8 9/GR7	10
B NO611	−73.80	10	−59.60	−11.62	2.86	1.69	165	1	62.8	8 9/GR8	10
B NO711	−73.80	10	−60.70	−1.78	3.54	1.78	126	1	62.8	8 9/GR8	10
B NO811	−73.80	10	−68.75	−4.71	2.37	1.65	73	1	62.8	8 9/GR8	
B SE911	−101.80	10	−45.99	−19.09	2.22	0.80	62	2	65.3	8	10
B SU111	−80.80	10	−51.10	−25.64	2.76	1.06	50	2	62.8	8 9/GR6	10
B SU112	−44.80	10	−50.76	−25.62	2.47	1.48	56	2	62.3	8 9/GR9	
B SU211	−80.80	10	−44.51	−16.94	3.22	1.37	60	2	62.5	8 9/GR6	10
B SU212	−44.80	10	−43.99	−16.97	3.27	1.92	59	2	61.3	8 9/GR9	
CAN01101	−137.80	10	−125.60	57.24	3.45	1.27	157	2	59.5	9/GR10	10
CAN01201	−137.80	10	−111.92	55.89	3.33	0.98	151	2	59.6	9/GR10	10
CAN01202	−72.30	10	−107.64	55.62	2.75	1.11	32	2	59.6		
CAN01203	−128.80	10	−111.43	55.56	3.07	1.15	151	2	59.5	9/GR12	10
CAN01303	−128.80	10	−102.39	57.12	3.54	0.92	154	2	60.0	9/GR12	10
CAN01304	−90.80	10	−99.00	57.33	1.96	1.73	1	2	59.8	9/GR13	
CAN01403	−128.80	10	−89.70	52.02	4.67	0.80	148	2	61.8	9/GR12	10
CAN01404	−90.80	10	−84.78	52.41	3.09	2.06	153	2	60.4	9/GR13	10
CAN01405	−81.80	10	−84.02	52.34	2.82	2.30	172	2	60.3	9/GR14	10
CAN01504	−90.80	10	−72.68	53.78	3.57	1.67	157	2	60.2	9/GR13	10
CAN01505	−81.80	10	−71.76	53.76	3.30	1.89	162	2	60.1	9/GR14	10
CAN01605	−81.80	10	−61.54	49.50	2.66	1.39	144	2	60.3	9/GR14	10
CAN01606	−70.30	10	−61.32	49.51	2.41	1.65	148	2	60.2	10	
CHLCONT4	−105.80	10	−69.59	−23.20	2.21	0.80	68	2	59.1	9/GR16	
CHLCONT6	−105.80	10	−73.52	−55.52	3.65	1.31	39	2	59.6	9/GR16	
CRBBAH01	−92.30	10	−76.09	24.13	1.83	0.80	141	1	61.7	9/GR18	
CRBBER01	−92.30	10	−64.76	32.13	0.80	0.80	90	1	56.7	9/GR18	
CRBBLZ01	−92.30	10	−88.61	17.26	0.80	0.80	90	1	58.6	9/GR18	
CRBEC001	−92.30	10	−60.07	8.26	4.20	0.86	115	1	64.2	9/GR18	10
CRBJMC01	−92.30	10	−79.45	17.97	0.99	0.80	151	1	61.1	9/GR18	
CTR00201	−130.80	10	−84.33	9.67	0.82	0.80	119	2	65.6		
EQAC0001	−94.80	10	−78.31	−1.52	1.48	1.15	65	1	63.0	9/GR19	
EQAG0001	−94.80	10	−90.36	−0.57	0.94	0.89	99	1	61.0	9/GR19	
GUY00302	−33.80	10	−59.07	4.77	1.43	0.85	91	2	63.5		
HNDIFRB2	−107.30	10	−86.23	15.16	1.14	0.85	8	1	63.4		
HTI00002	−83.30	10	−73.28	18.96	0.82	0.80	11	2	60.9		
HWA00002	−165.80	10	−165.79	23.32	4.20	0.80	160	2	58.8	9/GR1	10
HWA00003	−174.80	10	−166.10	23.42	4.25	0.80	159	2	58.8	9/GR2	10
MEX01NTE	−77.80	10	−105.80	25.99	2.88	2.07	155	2	60.5	1	
MEX02NTE	−135.80	10	−107.36	26.32	3.80	1.57	149	2	61.2	1	10
MEX02SUR	−126.80	10	−96.39	19.88	3.19	1.87	158	2	62.5	1	10
PRU00004	−85.80	10	−74.19	−8.39	3.74	2.45	112	2	62.8	10	
PTRVIR01	−100.80	10	−65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20	
PTRVIR02	−109.80	10	−65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21	
TCA00001	−115.80	10	−71.79	21.53	0.80	0.80	90	2	60.4		
USAEH001	−61.30	10	−85.16	36.21	5.63	3.32	22	2	61.8	1 5 6	10
USAEH002	−100.80	10	−89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20	10
USAEH003	−109.80	10	−90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21	10
USAEH004	−118.80	10	−91.16	36.05	5.38	3.24	153	2	62.6	1 5 6	10
USAPSA02	−165.80	10	−117.79	40.58	4.04	0.82	135	2	63.2	9/GR1	
USAPSA03	−174.80	10	−118.20	40.15	3.63	0.80	136	2	64.9	9/GR2	
USAWH101	−147.80	10	−109.70	38.13	5.52	1.96	142	2	62.1	10	
USAWH102	−156.80	10	−111.40	38.57	5.51	1.55	138	2	63.2	10	
VCT00001	−79.30	10	−61.18	13.23	0.80	0.80	90	2	58.4		
VEN11VEN	−103.80	10	−66.79	6.90	2.50	1.77	122	2	65.1	10	

12 369.80 MHz (11)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	11	−149.66	58.37	3.76	1.24	170	1	59.8	9/GR1	10
ALS00003	−175.20	11	−150.98	58.53	3.77	1.11	167	1	60.0	9/GR2	10
ARGINSU4	−94.20	11	−52.98	−59.81	3.40	0.80	19	1	59.9	9/GR3	
ARGINSU5	−55.20	11	−44.17	−59.91	3.77	0.80	13	1	59.3	9/GR4	10
ARGSUR04	−94.20	11	−65.04	−43.33	3.32	1.50	40	1	60.7	9/GR3	10
ARGSUR05	−55.20	11	−63.68	−43.01	2.54	2.38	152	1	60.1	9/GR4	10
ATGSJN01	−79.70	11	−61.79	17.07	0.80	0.80	90	1	58.4		
B CE311	−64.20	11	−40.60	−6.07	3.04	2.06	174	1	61.6	8 9/GR7	10
B CE312	−45.20	11	−40.27	−6.06	3.44	2.09	174	1	61.0	8 9/GR9	10
B CE411	−64.20	11	−50.97	−15.27	3.86	1.38	49	1	62.6	8 9/GR7	10
B CE412	−45.20	11	−50.71	−15.30	3.57	1.56	52	1	62.7	8 9/GR9	10
B CE511	−64.20	11	−53.10	−2.90	2.44	2.13	104	1	63.1	8 9/GR7	10
B NO611	−74.20	11	−59.60	−11.62	2.85	1.69	165	2	62.9	8 9/GR8	10
B NO711	−74.20	11	−60.70	−1.78	3.54	1.78	126	2	62.8	8 9/GR8	10
B NO811	−74.20	11	−68.76	−4.71	2.37	1.65	73	2	62.8	8 9/GR8	
B SU111	−81.20	11	−51.12	−25.63	2.76	1.05	50	1	62.9	8 9/GR6	10
B SU112	−45.20	11	−50.75	−25.62	2.47	1.48	56	1	62.3	8 9/GR9	
B SU211	−81.20	11	−44.51	−16.95	3.22	1.36	60	1	62.5	8 9/GR6	10
B SU212	−45.20	11	−44.00	−16.87	3.20	1.96	58	1	61.3	8 9/GR9	
BERBERMU	−96.20	11	−64.77	32.32	0.80	0.80	90	2	56.8		
BOLAND01	−115.20	11	−65.04	−16.76	2.49	1.27	76	1	67.9	9/GR5	
BOL00001	−87.20	11	−64.61	−16.71	2.52	2.19	85	1	63.8	10	
BRB00001	−92.70	11	−59.85	12.93	0.80	0.80	90	2	59.1		
CAN01101	−138.20	11	−125.63	57.24	3.45	1.27	157	1	59.5	9/GR10	10
CAN01201	−138.20	11	−112.04	55.95	3.35	0.97	151	1	59.6	9/GR10	10
CAN01202	−72.70	11	−107.70	55.63	2.74	1.12	32	1	59.6		
CAN01203	−129.20	11	−111.48	55.61	3.08	1.15	151	1	59.5	9/GR12	10
CAN01303	−129.20	11	−102.42	57.12	3.54	0.91	154	1	60.1	9/GR12	10
CAN01304	−91.20	11	−99.12	57.36	1.98	1.72	2	1	59.8	9/GR13	
CAN01403	−129.20	11	−89.75	52.02	4.68	0.80	148	1	61.8	9/GR12	10
CAN01404	−91.20	11	−84.82	52.42	3.10	2.05	152	1	60.4	9/GR13	10
CAN01405	−82.20	11	−84.00	52.39	2.84	2.29	172	1	60.3	9/GR14	10
CAN01504	−91.20	11	−72.66	53.77	3.57	1.67	156	1	60.2	9/GR13	10
CAN01505	−82.20	11	−71.77	53.79	3.30	1.89	162	1	60.1	9/GR14	10
CAN01605	−82.20	11	−61.50	49.55	2.65	1.40	143	1	60.3	9/GR14	10
CAN01606	−70.70	11	−61.30	49.55	2.40	1.65	148	1	60.2	10	
CHLCONT5	−106.20	11	−72.23	−35.57	2.60	0.80	55	1	59.4	9/GR17	
CHLPAC02	−106.20	11	−80.06	−30.06	1.36	0.80	69	1	59.2	9/GR17	
CLMAND01	−115.20	11	−74.72	5.93	3.85	1.63	114	1	65.0	9/GR5	
CLM00001	−103.20	11	−74.50	5.87	3.98	1.96	118	1	63.6	10	
CUB00001	−89.20	11	−79.81	21.62	2.24	0.80	168	1	61.1		
EQACAND1	−115.20	11	−78.40	−1.61	1.37	0.95	75	1	64.1	9/GR5	
EQAGAND1	−115.20	11	−90.34	−0.62	0.90	0.81	89	1	61.3	9/GR5	
GRD00002	−42.20	11	−61.58	12.29	0.80	0.80	90	1	58.8		
GRD00059	−57.20	11	−61.58	12.29	0.80	0.80	90	1	58.5		
GRLDNK01	−53.20	11	−44.89	66.56	2.70	0.82	173	1	60.0	2	10
GUY00201	−84.70	11	−59.19	4.78	1.44	0.85	95	1	63.5		
HWA00002	−166.20	11	−165.79	23.42	4.20	0.80	160	1	58.8	9/GR1	10
HWA00003	−175.20	11	−166.10	23.42	4.25	0.80	159	1	58.8	9/GR2	10
MEX01NTE	−78.20	11	−105.81	26.01	2.89	2.08	155	1	60.5	1	
MEX01SUR	−69.20	11	−94.84	19.82	3.05	2.09	4	1	62.3	1	10
MEX02NTE	−136.20	11	−107.21	26.31	3.84	1.55	148	1	61.2	1	10
MEX02SUR	−127.20	11	−96.39	19.88	3.18	1.87	157	1	62.6	1	10
PAQPAC01	−106.20	11	−109.18	−27.53	0.80	0.80	90	1	56.2	9/GR17	
PRG00002	−99.20	11	−58.66	−23.32	1.45	1.04	76	1	60.2		
PRUAND02	−115.20	11	−74.69	−8.39	3.41	1.79	95	1	64.0	9/GR5	
PTRVIR01	−101.20	11	−65.85	18.12	0.80	0.80	90	1	60.6	1 6 9/GR20	
PTRVIR02	−110.20	11	−65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21	
URG00001	−71.70	11	−56.22	−32.52	1.02	0.89	11	1	60.0		
USAEH001	−61.70	11	−85.19	36.21	5.63	3.33	22	1	61.8	1 5 6	10
USAEH002	−101.20	11	−89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20	10
USAEH003	−110.20	11	−90.14	36.11	5.55	3.55	161	1	62.1	1 6 9/GR21	10
USAEH004	−119.20	11	−91.16	36.05	5.38	3.24	152	1	62.6	1 5 6	10
USAPSA02	−166.20	11	−117.80	40.58	4.03	0.82	135	1	63.3	9/GR1	
USAPSA03	−175.20	11	−118.27	40.12	3.62	0.80	136	1	65.0	9/GR2	
USAWH101	−148.20	11	−109.65	38.13	5.53	1.95	142	1	62.1	10	
USAWH102	−157.20	11	−111.41	38.57	5.51	1.54	138	1	63.2	10	
VENAND03	−115.20	11	−67.04	6.91	2.37	1.43	111	1	67.3	9/GR5	

12 384.38 MHz (12)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	12	−149.63	58.52	3.81	1.23	171	2	59.8	9/GR1	10
ALS00003	−174.80	12	−150.95	58.54	3.77	1.11	167	2	60.0	9/GR2	10
ARGNORT4	−93.80	12	−63.96	−30.01	3.86	1.99	48	2	65.7	10	
ARGNORT5	−54.80	12	−62.85	−29.80	3.24	2.89	47	2	63.5	10	
B CE311	−63.80	12	−40.60	−6.07	3.04	2.06	174	2	61.6	8 9/GR7	10
B CE312	−44.80	12	−40.26	−6.06	3.44	2.09	174	2	61.0	8 9/GR9	10
B CE411	−63.80	12	−50.97	−15.26	3.86	1.38	49	2	62.6	8 9/GR7	10
B CE412	−44.80	12	−50.71	−15.30	3.57	1.56	52	2	62.8	8 9/GR9	10
B CE511	−63.80	12	−53.11	−2.98	2.42	2.15	107	2	63.1	8 9/GR7	10
B NO611	−73.80	12	−59.60	−11.62	2.86	1.69	165	1	62.9	8 9/GR8	10
B NO711	−73.80	12	−60.70	−1.78	3.54	1.78	126	1	62.8	8 9/GR8	10
B NO811	−73.80	12	−68.75	−4.71	2.37	1.65	73	1	62.8	8 9/GR8	
B SE911	−101.80	12	−45.99	−19.09	2.22	0.80	62	2	65.3	8	10
B SU111	−80.80	12	−51.10	−25.64	2.76	1.06	50	2	62.9	8 9/GR6	10
B SU112	−44.80	12	−50.76	−25.62	2.47	1.48	56	2	62.3	8 9/GR9	
B SU211	−80.80	12	−44.51	−16.94	3.22	1.37	60	2	62.5	8 9/GR6	10
B SU212	−44.80	12	−43.99	−16.97	3.27	1.92	59	2	61.3	8 9/GR9	
CAN01101	−137.80	12	−125.60	57.24	3.45	1.27	157	2	59.5	9/GR10	10
CAN01201	−137.80	12	−111.92	55.89	3.33	0.98	151	2	59.6	9/GR10	10
CAN01202	−72.30	12	−107.64	55.62	2.75	1.11	32	2	59.6		
CAN01203	−128.80	12	−111.43	55.56	3.07	1.15	151	2	59.5	9/GR12	10
CAN01303	−128.80	12	−102.39	57.12	3.54	0.92	154	2	60.1	9/GR12	10
CAN01304	−90.80	12	−99.00	57.33	1.96	1.73	1	2	59.8	9/GR13	
CAN01403	−128.80	12	−89.70	52.02	4.67	0.80	148	2	61.8	9/GR12	10
CAN01404	−90.80	12	−84.78	52.41	3.09	2.06	153	2	60.4	9/GR13	10
CAN01405	−81.80	12	−84.02	52.34	2.82	2.30	172	2	60.3	9/GR14	10
CAN01504	−90.80	12	−72.68	53.78	3.57	1.67	157	2	60.2	9/GR13	10
CAN01505	−81.80	12	−71.76	53.76	3.30	1.89	162	2	60.2	9/GR14	10
CAN01605	−81.80	12	−61.54	49.50	2.66	1.39	144	2	60.3	9/GR14	10
CAN01606	−70.30	12	−61.32	49.51	2.41	1.65	148	2	60.2	10	
CHLCONT4	−105.80	12	−69.59	−23.20	2.21	0.80	68	2	59.1	9/GR16	
CHLCONT6	−105.80	12	−73.52	−55.52	3.65	1.31	39	2	59.6	9/GR16	
CRBBAH01	−92.30	12	−76.09	24.13	1.83	0.80	141	1	61.7	9/GR18	
CRBBER01	−92.30	12	−64.76	32.13	0.80	0.80	90	1	56.8	9/GR18	
CRBBLZ01	−92.30	12	−88.61	17.26	0.80	0.80	90	1	58.7	9/GR18	
CRBEC001	−92.30	12	−60.07	8.26	4.20	0.86	115	1	64.3	9/GR18	10
CRBJMC01	−92.30	12	−79.45	17.97	0.99	0.80	151	1	61.1	9/GR18	
CYM00001	−115.80	12	−80.58	19.57	0.80	0.80	90	2	59.6		
DOMIFRB2	−83.30	12	−70.51	18.79	0.98	0.80	167	2	61.1		
EQAC0001	−94.80	12	−78.31	−1.52	1.48	1.15	65	1	63.0	9/GR19	
EQAG0001	−94.80	12	−90.36	−0.57	0.94	0.89	99	1	61.0	9/GR19	
GUFMGG02	−52.80	12	−56.42	8.47	4.16	0.81	123	2	62.7	2 7	10
HWA00002	−165.80	12	−165.79	23.32	4.20	0.80	160	2	58.8	9/GR1	10
HWA00003	−174.80	12	−166.10	23.42	4.25	0.80	159	2	58.8	9/GR2	10
JMC00005	−33.80	12	−77.27	18.12	0.80	0.80	90	2	60.6		
LCAIFRB1	−79.30	12	−61.15	13.90	0.80	0.80	90	2	58.4		
MEX01NTE	−77.80	12	−105.80	25.99	2.88	2.07	155	2	60.5	1	
MEX02NTE	−135.80	12	−107.36	26.32	3.80	1.57	149	2	61.2	1	10
MEX02SUR	−126.80	12	−96.39	19.88	3.19	1.87	158	2	62.5	1	10
PRU00004	−85.80	12	−74.19	−8.39	3.74	2.45	112	2	62.9	10	
PTRVIR01	−100.80	12	−65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20	
PTRVIR02	−109.80	12	−65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21	
SLVIFRB2	−107.30	12	−88.91	13.59	0.80	0.80	90	1	61.7		
USAEH001	−61.30	12	−85.16	36.21	5.63	3.32	22	2	61.9	1 5 6	10
USAEH002	−100.80	12	−89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20	10
USAEH003	−109.80	12	−90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21	10
USAEH004	−118.80	12	−91.16	36.05	5.38	3.24	153	2	62.6	1 5 6	10
USAPSA02	−165.80	12	−117.79	40.58	4.04	0.82	135	2	63.3	9/GR1	
USAPSA03	−174.80	12	−118.20	40.15	3.63	0.80	136	2	65.0	9/GR2	
USAWH101	−147.80	12	−109.70	38.13	5.52	1.96	142	2	62.1	10	
USAWH102	−156.80	12	−111.40	38.57	5.51	1.55	138	2	63.2	10	
VEN11VEN	−103.80	12	−66.79	6.90	2.50	1.77	122	2	65.2	10	

12 398.96 MHz (13)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	13	−149.66	58.37	3.76	1.24	170	1	59.7	9/GR1	10
ALS00003	−175.20	13	−150.98	58.53	3.77	1.11	167	1	60.0	9/GR2	10
ARGINSU4	−94.20	13	−52.98	−59.81	3.40	0.80	19	1	59.9	9/GR3	
ARGSUR04	−94.20	13	−65.04	−43.33	3.32	1.50	40	1	60.7	9/GR3	10
B CE311	−64.20	13	−40.60	−6.07	3.04	2.06	174	1	61.6	8 9/GR7	10
B CE312	−45.20	13	−40.27	−6.06	3.44	2.09	174	1	61.0	8 9/GR9	10
B CE411	−64.20	13	−50.97	−15.27	3.86	1.38	49	1	62.6	8 9/GR7	10
B CE412	−45.20	13	−50.71	−15.30	3.57	1.56	52	1	62.7	8 9/GR9	10
B CE511	−64.20	13	−53.10	−2.90	2.44	2.13	104	1	63.0	8 9/GR7	10
B NO611	−74.20	13	−59.60	−11.62	2.85	1.69	165	2	62.8	8 9/GR8	10
B NO711	−74.20	13	−60.70	−1.78	3.54	1.78	126	2	62.8	8 9/GR8	10
B NO811	−74.20	13	−68.76	−4.71	2.37	1.65	73	2	62.8	8 9/GR8	
B SU111	−81.20	13	−51.12	−25.63	2.76	1.05	50	1	62.8	8 9/GR6	10
B SU112	−45.20	13	−50.75	−25.62	2.47	1.48	56	1	62.2	8 9/GR9	
B SU211	−81.20	13	−44.51	−16.95	3.22	1.36	60	1	62.5	8 9/GR6	10
B SU212	−45.20	13	−44.00	−16.87	3.20	1.96	58	1	61.3	8 9/GR9	
BAHIFRB1	−87.20	13	−76.06	24.16	1.81	0.80	142	1	61.6		
BERBERMU	−96.20	13	−64.77	32.32	0.80	0.80	90	2	56.8		
BERBER02	−31.00	13	−64.77	32.32	0.80	0.80	90	1	56.9	2	10
BOLAND01	−115.20	13	−65.04	−16.76	2.49	1.27	76	1	67.9	9/GR5	
CAN01101	−138.20	13	−125.63	57.24	3.45	1.27	157	1	59.5	9/GR10	10
CAN01201	−138.20	13	−112.04	55.95	3.35	0.97	151	1	59.6	9/GR10	10
CAN01202	−72.70	13	−107.70	55.63	2.74	1.12	32	1	59.6		
CAN01203	−129.20	13	−111.48	55.61	3.08	1.15	151	1	59.5	9/GR12	10
CAN01303	−129.20	13	−102.42	57.12	3.54	0.91	154	1	60.0	9/GR12	10
CAN01304	−91.20	13	−99.12	57.36	1.98	1.72	2	1	59.8	9/GR13	
CAN01403	−129.20	13	−89.75	52.02	4.68	0.80	148	1	61.8	9/GR12	10
CAN01404	−91.20	13	−84.82	52.42	3.10	2.05	152	1	60.4	9/GR13	10
CAN01405	−82.20	13	−84.00	52.39	2.84	2.29	172	1	60.3	9/GR14	10
CAN01504	−91.20	13	−72.66	53.77	3.57	1.67	156	1	60.2	9/GR13	10
CAN01505	−82.20	13	−71.77	53.79	3.30	1.89	162	1	60.1	9/GR14	10
CAN01605	−82.20	13	−61.50	49.55	2.65	1.40	143	1	60.3	9/GR14	10
CAN01606	−70.70	13	−61.30	49.55	2.40	1.65	148	1	60.2	10	
CHLCONT5	−106.20	13	−72.23	−35.57	2.60	0.80	55	1	59.4	9/GR17	
CHLPAC02	−106.20	13	−80.06	−30.06	1.36	0.80	69	1	59.2	9/GR17	
CLMAND01	−115.20	13	−74.72	5.93	3.85	1.63	114	1	64.9	9/GR5	
CLM00001	−103.20	13	−74.50	5.87	3.98	1.96	118	1	63.5	10	
EQACAND1	−115.20	13	−78.40	−1.61	1.37	0.95	75	1	64.0	9/GR5	
EQAGAND1	−115.20	13	−90.34	−0.62	0.90	0.81	89	1	61.3	9/GR5	
FLKANT01	−57.20	13	−44.54	−60.13	3.54	0.80	12	1	59.3	2	10
FLKFALKS	−31.00	13	−59.90	−51.64	0.80	0.80	90	1	58.1	2	
GRD00002	−42.20	13	−61.58	12.29	0.80	0.80	90	1	58.8		
HWA00002	−166.20	13	−165.79	23.42	4.20	0.80	160	1	58.8	9/GR1	10
HWA00003	−175.20	13	−166.10	23.42	4.25	0.80	159	1	58.8	9/GR2	10
MEX01NTE	−78.20	13	−105.81	26.01	2.89	2.08	155	1	60.5	1	
MEX01SUR	−69.20	13	−94.84	19.82	3.05	2.09	4	1	62.2	1	10
MEX02NTE	−136.20	13	−107.21	26.31	3.84	1.55	148	1	61.2	1	10
MEX02SUR	−127.20	13	−96.39	19.88	3.18	1.87	157	1	62.5	1	10
PAQPAC01	−106.20	13	−109.18	−27.53	0.80	0.80	90	1	56.2	9/GR17	
PRG00002	−99.20	13	−58.66	−23.32	1.45	1.04	76	1	60.2		
PRUAND02	−115.20	13	−74.69	−8.39	3.41	1.79	95	1	63.9	9/GR5	
PTRVIR01	−101.20	13	−65.85	18.12	0.80	0.80	90	1	60.5	1 6 9/GR20	
PTRVIR02	−110.20	13	−65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21	
SPMFRAN3	−53.20	13	−67.24	47.51	3.16	0.80	7	1	60.4	2 7	10
TRD00001	−84.70	13	−61.23	10.70	0.80	0.80	90	1	59.4		
URG00001	−71.70	13	−56.22	−32.52	1.02	0.89	11	1	60.0		
USAEH001	−61.70	13	−85.19	36.21	5.63	3.33	22	1	61.8	1 5 6	10
USAEH002	−101.20	13	−89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20	10
USAEH003	−110.20	13	−90.14	36.11	5.55	3.55	161	1	62.0	1 6 9/GR21	10
USAEH004	−119.20	13	−91.16	36.05	5.38	3.24	152	1	62.6	1 5 6	10
USAPSA02	−166.20	13	−117.80	40.58	4.03	0.82	135	1	63.2	9/GR1	
USAPSA03	−175.20	13	−118.27	40.12	3.62	0.80	136	1	65.0	9/GR2	
USAWH101	−148.20	13	−109.65	38.13	5.53	1.95	142	1	62.1	10	
USAWH102	−157.20	13	−111.41	38.57	5.51	1.54	138	1	63.2	10	
VENAND03	−115.20	13	−67.04	6.91	2.37	1.43	111	1	67.2	9/GR5	
VRG00001	−79.70	13	−64.37	18.48	0.80	0.80	90	1	58.3	4	

12 413.54 MHz (14)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	14	−149.63	58.52	3.81	1.23	171	2	59.7	9/GR1	10
ALS00003	−174.80	14	−150.95	58.54	3.77	1.11	167	2	60.0	9/GR2	10
ARGNORT4	−93.80	14	−63.96	−30.01	3.86	1.99	48	2	65.6	10	
ARGNORT5	−54.80	14	−62.85	−29.80	3.24	2.89	47	2	63.5	10	
ATNBEAM1	−52.80	14	−66.44	14.87	1.83	0.80	39	2	61.0		
B CE311	−63.80	14	−40.60	−6.07	3.04	2.06	174	2	61.6	8 9/GR7	10
B CE312	−44.80	14	−40.26	−6.06	3.44	2.09	174	2	61.0	8 9/GR9	10
B CE411	−63.80	14	−50.97	−15.26	3.86	1.38	49	2	62.6	8 9/GR7	10
B CE412	−44.80	14	−50.71	−15.30	3.57	1.56	52	2	62.7	8 9/GR9	10
B CE511	−63.80	14	−53.11	−2.98	2.42	2.15	107	2	63.1	8 9/GR7	10
B NO611	−73.80	14	−59.60	−11.62	2.86	1.69	165	1	62.8	8 9/GR8	10
B NO711	−73.80	14	−60.70	−1.78	3.54	1.78	126	1	62.8	8 9/GR8	10
B NO811	−73.80	14	−68.75	−4.71	2.37	1.65	73	1	62.8	8 9/GR8	
B SE911	−101.80	14	−45.99	−19.09	2.22	0.80	62	2	65.3	8	10
B SU111	−80.80	14	−51.10	−25.64	2.76	1.06	50	2	62.8	8 9/GR6	10
B SU112	−44.80	14	−50.76	−25.62	2.47	1.48	56	2	62.3	8 9/GR9	
B SU211	−80.80	14	−44.51	−16.94	3.22	1.37	60	2	62.5	8 9/GR6	10
B SU212	−44.80	14	−43.99	−16.97	3.27	1.92	59	2	61.3	8 9/GR9	
CAN01101	−137.80	14	−125.60	57.24	3.45	1.27	157	2	59.5	9/GR10	10
CAN01201	−137.80	14	−111.92	55.89	3.33	0.98	151	2	59.6	9/GR10	10
CAN01202	−72.30	14	−107.64	55.62	2.75	1.11	32	2	59.6		
CAN01203	−128.80	14	−111.43	55.56	3.07	1.15	151	2	59.5	9/GR12	10
CAN01303	−128.80	14	−102.39	57.12	3.54	0.92	154	2	60.0	9/GR12	10
CAN01304	−90.80	14	−99.00	57.33	1.96	1.73	1	2	59.8	9/GR13	
CAN01403	−128.80	14	−89.70	52.02	4.67	0.80	148	2	61.8	9/GR12	10
CAN01404	−90.80	14	−84.78	52.41	3.09	2.06	153	2	60.4	9/GR13	10
CAN01405	−81.80	14	−84.02	52.34	2.82	2.30	172	2	60.3	9/GR14	10
CAN01504	−90.80	14	−72.68	53.78	3.57	1.67	157	2	60.2	9/GR13	10
CAN01505	−81.80	14	−71.76	53.76	3.30	1.89	162	2	60.1	9/GR14	10
CAN01605	−81.80	14	−61.54	49.50	2.66	1.39	144	2	60.3	9/GR14	10
CAN01606	−70.30	14	−61.32	49.51	2.41	1.65	148	2	60.2	10	
CHLCONT4	−105.80	14	−69.59	−23.20	2.21	0.80	68	2	59.1	9/GR16	
CHLCONT6	−105.80	14	−73.52	−55.52	3.65	1.31	39	2	59.6	9/GR16	
CRBBAH01	−92.30	14	−76.09	24.13	1.83	0.80	141	1	61.7	9/GR18	
CRBBER01	−92.30	14	−64.76	32.13	0.80	0.80	90	1	56.7	9/GR18	
CRBBLZ01	−92.30	14	−88.61	17.26	0.80	0.80	90	1	58.6	9/GR18	
CRBEC001	−92.30	14	−60.07	8.26	4.20	0.86	115	1	64.2	9/GR18	10
CRBJMC01	−92.30	14	−79.45	17.97	0.99	0.80	151	1	61.1	9/GR18	
CTR00201	−130.80	14	−84.33	9.67	0.82	0.80	119	2	65.6		
EQAC0001	−94.80	14	−78.31	−1.52	1.48	1.15	65	1	63.0	9/GR19	
EQAG0001	−94.80	14	−90.36	−0.57	0.94	0.89	99	1	61.0	9/GR19	
GUY00302	−33.80	14	−59.07	4.77	1.43	0.85	91	2	63.5		
HNDIFRB2	−107.30	14	−86.23	15.16	1.14	0.85	8	1	63.4		
HTI00002	−83.30	14	−73.28	18.96	0.82	0.80	11	2	60.9		
HWA00002	−165.80	14	−165.79	23.32	4.20	0.80	160	2	58.8	9/GR1	10
HWA00003	−174.80	14	−166.10	23.42	4.25	0.80	159	2	58.8	9/GR2	10
MEX01NTE	−77.80	14	−105.80	25.99	2.88	2.07	155	2	60.5	1	
MEX02NTE	−135.80	14	−107.36	26.32	3.80	1.57	149	2	61.2	1	10
MEX02SUR	−126.80	14	−96.39	19.88	3.19	1.87	158	2	62.5	1	10
PRU00004	−85.80	14	−74.19	−8.39	3.74	2.45	112	2	62.8	10	
PTRVIR01	−100.80	14	−65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20	
PTRVIR02	−109.80	14	−65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21	
TCA00001	−115.80	14	−71.79	21.53	0.80	0.80	90	2	60.4		
USAEH001	−61.30	14	−85.16	36.21	5.63	3.32	22	2	61.8	1 5 6	10
USAEH002	−100.80	14	−89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20	10
USAEH003	−109.80	14	−90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21	10
USAEH004	−118.80	14	−91.16	36.05	5.38	3.24	153	2	62.6	1 5 6	10
USAPSA02	−165.80	14	−117.79	40.58	4.04	0.82	135	2	63.2	9/GR1	
USAPSA03	−174.80	14	−118.20	40.15	3.63	0.80	136	2	64.9	9/GR2	
USAWH101	−147.80	14	−109.70	38.13	5.52	1.96	142	2	62.1	10	
USAWH102	−156.80	14	−111.40	38.57	5.51	1.55	138	2	63.2	10	
VCT00001	−79.30	14	−61.18	13.23	0.80	0.80	90	2	58.4		
VEN11VEN	−103.80	14	−66.79	6.90	2.50	1.77	122	2	65.1	10	

12 428.12 MHz (15)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	15	−149.66	58.37	3.76	1.24	170	1	59.8	9/GR1	10
ALS00003	−175.20	15	−150.98	58.53	3.77	1.11	167	1	60.0	9/GR2	10
ARGINSU4	−94.20	15	−52.98	−59.81	3.40	0.80	19	1	59.9	9/GR3	
ARGINSU5	−55.20	15	−44.17	−59.91	3.77	0.80	13	1	59.3	9/GR4	10
ARGSUR04	−94.20	15	−65.04	−43.33	3.32	1.50	40	1	60.7	9/GR3	10
ARGSUR05	−55.20	15	−63.68	−43.01	2.54	2.38	152	1	60.1	9/GR4	10
ATGSJN01	−79.70	15	−61.79	17.07	0.80	0.80	90	1	58.4		
B CE311	−64.20	15	−40.60	−6.07	3.04	2.06	174	1	61.6	8 9/GR7	10
B CE312	−45.20	15	−40.27	−6.06	3.44	2.09	174	1	61.0	8 9/GR9	10
B CE411	−64.20	15	−50.97	−15.27	3.86	1.38	49	1	62.6	8 9/GR7	10
B CE412	−45.20	15	−50.71	−15.30	3.57	1.56	52	1	62.7	8 9/GR9	10
B CE511	−64.20	15	−53.10	−2.90	2.44	2.13	104	1	63.1	8 9/GR7	10
B NO611	−74.20	15	−59.60	−11.62	2.85	1.69	165	2	62.9	8 9/GR8	10
B NO711	−74.20	15	−60.70	−1.78	3.54	1.78	126	2	62.8	8 9/GR8	10
B NO811	−74.20	15	−68.76	−4.71	2.37	1.65	73	2	62.8	8 9/GR8	
B SU111	−81.20	15	−51.12	−25.63	2.76	1.05	50	1	62.9	8 9/GR6	10
B SU112	−45.20	15	−50.75	−25.62	2.47	1.48	56	1	62.3	8 9/GR9	
B SU211	−81.20	15	−44.51	−16.95	3.22	1.36	60	1	62.5	8 9/GR6	10
B SU212	−45.20	15	−44.00	−16.87	3.20	1.96	58	1	61.3	8 9/GR9	
BERBERMU	−96.20	15	−64.77	32.32	0.80	0.80	90	2	56.8		
BOLAND01	−115.20	15	−65.04	−16.76	2.49	1.27	76	1	67.9	9/GR5	
BOL00001	−87.20	15	−64.61	−16.71	2.52	2.19	85	1	63.8	10	
BRB00001	−92.70	15	−59.85	12.93	0.80	0.80	90	2	59.1		
CAN01101	−138.20	15	−125.63	57.24	3.45	1.27	157	1	59.5	9/GR10	10
CAN01201	−138.20	15	−112.04	55.95	3.35	0.97	151	1	59.6	9/GR10	10
CAN01202	−72.70	15	−107.70	55.63	2.74	1.12	32	1	59.6		
CAN01203	−129.20	15	−111.48	55.61	3.08	1.15	151	1	59.5	9/GR12	10
CAN01303	−129.20	15	−102.42	57.12	3.54	0.91	154	1	60.1	9/GR12	10
CAN01304	−91.20	15	−99.12	57.36	1.98	1.72	2	1	59.8	9/GR13	
CAN01403	−129.20	15	−89.75	52.02	4.68	0.80	148	1	61.8	9/GR12	10
CAN01404	−91.20	15	−84.82	52.42	3.10	2.05	152	1	60.4	9/GR13	10
CAN01405	−82.20	15	−84.00	52.39	2.84	2.29	172	1	60.3	9/GR14	10
CAN01504	−91.20	15	−72.66	53.77	3.57	1.67	156	1	60.2	9/GR13	10
CAN01505	−82.20	15	−71.77	53.79	3.30	1.89	162	1	60.1	9/GR14	10
CAN01605	−82.20	15	−61.50	49.55	2.65	1.40	143	1	60.3	9/GR14	10
CAN01606	−70.70	15	−61.30	49.55	2.40	1.65	148	1	60.2	10	
CHLCONT5	−106.20	15	−72.23	−35.57	2.60	0.80	55	1	59.4	9/GR17	
CHLPAC02	−106.20	15	−80.06	−30.06	1.36	0.80	69	1	59.2	9/GR17	
CLMAND01	−115.20	15	−74.72	5.93	3.85	1.63	114	1	65.0	9/GR5	
CLM00001	−103.20	15	−74.50	5.87	3.98	1.96	118	1	63.6	10	
CUB00001	−89.20	15	−79.81	21.62	2.24	0.80	168	1	61.1		
EQACAND1	−115.20	15	−78.40	−1.61	1.37	0.95	75	1	64.1	9/GR5	
EQAGAND1	−115.20	15	−90.34	−0.62	0.90	0.81	89	1	61.3	9/GR5	
GRD00002	−42.20	15	−61.58	12.29	0.80	0.80	90	1	58.8		
GRD00059	−57.20	15	−61.58	12.29	0.80	0.80	90	1	58.5		
GRLDNK01	−53.20	15	−44.89	66.56	2.70	0.82	173	1	60.0	2	10
GUY00201	−84.70	15	−59.19	4.78	1.44	0.85	95	1	63.5		
HWA00002	−166.20	15	−165.79	23.42	4.20	0.80	160	1	58.8	9/GR1	10
HWA00003	−175.20	15	−166.10	23.42	4.25	0.80	159	1	58.8	9/GR2	10
MEX01NTE	−78.20	15	−105.81	26.01	2.89	2.08	155	1	60.5	1	
MEX01SUR	−69.20	15	−94.84	19.82	3.05	2.09	4	1	62.3	1	10
MEX02NTE	−136.20	15	−107.21	26.31	3.84	1.55	148	1	61.2	1	10
MEX02SUR	−127.20	15	−96.39	19.88	3.18	1.87	157	1	62.6	1	10
PAQPAC01	−106.20	15	−109.18	−27.53	0.80	0.80	90	1	56.2	9/GR17	
PRG00002	−99.20	15	−58.66	−23.32	1.45	1.04	76	1	60.2		
PRUAND02	−115.20	15	−74.69	−8.39	3.41	1.79	95	1	64.0	9/GR5	
PTRVIR01	−101.20	15	−65.85	18.12	0.80	0.80	90	1	60.6	1 6 9/GR20	
PTRVIR02	−110.20	15	−65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21	
URG00001	−71.70	15	−56.22	−32.52	1.02	0.89	11	1	60.0		
USAEH001	−61.70	15	−85.19	36.21	5.63	3.33	22	1	61.8	1 5 6	10
USAEH002	−101.20	15	−89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20	10
USAEH003	−110.20	15	−90.14	36.11	5.55	3.55	161	1	62.1	1 6 9/GR21	10
USAEH004	−119.20	15	−91.16	36.05	5.38	3.24	152	1	62.6	1 5 6	10
USAPSA02	−166.20	15	−117.80	40.58	4.03	0.82	135	1	63.3	9/GR1	
USAPSA03	−175.20	15	−118.27	40.12	3.62	0.80	136	1	65.0	9/GR2	
USAWH101	−148.20	15	−109.65	38.13	5.53	1.95	142	1	62.1	10	
USAWH102	−157.20	15	−111.41	38.57	5.51	1.54	138	1	63.2	10	
VENAND03	−115.20	15	−67.04	6.91	2.37	1.43	111	1	67.3	9/GR5	

12 442.70 MHz (16)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	16	−149.63	58.52	3.81	1.23	171	2	59.8	9/GR1	10
ALS00003	−174.80	16	−150.95	58.54	3.77	1.11	167	2	60.0	9/GR2	10
ARGNORT4	−93.80	16	−63.96	−30.01	3.86	1.99	48	2	65.7	10	
ARGNORT5	−54.80	16	−62.85	−29.80	3.24	2.89	47	2	63.5	10	
B CE311	−63.80	16	−40.60	−6.07	3.04	2.06	174	2	61.6	8 9/GR7	10
B CE312	−44.80	16	−40.26	−6.06	3.44	2.09	174	2	61.0	8 9/GR9	10
B CE411	−63.80	16	−50.97	−15.26	3.86	1.38	49	2	62.6	8 9/GR7	10
B CE412	−44.80	16	−50.71	−15.30	3.57	1.56	52	2	62.8	8 9/GR9	10
B CE511	−63.80	16	−53.11	−2.98	2.42	2.15	107	2	63.1	8 9/GR7	10
B NO611	−73.80	16	−59.60	−11.62	2.86	1.69	165	1	62.9	8 9/GR8	10
B NO711	−73.80	16	−60.70	−1.78	3.54	1.78	126	1	62.8	8 9/GR8	10
B NO811	−73.80	16	−68.75	−4.71	2.37	1.65	73	1	62.8	8 9/GR8	
B SE911	−101.80	16	−45.99	−19.09	2.22	0.80	62	2	65.3	8	10
B SU111	−80.80	16	−51.10	−25.64	2.76	1.06	50	2	62.9	8 9/GR6	10
B SU112	−44.80	16	−50.76	−25.62	2.47	1.48	56	2	62.3	8 9/GR9	
B SU211	−80.80	16	−44.51	−16.94	3.22	1.37	60	2	62.5	8 9/GR6	10
B SU212	−44.80	16	−43.99	−16.97	3.27	1.92	59	2	61.3	8 9/GR9	
CAN01101	−137.80	16	−125.60	57.24	3.45	1.27	157	2	59.5	9/GR10	10
CAN01201	−137.80	16	−111.92	55.89	3.33	0.98	151	2	59.6	9/GR10	10
CAN01202	−72.30	16	−107.64	55.62	2.75	1.11	32	2	59.6		
CAN01203	−128.80	16	−111.43	55.56	3.07	1.15	151	2	59.5	9/GR12	10
CAN01303	−128.80	16	−102.39	57.12	3.54	0.92	154	2	60.1	9/GR12	10
CAN01304	−90.80	16	−99.00	57.33	1.96	1.73	1	2	59.8	9/GR13	
CAN01403	−128.80	16	−89.70	52.02	4.67	0.80	148	2	61.8	9/GR12	10
CAN01404	−90.80	16	−84.78	52.41	3.09	2.06	153	2	60.4	9/GR13	10
CAN01405	−81.80	16	−84.02	52.34	2.82	2.30	172	2	60.3	9/GR14	10
CAN01504	−90.80	16	−72.68	53.78	3.57	1.67	157	2	60.2	9/GR13	10
CAN01505	−81.80	16	−71.76	53.76	3.30	1.89	162	2	60.2	9/GR14	10
CAN01605	−81.80	16	−61.54	49.50	2.66	1.39	144	2	60.3	9/GR14	10
CAN01606	−70.30	16	−61.32	49.51	2.41	1.65	148	2	60.2	10	
CHLCONT4	−105.80	16	−69.59	−23.20	2.21	0.80	68	2	59.1	9/GR16	
CHLCONT6	−105.80	16	−73.52	−55.52	3.65	1.31	39	2	59.6	9/GR16	
CRBBAH01	−92.30	16	−76.09	24.13	1.83	0.80	141	1	61.7	9/GR18	
CRBBER01	−92.30	16	−64.76	32.13	0.80	0.80	90	1	56.8	9/GR18	
CRBBLZ01	−92.30	16	−88.61	17.26	0.80	0.80	90	1	58.7	9/GR18	
CRBEC001	−92.30	16	−60.07	8.26	4.20	0.86	115	1	64.3	9/GR18	10
CRBJMC01	−92.30	16	−79.45	17.97	0.99	0.80	151	1	61.1	9/GR18	
CYM00001	−115.80	16	−80.58	19.57	0.80	0.80	90	2	59.6		
DOMIFRB2	−83.30	16	−70.51	18.79	0.98	0.80	167	2	61.1		
EQAC0001	−94.80	16	−78.31	−1.52	1.48	1.15	65	1	63.0	9/GR19	
EQAG0001	−94.80	16	−90.36	−0.57	0.94	0.89	99	1	61.0	9/GR19	
GUFMGG02	−52.80	16	−56.42	8.47	4.16	0.81	123	2	62.7	2 7	10
HWA00002	−165.80	16	−165.79	23.32	4.20	0.80	160	2	58.8	9/GR1	10
HWA00003	−174.80	16	−166.10	23.42	4.25	0.80	159	2	58.8	9/GR2	10
JMC00005	−33.80	16	−77.27	18.12	0.80	0.80	90	2	60.6		
LCAIFRB1	−79.30	16	−61.15	13.90	0.80	0.80	90	2	58.4		
MEX01NTE	−77.80	16	−105.80	25.99	2.88	2.07	155	2	60.5	1	
MEX02NTE	−135.80	16	−107.36	26.32	3.80	1.57	149	2	61.2	1	10
MEX02SUR	−126.80	16	−96.39	19.88	3.19	1.87	158	2	62.5	1	10
PRU00004	−85.80	16	−74.19	−8.39	3.74	2.45	112	2	62.9	10	
PTRVIR01	−100.80	16	−65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20	
PTRVIR02	−109.80	16	−65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21	
SLVIFRB2	−107.30	16	−88.91	13.59	0.80	0.80	90	1	61.7		
USAEH001	−61.30	16	−85.16	36.21	5.63	3.32	22	2	61.9	1 5 6	10
USAEH002	−100.80	16	−89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20	10
USAEH003	−109.80	16	−90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21	10
USAEH004	−118.80	16	−91.16	36.05	5.38	3.24	153	2	62.6	1 5 6	10
USAPSA02	−165.80	16	−117.79	40.58	4.04	0.82	135	2	63.3	9/GR1	
USAPSA03	−174.80	16	−118.20	40.15	3.63	0.80	136	2	65.0	9/GR2	
USAWH101	−147.80	16	−109.70	38.13	5.52	1.96	142	2	62.1	10	
USAWH102	−156.80	16	−111.40	38.57	5.51	1.55	138	2	63.2	10	
VEN11VEN	−103.80	16	−66.79	6.90	2.50	1.77	122	2	65.2	10	

12 457.28 MHz (17)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	17	−149.66	58.37	3.76	1.24	170	1	59.9	9/GR1	10
ALS00003	−175.20	17	−150.98	58.53	3.77	1.11	167	1	60.2	9/GR2	10
ARGINSU4	−94.20	17	−52.98	−59.81	3.40	0.80	19	1	60.1	9/GR3	
ARGINSU5	−55.20	17	−44.17	−59.91	3.77	0.80	13	1	59.5	9/GR4	10
ARGSUR04	−94.20	17	−65.04	−43.33	3.32	1.50	40	1	60.9	9/GR3	10
ARGSUR05	−55.20	17	−63.68	−43.01	2.54	2.38	152	1	60.2	9/GR4	10
B CE311	−64.20	17	−40.60	−6.07	3.04	2.06	174	1	61.9	8 9/GR7	10
B CE312	−45.20	17	−40.27	−6.06	3.44	2.09	174	1	61.2	8 9/GR9	10
B CE411	−64.20	17	−50.97	−15.27	3.86	1.38	49	1	62.9	8 9/GR7	10
B CE412	−45.20	17	−50.71	−15.30	3.57	1.56	52	1	63.0	8 9/GR9	10
B CE511	−64.20	17	−53.10	−2.90	2.44	2.13	104	1	63.4	8 9/GR7	10
B NO611	−74.20	17	−59.60	−11.62	2.85	1.69	165	2	63.1	8 9/GR8	10
B NO711	−74.20	17	−60.70	−1.78	3.54	1.78	126	2	63.1	8 9/GR8	10
B NO811	−74.20	17	−68.76	−4.71	2.37	1.65	73	2	63.1	8 9/GR8	
B SU111	−81.20	17	−51.12	−25.63	2.76	1.05	50	1	63.2	8 9/GR6	10
B SU112	−45.20	17	−50.75	−25.62	2.47	1.48	56	1	62.5	8 9/GR9	
B SU211	−81.20	17	−44.51	−16.95	3.22	1.36	60	1	62.8	8 9/GR6	10
B SU212	−45.20	17	−44.00	−16.87	3.20	1.96	58	1	61.6	8 9/GR9	
BERBERMU	−96.20	17	−64.77	32.32	0.80	0.80	90	2	57.0		
BERBER02	−31.00	17	−64.77	32.32	0.80	0.80	90	1	57.1	2	10
BOLAND01	−115.20	17	−65.04	−16.76	2.49	1.27	76	1	68.0	9/GR5	
CAN01101	−138.20	17	−125.63	57.24	3.45	1.27	157	1	59.7	9/GR10	10
CAN01201	−138.20	17	−112.04	55.95	3.35	0.97	151	1	59.8	9/GR10	10
CAN01202	−72.70	17	−107.70	55.63	2.74	1.12	32	1	59.8		
CAN01203	−129.20	17	−111.48	55.61	3.08	1.15	151	1	59.7	9/GR12	10
CAN01303	−129.20	17	−102.42	57.12	3.54	0.91	154	1	60.2	9/GR12	10
CAN01304	−91.20	17	−99.12	57.36	1.98	1.72	2	1	60.0	9/GR13	
CAN01403	−129.20	17	−89.75	52.02	4.68	0.80	148	1	62.1	9/GR12	10
CAN01404	−91.20	17	−84.82	52.42	3.10	2.05	152	1	60.6	9/GR13	10
CAN01405	−82.20	17	−84.00	52.39	2.84	2.29	172	1	60.5	9/GR14	10
CAN01504	−91.20	17	−72.66	53.77	3.57	1.67	156	1	60.4	9/GR13	10
CAN01505	−82.20	17	−71.77	53.79	3.30	1.89	162	1	60.3	9/GR14	10
CAN01605	−82.20	17	−61.50	49.55	2.65	1.40	143	1	60.5	9/GR14	10
CAN01606	−70.70	17	−61.30	49.55	2.40	1.65	148	1	60.4	10	
CHLCONT5	−106.20	17	−72.23	−35.57	2.60	0.80	55	1	59.6	9/GR17	
CHLPAC02	−106.20	17	−80.06	−30.06	1.36	0.80	69	1	59.4	9/GR17	
CLMAND01	−115.20	17	−74.72	5.93	3.85	1.63	114	1	65.3	9/GR5	
CLM00001	−103.20	17	−74.50	5.87	3.98	1.96	118	1	63.9	10	
EQACAND1	−115.20	17	−78.40	−1.61	1.37	0.95	75	1	64.4	9/GR5	
EQAGAND1	−115.20	17	−90.34	−0.62	0.90	0.81	89	1	61.5	9/GR5	
FLKFALKS	−31.00	17	−59.90	−51.64	0.80	0.80	90	1	58.2	2	
HWA00002	−166.20	17	−165.79	23.42	4.20	0.80	160	1	59.0	9/GR1	10
HWA00003	−175.20	17	−166.10	23.42	4.25	0.80	159	1	58.9	9/GR2	10
JMC00002	−92.70	17	−77.30	18.12	0.80	0.80	90	2	60.1		
MEX01NTE	−78.20	17	−105.81	26.01	2.89	2.08	155	1	60.7	1	
MEX01SUR	−69.20	17	−94.84	19.82	3.05	2.09	4	1	62.5	1	10
MEX02NTE	−136.20	17	−107.21	26.31	3.84	1.55	148	1	61.4	1	10
MEX02SUR	−127.20	17	−96.39	19.88	3.18	1.87	157	1	62.8	1	10
PAQPAC01	−106.20	17	−109.18	−27.53	0.80	0.80	90	1	56.4	9/GR17	
PRG00002	−99.20	17	−58.66	−23.32	1.45	1.04	76	1	60.4		
PRUAND02	−115.20	17	−74.69	−8.39	3.41	1.79	95	1	64.3	9/GR5	
PTRVIR01	−101.20	17	−65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20	
PTRVIR02	−110.20	17	−65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21	
SCN00001	−79.70	17	−62.46	17.44	0.80	0.80	90	1	58.6		
SPMFRAN3	−53.20	17	−67.24	47.51	3.16	0.80	7	1	60.6	2 7	10
SURINAM2	−84.70	17	−55.69	4.35	1.00	0.80	86	1	63.5		
URG00001	−71.70	17	−56.22	−32.52	1.02	0.89	11	1	60.2		
USAEH001	−61.70	17	−85.19	36.21	5.63	3.33	22	1	62.1	1 5 6	10
USAEH002	−101.20	17	−89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20	10
USAEH003	−110.20	17	−90.14	36.11	5.55	3.55	161	1	62.3	1 6 9/GR21	10
USAEH004	−119.20	17	−91.16	36.05	5.38	3.24	152	1	62.9	1 5 6	10
USAPSA02	−166.20	17	−117.80	40.58	4.03	0.82	135	1	63.5	9/GR1	
USAPSA03	−175.20	17	−118.27	40.12	3.62	0.80	136	1	65.3	9/GR2	
USAWH101	−148.20	17	−109.65	38.13	5.53	1.95	142	1	62.3	10	
USAWH102	−157.20	17	−111.41	38.57	5.51	1.54	138	1	63.5	10	
VENAND03	−115.20	17	−67.04	6.91	2.37	1.43	111	1	67.6	9/GR5	

12 471.86 MHz (18)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	18	−149.63	58.52	3.81	1.23	171	2	59.9	9/GR1	10
ALS00003	−174.80	18	−150.95	58.54	3.77	1.11	167	2	60.2	9/GR2	10
ARGNORT4	−93.80	18	−63.96	−30.01	3.86	1.99	48	2	66.0	10	
ARGNORT5	−54.80	18	−62.85	−29.80	3.24	2.89	47	2	63.8	10	
ATNBEAM1	−52.80	18	−66.44	14.87	1.83	0.80	39	2	61.3		
B CE311	−63.80	18	−40.60	−6.07	3.04	2.06	174	2	61.9	8 9/GR7	10
B CE312	−44.80	18	−40.26	−6.06	3.44	2.09	174	2	61.2	8 9/GR9	10
B CE411	−63.80	18	−50.97	−15.26	3.86	1.38	49	2	62.9	8 9/GR7	10
B CE412	−44.80	18	−50.71	−15.30	3.57	1.56	52	2	63.0	8 9/GR9	10
B CE511	−63.80	18	−53.11	−2.98	2.42	2.15	107	2	63.4	8 9/GR7	10
B NO611	−73.80	18	−59.60	−11.62	2.86	1.69	165	1	63.1	8 9/GR8	10
B NO711	−73.80	18	−60.70	−1.78	3.54	1.78	126	1	63.1	8 9/GR8	10
B NO811	−73.80	18	−68.75	−4.71	2.37	1.65	73	1	63.1	8 9/GR8	
B SE911	−101.80	18	−45.99	−19.09	2.22	0.80	62	2	65.7	8	10
B SU111	−80.80	18	−51.10	−25.64	2.76	1.06	50	2	63.1	8 9/GR6	10
B SU112	−44.80	18	−50.76	−25.62	2.47	1.48	56	2	62.6	8 9/GR9	
B SU211	−80.80	18	−44.51	−16.94	3.22	1.37	60	2	62.8	8 9/GR6	10
B SU212	−44.80	18	−43.99	−16.97	3.27	1.92	59	2	61.6	8 9/GR9	
BLZ00001	−115.80	18	−88.68	17.27	0.80	0.80	90	2	59.2		
CAN01101	−137.80	18	−125.60	57.24	3.45	1.27	157	2	59.7	9/GR10	10
CAN01201	−137.80	18	−111.92	55.89	3.33	0.98	151	2	59.8	9/GR10	10
CAN01202	−72.30	18	−107.64	55.62	2.75	1.11	32	2	59.8		
CAN01203	−128.80	18	−111.43	55.56	3.07	1.15	151	2	59.7	9/GR12	10
CAN01303	−128.80	18	−102.39	57.12	3.54	0.92	154	2	60.3	9/GR12	10
CAN01304	−90.80	18	−99.00	57.33	1.96	1.73	1	2	60.0	9/GR13	
CAN01403	−128.80	18	−89.70	52.02	4.67	0.80	148	2	62.1	9/GR12	10
CAN01404	−90.80	18	−84.78	52.41	3.09	2.06	153	2	60.6	9/GR13	10
CAN01405	−81.80	18	−84.02	52.34	2.82	2.30	172	2	60.5	9/GR14	10
CAN01504	−90.80	18	−72.68	53.78	3.57	1.67	157	2	60.4	9/GR13	10
CAN01505	−81.80	18	−71.76	53.76	3.30	1.89	162	2	60.3	9/GR14	10
CAN01605	−81.80	18	−61.54	49.50	2.66	1.39	144	2	60.5	9/GR14	10
CAN01606	−70.30	18	−61.32	49.51	2.41	1.65	148	2	60.4	10	
CHLCONT4	−105.80	18	−69.59	−23.20	2.21	0.80	68	2	59.3	9/GR16	
CHLCONT6	−105.80	18	−73.52	−55.52	3.65	1.31	39	2	59.7	9/GR16	
CRBBAH01	−92.30	18	−76.09	24.13	1.83	0.80	141	1	61.9	9/GR18	
CRBBER01	−92.30	18	−64.76	32.13	0.80	0.80	90	1	56.9	9/GR18	
CRBBLZ01	−92.30	18	−88.61	17.26	0.80	0.80	90	1	58.9	9/GR18	
CRBEC001	−92.30	18	−60.07	8.26	4.20	0.86	115	1	64.6	9/GR18	10
CRBJMC01	−92.30	18	−79.45	17.97	0.99	0.80	151	1	61.3	9/GR18	
CTR00201	−130.80	18	−84.33	9.67	0.82	0.80	119	2	66.0		
DMAIFRB1	−79.30	18	−61.30	15.35	0.80	0.80	90	2	58.7		
EQAC0001	−94.80	18	−78.31	−1.52	1.48	1.15	65	1	63.3	9/GR19	
EQAG0001	−94.80	18	−90.36	−0.57	0.94	0.89	99	1	61.2	9/GR19	
HWA00002	−165.80	18	−165.79	23.32	4.20	0.80	160	2	59.0	9/GR1	10
HWA00003	−174.80	18	−166.10	23.42	4.25	0.80	159	2	59.0	9/GR2	10
MEX01NTE	−77.80	18	−105.80	25.99	2.88	2.07	155	2	60.7	1	
MEX02NTE	−135.80	18	−107.36	26.32	3.80	1.57	149	2	61.4	1	10
MEX02SUR	−126.80	18	−96.39	19.88	3.19	1.87	158	2	62.8	1	10
NCG00003	−107.30	18	−84.99	12.90	1.05	1.01	176	1	63.6		
PRU00004	−85.80	18	−74.19	−8.39	3.74	2.45	112	2	63.1	10	
PTRVIR01	−100.80	18	−65.85	18.12	0.80	0.80	90	2	60.8	1 6 9/GR20	
PTRVIR02	−109.80	18	−65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21	
USAEH001	−61.30	18	−85.16	36.21	5.63	3.32	22	2	62.1	1 5 6	10
USAEH002	−100.80	18	−89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20	10
USAEH003	−109.80	18	−90.12	36.11	5.55	3.56	161	2	62.3	1 6 9/GR21	10
USAEH004	−118.80	18	−91.16	36.05	5.38	3.24	153	2	62.9	1 5 6	10
USAPSA02	−165.80	18	−117.79	40.58	4.04	0.82	135	2	63.5	9/GR1	
USAPSA03	−174.80	18	−118.20	40.15	3.63	0.80	136	2	65.3	9/GR2	
USAWH101	−147.80	18	−109.70	38.13	5.52	1.96	142	2	62.3	10	
USAWH102	−156.80	18	−111.40	38.57	5.51	1.55	138	2	63.5	10	
VEN11VEN	−103.80	18	−66.79	6.90	2.50	1.77	122	2	65.5	10	

12 486.44 MHz (19)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	19	−149.66	58.37	3.76	1.24	170	1	60.0	9/GR1	10
ALS00003	−175.20	19	−150.98	58.53	3.77	1.11	167	1	60.2	9/GR2	10
ARGINSU4	−94.20	19	−52.98	−59.81	3.40	0.80	19	1	60.1	9/GR3	
ARGINSU5	−55.20	19	−44.17	−59.91	3.77	0.80	13	1	59.5	9/GR4	10
ARGSUR04	−94.20	19	−65.04	−43.33	3.32	1.50	40	1	60.9	9/GR3	10
ARGSUR05	−55.20	19	−63.68	−43.01	2.54	2.38	152	1	60.3	9/GR4	10
B CE311	−64.20	19	−40.60	−6.07	3.04	2.06	174	1	61.9	8 9/GR7	10
B CE312	−45.20	19	−40.27	−6.06	3.44	2.09	174	1	61.3	8 9/GR9	10
B CE411	−64.20	19	−50.97	−15.27	3.86	1.38	49	1	62.9	8 9/GR7	10
B CE412	−45.20	19	−50.71	−15.30	3.57	1.56	52	1	63.1	8 9/GR9	10
B CE511	−64.20	19	−53.10	−2.90	2.44	2.13	104	1	63.4	8 9/GR7	10
B NO611	−74.20	19	−59.60	−11.62	2.85	1.69	165	2	63.2	8 9/GR8	10
B NO711	−74.20	19	−60.70	−1.78	3.54	1.78	126	2	63.2	8 9/GR8	10
B NO811	−74.20	19	−68.76	−4.71	2.37	1.65	73	2	63.1	8 9/GR8	
B SU111	−81.20	19	−51.12	−25.63	2.76	1.05	50	1	63.2	8 9/GR6	10
B SU112	−45.20	19	−50.75	−25.62	2.47	1.48	56	1	62.6	8 9/GR9	
B SU211	−81.20	19	−44.51	−16.95	3.22	1.36	60	1	62.8	8 9/GR6	10
B SU212	−45.20	19	−44.00	−16.87	3.20	1.96	58	1	61.6	8 9/GR9	
BERBERMU	−96.20	19	−64.77	32.32	0.80	0.80	90	2	57.0		
BOLAND01	−115.20	19	−65.04	−16.76	2.49	1.27	76	1	68.1	9/GR5	
BOL00001	−87.20	19	−64.61	−16.71	2.52	2.19	85	1	64.2	10	
BRB00001	−92.70	19	−59.85	12.93	0.80	0.80	90	2	59.4		
CAN01101	−138.20	19	−125.63	57.24	3.45	1.27	157	1	59.7	9/GR10	10
CAN01201	−138.20	19	−112.04	55.95	3.35	0.97	151	1	59.8	9/GR10	10
CAN01202	−72.70	19	−107.70	55.63	2.74	1.12	32	1	59.8		
CAN01203	−129.20	19	−111.48	55.61	3.08	1.15	151	1	59.7	9/GR12	10
CAN01303	−129.20	19	−102.42	57.12	3.54	0.91	154	1	60.3	9/GR12	10
CAN01304	−91.20	19	−99.12	57.36	1.98	1.72	2	1	60.1	9/GR13	
CAN01403	−129.20	19	−89.75	52.02	4.68	0.80	148	1	62.1	9/GR12	10
CAN01404	−91.20	19	−84.82	52.42	3.10	2.05	152	1	60.6	9/GR13	10
CAN01405	−82.20	19	−84.00	52.39	2.84	2.29	172	1	60.5	9/GR14	10
CAN01504	−91.20	19	−72.66	53.77	3.57	1.67	156	1	60.4	9/GR13	10
CAN01505	−82.20	19	−71.77	53.79	3.30	1.89	162	1	60.4	9/GR14	10
CAN01605	−82.20	19	−61.50	49.55	2.65	1.40	143	1	60.5	9/GR14	10
CAN01606	−70.70	19	−61.30	49.55	2.40	1.65	148	1	60.5	10	
CHLCONT5	−106.20	19	−72.23	−35.57	2.60	0.80	55	1	59.6	9/GR17	
CHLPAC02	−106.20	19	−80.06	−30.06	1.36	0.80	69	1	59.4	9/GR17	
CLMAND01	−115.20	19	−74.72	5.93	3.85	1.63	114	1	65.4	9/GR5	
CLM00001	−103.20	19	−74.50	5.87	3.98	1.96	118	1	63.9	10	
CUB00001	−89.20	19	−79.81	21.62	2.24	0.80	168	1	61.3		
EQACAND1	−115.20	19	−78.40	−1.61	1.37	0.95	75	1	64.4	9/GR5	
EQAGAND1	−115.20	19	−90.34	−0.62	0.90	0.81	89	1	61.6	9/GR5	
GRD00059	−57.20	19	−61.58	12.29	0.80	0.80	90	1	58.7		
GRLDNK01	−53.20	19	−44.89	66.56	2.70	0.82	173	1	60.2	2	10
GUY00201	−84.70	19	−59.19	4.78	1.44	0.85	95	1	63.8		
HWA00002	−166.20	19	−165.79	23.42	4.20	0.80	160	1	59.0	9/GR1	10
HWA00003	−175.20	19	−166.10	23.42	4.25	0.80	159	1	59.0	9/GR2	10
MEX01NTE	−78.20	19	−105.81	26.01	2.89	2.08	155	1	60.8	1	
MEX01SUR	−69.20	19	−94.84	19.82	3.05	2.09	4	1	62.5	1	10
MEX02NTE	−136.20	19	−107.21	26.31	3.84	1.55	148	1	61.5	1	10
MEX02SUR	−127.20	19	−96.39	19.88	3.18	1.87	157	1	62.8	1	10
MSR00001	−79.70	19	−61.73	16.75	0.80	0.80	90	1	58.9	4	
PAQPAC01	−106.20	19	−109.18	−27.53	0.80	0.80	90	1	56.4	9/GR17	
PRG00002	−99.20	19	−58.66	−23.32	1.45	1.04	76	1	60.5		
PRUAND02	−115.20	19	−74.69	−8.39	3.41	1.79	95	1	64.3	9/GR5	
PTRVIR01	−101.20	19	−65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20	
PTRVIR02	−110.20	19	−65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21	
URG00001	−71.70	19	−56.22	−32.52	1.02	0.89	11	1	60.2		
USAEH001	−61.70	19	−85.19	36.21	5.63	3.33	22	1	62.1	1 5 6	10
USAEH002	−101.20	19	−89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20	10
USAEH003	−110.20	19	−90.14	36.11	5.55	3.55	161	1	62.4	1 6 9/GR21	10
USAEH004	−119.20	19	−91.16	36.05	5.38	3.24	152	1	62.9	1 5 6	10
USAPSA02	−166.20	19	−117.80	40.58	4.03	0.82	135	1	63.6	9/GR1	
USAPSA03	−175.20	19	−118.27	40.12	3.62	0.80	136	1	65.4	9/GR2	
USAWH101	−148.20	19	−109.65	38.13	5.53	1.95	142	1	62.4	10	
USAWH102	−157.20	19	−111.41	38.57	5.51	1.54	138	1	63.5	10	
VENAND03	−115.20	19	−67.04	6.91	2.37	1.43	111	1	67.7	9/GR5	

12 501.02 MHz (20)

1	2	3	4		5		6	7	8	9	
ALS00002	–165.80	20	–149.63	58.52	3.81	1.23	171	2	59.9	9/GR1	10
ALS00003	–174.80	20	–150.95	58.54	3.77	1.11	167	2	60.2	9/GR2	10
ARGNORT4	–93.80	20	–63.96	–30.01	3.86	1.99	48	2	66.1	10	
ARGNORT5	–54.80	20	–62.85	–29.80	3.24	2.89	47	2	63.9	10	
B CE311	–63.80	20	–40.60	–6.07	3.04	2.06	174	2	61.9	8 9/GR7	10
B CE312	–44.80	20	–40.26	–6.06	3.44	2.09	174	2	61.3	8 9/GR9	10 11
B CE411	–63.80	20	–50.97	–15.26	3.86	1.38	49	2	62.9	8 9/GR7	10
B CE412	–44.80	20	–50.71	–15.30	3.57	1.56	52	2	63.1	8 9/GR9	10 12
B CE511	–63.80	20	–53.11	–2.98	2.42	2.15	107	2	63.4	8 9/GR7	10
B NO611	–73.80	20	–59.60	–11.62	2.86	1.69	165	1	63.2	8 9/GR8	10
B NO711	–73.80	20	–60.70	–1.78	3.54	1.78	126	1	63.2	8 9/GR8	10
B NO811	–73.80	20	–68.75	–4.71	2.37	1.65	73	1	63.2	8 9/GR8	
B SE911	–101.80	20	–45.99	–19.09	2.22	0.80	62	2	65.7	8	10
B SU111	–80.80	20	–51.10	–25.64	2.76	1.06	50	2	63.2	8 9/GR6	10
B SU112	–44.80	20	–50.76	–25.62	2.47	1.48	56	2	62.6	8 9/GR9	11
B SU211	–80.80	20	–44.51	–16.94	3.22	1.37	60	2	62.8	8 9/GR6	10
B SU212	–44.80	20	–43.99	–16.97	3.27	1.92	59	2	61.6	8 9/GR9	12
CAN01101	–137.80	20	–125.60	57.24	3.45	1.27	157	2	59.7	9/GR10	10
CAN01201	–137.80	20	–111.92	55.89	3.33	0.98	151	2	59.8	9/GR10	10
CAN01202	–72.30	20	–107.64	55.62	2.75	1.11	32	2	59.8		
CAN01203	–128.80	20	–111.43	55.56	3.07	1.15	151	2	59.7	9/GR12	10
CAN01303	–128.80	20	–102.39	57.12	3.54	0.92	154	2	60.3	9/GR12	10
CAN01304	–90.80	20	–99.00	57.33	1.96	1.73	1	2	60.0	9/GR13	
CAN01403	–128.80	20	–89.70	52.02	4.67	0.80	148	2	62.1	9/GR12	10
CAN01404	–90.80	20	–84.78	52.41	3.09	2.06	153	2	60.6	9/GR13	10
CAN01405	–81.80	20	–84.02	52.34	2.82	2.30	172	2	60.5	9/GR14	10
CAN01504	–90.80	20	–72.68	53.78	3.57	1.67	157	2	60.4	9/GR13	10
CAN01505	–81.80	20	–71.76	53.76	3.30	1.89	162	2	60.4	9/GR14	10
CAN01605	–81.80	20	–61.54	49.50	2.66	1.39	144	2	60.5	9/GR14	10
CAN01606	–70.30	20	–61.32	49.51	2.41	1.65	148	2	60.5	10	
CHLCONT4	–105.80	20	–69.59	–23.20	2.21	0.80	68	2	59.3	9/GR16	
CHLCONT6	–105.80	20	–73.52	–55.52	3.65	1.31	39	2	59.8	9/GR16	
CRBBAH01	–92.30	20	–76.09	24.13	1.83	0.80	141	1	62.0	9/GR18	
CRBBER01	–92.30	20	–64.76	32.13	0.80	0.80	90	1	57.0	9/GR18	
CRBBLZ01	–92.30	20	–88.61	17.26	0.80	0.80	90	1	58.9	9/GR18	
CRBEC001	–92.30	20	–60.07	8.26	4.20	0.86	115	1	64.6	9/GR18	10
CRBJMC01	–92.30	20	–79.45	17.97	0.99	0.80	151	1	61.4	9/GR18	
EQAC0001	–94.80	20	–78.31	–1.52	1.48	1.15	65	1	63.3	9/GR19	
EQAG0001	–94.80	20	–90.36	–0.57	0.94	0.89	99	1	61.3	9/GR19	
GRD00003	–79.30	20	–61.62	12.34	0.80	0.80	90	2	58.9		
GTMIFRB2	–107.30	20	–90.50	15.64	1.03	0.80	84	1	61.4		
GUFMGG02	–52.80	20	–56.42	8.47	4.16	0.81	123	2	63.0	2 7	10
HWA00002	–165.80	20	–165.79	23.32	4.20	0.80	160	2	59.0	9/GR1	10
HWA00003	–174.80	20	–166.10	23.42	4.25	0.80	159	2	59.0	9/GR2	10
MEX01NTE	–77.80	20	–105.80	25.99	2.88	2.07	155	2	60.8	1	
MEX02NTE	–135.80	20	–107.36	26.32	3.80	1.57	149	2	61.5	1	10
MEX02SUR	–126.80	20	–96.39	19.88	3.19	1.87	158	2	62.8	1	10
PNRIFRB2	–121.00	20	–80.15	8.46	1.01	0.80	170	1	65.1		
PRU00004	–85.80	20	–74.19	–8.39	3.74	2.45	112	2	63.2	10	
PTRVIR01	–100.80	20	–65.85	18.12	0.80	0.80	90	2	60.9	1 6 9/GR20	
PTRVIR02	–109.80	20	–65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21	
USAEH001	–61.30	20	–85.16	36.21	5.63	3.32	22	2	62.1	1 5 6	10
USAEH002	–100.80	20	–89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20	10
USAEH003	–109.80	20	–90.12	36.11	5.55	3.56	161	2	62.4	1 6 9/GR21	10
USAEH004	–118.80	20	–91.16	36.05	5.38	3.24	153	2	62.9	1 5 6	10
USAPSA02	–165.80	20	–117.79	40.58	4.04	0.82	135	2	63.6	9/GR1	
USAPSA03	–174.80	20	–118.20	40.15	3.63	0.80	136	2	65.3	9/GR2	
USAWH101	–147.80	20	–109.70	38.13	5.52	1.96	142	2	62.4	10	
USAWH102	–156.80	20	–111.40	38.57	5.51	1.55	138	2	63.5	10	
VEN02VEN	–103.80	20	–63.50	15.50	0.80	0.80	90	2	60.1	9/GR22	
VEN11VEN	–103.80	20	–66.79	6.90	2.50	1.77	122	2	65.6	9/GR22	10

12 515.60 MHz (21)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	21	−149.66	58.37	3.76	1.24	170	1	59.9	9/GR1	10
ALS00003	−175.20	21	−150.98	58.53	3.77	1.11	167	1	60.2	9/GR2	10
ARGINSU4	−94.20	21	−52.98	−59.81	3.40	0.80	19	1	60.1	9/GR3	
ARGINSU5	−55.20	21	−44.17	−59.91	3.77	0.80	13	1	59.5	9/GR4	
ARGSUR04	−94.20	21	−65.04	−43.33	3.32	1.50	40	1	60.9	9/GR3	
ARGSUR05	−55.20	21	−63.68	−43.01	2.54	2.38	152	1	60.2	9/GR4	
B CE311	−64.20	21	−40.60	−6.07	3.04	2.06	174	1	61.9	8 9/GR7	
B CE312	−45.20	21	−40.27	−6.06	3.44	2.09	174	1	61.2	8 9/GR9	10 11
B CE411	−64.20	21	−50.97	−15.27	3.86	1.38	49	1	62.9	8 9/GR7	
B CE412	−45.20	21	−50.71	−15.30	3.57	1.56	52	1	63.0	8 9/GR9	10 12
B CE511	−64.20	21	−53.10	−2.90	2.44	2.13	104	1	63.4	8 9/GR7	
B NO611	−74.20	21	−59.60	−11.62	2.85	1.69	165	2	63.1	8 9/GR8	
B NO711	−74.20	21	−60.70	−1.78	3.54	1.78	126	2	63.1	8 9/GR8	
B NO811	−74.20	21	−68.76	−4.71	2.37	1.65	73	2	63.1	8 9/GR8	
B SU111	−81.20	21	−51.12	−25.63	2.76	1.05	50	1	63.2	8 9/GR6	
B SU112	−45.20	21	−50.75	−25.62	2.47	1.48	56	1	62.5	8 9/GR9	11
B SU211	−81.20	21	−44.51	−16.95	3.22	1.36	60	1	62.8	8 9/GR6	
B SU212	−45.20	21	−44.00	−16.87	3.20	1.96	58	1	61.6	8 9/GR9	12
BERBERMU	−96.20	21	−64.77	32.32	0.80	0.80	90	2	57.0		
BOLAND01	−115.20	21	−65.04	−16.76	2.49	1.27	76	1	68.0	9/GR5	
CAN01101	−138.20	21	−125.63	57.24	3.45	1.27	157	1	59.7	9/GR10	10
CAN01201	−138.20	21	−112.04	55.95	3.35	0.97	151	1	59.8	9/GR10	10
CAN01202	−72.70	21	−107.70	55.63	2.74	1.12	32	1	59.8		
CAN01203	−129.20	21	−111.48	55.61	3.08	1.15	151	1	59.7	9/GR12	10
CAN01303	−129.20	21	−102.42	57.12	3.54	0.91	154	1	60.2	9/GR12	10
CAN01304	−91.20	21	−99.12	57.36	1.98	1.72	2	1	60.0	9/GR13	
CAN01403	−129.20	21	−89.75	52.02	4.68	0.80	148	1	62.1	9/GR12	10
CAN01404	−91.20	21	−84.82	52.42	3.10	2.05	152	1	60.6	9/GR13	
CAN01405	−82.20	21	−84.00	52.39	2.84	2.29	172	1	60.5	9/GR14	
CAN01504	−91.20	21	−72.66	53.77	3.57	1.67	156	1	60.4	9/GR13	
CAN01505	−82.20	21	−71.77	53.79	3.30	1.89	162	1	60.3	9/GR14	
CAN01605	−82.20	21	−61.50	49.55	2.65	1.40	143	1	60.5	9/GR14	
CAN01606	−70.70	21	−61.30	49.55	2.40	1.65	148	1	60.4		
CHLCONT5	−106.20	21	−72.23	−35.57	2.60	0.80	55	1	59.6	9/GR17	
CHLPAC02	−106.20	21	−80.06	−30.06	1.36	0.80	69	1	59.4	9/GR17	
CLMAND01	−115.20	21	−74.72	5.93	3.85	1.63	114	1	65.3	9/GR5	10
CLM00001	−103.20	21	−74.50	5.87	3.98	1.96	118	1	63.9	10	
EQACAND1	−115.20	21	−78.40	−1.61	1.37	0.95	75	1	64.4	9/GR5	
EQAGAND1	−115.20	21	−90.34	−0.62	0.90	0.81	89	1	61.5	9/GR5	
HWA00002	−166.20	21	−165.79	23.42	4.20	0.80	160	1	59.0	9/GR1	10
HWA00003	−175.20	21	−166.10	23.42	4.25	0.80	159	1	58.9	9/GR2	10
JMC00002	−92.70	21	−77.30	18.12	0.80	0.80	90	2	60.1		
MEX01NTE	−78.20	21	−105.81	26.01	2.89	2.08	155	1	60.7	1	
MEX01SUR	−69.20	21	−94.84	19.82	3.05	2.09	4	1	62.5	1	
MEX02NTE	−136.20	21	−107.21	26.31	3.84	1.55	148	1	61.4	1	10
MEX02SUR	−127.20	21	−96.39	19.88	3.18	1.87	157	1	62.8	1	10
PAQPAC01	−106.20	21	−109.18	−27.53	0.80	0.80	90	1	56.4	9/GR17	
PRG00002	−99.20	21	−58.66	−23.32	1.45	1.04	76	1	60.4		
PRUAND02	−115.20	21	−74.69	−8.39	3.41	1.79	95	1	64.3	9/GR5	
PTRVIR01	−101.20	21	−65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20	
PTRVIR02	−110.20	21	−65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21	
SCN00001	−79.70	21	−62.46	17.44	0.80	0.80	90	1	58.6		
SPMFRAN3	−53.20	21	−67.24	47.51	3.16	0.80	7	1	60.6	2 7	
SURINAM2	−84.70	21	−55.69	4.35	1.00	0.80	86	1	63.5		
URG00001	−71.70	21	−56.22	−32.52	1.02	0.89	11	1	60.2		
USAEH001	−61.70	21	−85.19	36.21	5.63	3.33	22	1	62.1	1 5 6	
USAEH002	−101.20	21	−89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20	10
USAEH003	−110.20	21	−90.14	36.11	5.55	3.55	161	1	62.3	1 6 9/GR21	10
USAEH004	−119.20	21	−91.16	36.05	5.38	3.24	152	1	62.9	1 5 6	10
USAPSA02	−166.20	21	−117.80	40.58	4.03	0.82	135	1	63.5	9/GR1	
USAPSA03	−175.20	21	−118.27	40.12	3.62	0.80	136	1	65.3	9/GR2	
USAWH101	−148.20	21	−109.65	38.13	5.53	1.95	142	1	62.3	10	
USAWH102	−157.20	21	−111.41	38.57	5.51	1.54	138	1	63.5	10	
VENAND03	−115.20	21	−67.04	6.91	2.37	1.43	111	1	67.6	9/GR5	10

12 530.18 MHz (22)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	22	−149.63	58.52	3.81	1.23	171	2	59.9	9/GR1	10
ALS00003	−174.80	22	−150.95	58.54	3.77	1.11	167	2	60.2	9/GR2	10
ARGNORT4	−93.80	22	−63.96	−30.01	3.86	1.99	48	2	66.0		
ARGNORT5	−54.80	22	−62.85	−29.80	3.24	2.89	47	2	63.8		
ATNBEAM1	−52.80	22	−66.44	14.87	1.83	0.80	39	2	61.3		
B CE311	−63.80	22	−40.60	−6.07	3.04	2.06	174	2	61.9	8 9/GR7	
B CE312	−44.80	22	−40.26	−6.06	3.44	2.09	174	2	61.2	8 9/GR9	10 11
B CE411	−63.80	22	−50.97	−15.26	3.86	1.38	49	2	62.9	8 9/GR7	
B CE412	−44.80	22	−50.71	−15.30	3.57	1.56	52	2	63.0	8 9/GR9	10 12
B CE511	−63.80	22	−53.11	−2.98	2.42	2.15	107	2	63.4	8 9/GR7	
B NO611	−73.80	22	−59.60	−11.62	2.86	1.69	165	1	63.1	8 9/GR8	
B NO711	−73.80	22	−60.70	−1.78	3.54	1.78	126	1	63.1	8 9/GR8	
B NO811	−73.80	22	−68.75	−4.71	2.37	1.65	73	1	63.1	8 9/GR8	
B SE911	−101.80	22	−45.99	−19.09	2.22	0.80	62	2	65.7	8	
B SU111	−80.80	22	−51.10	−25.64	2.76	1.06	50	2	63.1	8 9/GR6	
B SU112	−44.80	22	−50.76	−25.62	2.47	1.48	56	2	62.6	8 9/GR9	11
B SU211	−80.80	22	−44.51	−16.94	3.22	1.37	60	2	62.8	8 9/GR6	
B SU212	−44.80	22	−43.99	−16.97	3.27	1.92	59	2	61.6	8 9/GR9	12
BLZ00001	−115.80	22	−88.68	17.27	0.80	0.80	90	2	59.2		
CAN01101	−137.80	22	−125.60	57.24	3.45	1.27	157	2	59.7	9/GR10	10
CAN01201	−137.80	22	−111.92	55.89	3.33	0.98	151	2	59.8	9/GR10	10
CAN01202	−72.30	22	−107.64	55.62	2.75	1.11	32	2	59.8		
CAN01203	−128.80	22	−111.43	55.56	3.07	1.15	151	2	59.7	9/GR12	10
CAN01303	−128.80	22	−102.39	57.12	3.54	0.92	154	2	60.3	9/GR12	10
CAN01304	−90.80	22	−99.00	57.33	1.96	1.73	1	2	60.0	9/GR13	
CAN01403	−128.80	22	−89.70	52.02	4.67	0.80	148	2	62.1	9/GR12	10
CAN01404	−90.80	22	−84.78	52.41	3.09	2.06	153	2	60.6	9/GR13	
CAN01405	−81.80	22	−84.02	52.34	2.82	2.30	172	2	60.5	9/GR14	
CAN01504	−90.80	22	−72.68	53.78	3.57	1.67	157	2	60.4	9/GR13	
CAN01505	−81.80	22	−71.76	53.76	3.30	1.89	162	2	60.3	9/GR14	
CAN01605	−81.80	22	−61.54	49.50	2.66	1.39	144	2	60.5	9/GR14	
CAN01606	−70.30	22	−61.32	49.51	2.41	1.65	148	2	60.4		
CHLCONT4	−105.80	22	−69.59	−23.20	2.21	0.80	68	2	59.3	9/GR16	
CHLCONT6	−105.80	22	−73.52	−55.52	3.65	1.31	39	2	59.7	9/GR16	
CRBBAH01	−92.30	22	−76.09	24.13	1.83	0.80	141	1	61.9	9/GR18	
CRBBER01	−92.30	22	−64.76	32.13	0.80	0.80	90	1	56.9	9/GR18	
CRBBLZ01	−92.30	22	−88.61	17.26	0.80	0.80	90	1	58.9	9/GR18	
CRBEC001	−92.30	22	−60.07	8.26	4.20	0.86	115	1	64.6	9/GR18	
CRBJMC01	−92.30	22	−79.45	17.97	0.99	0.80	151	1	61.3	9/GR18	
CTR00201	−130.80	22	−84.33	9.67	0.82	0.80	119	2	66.0		
DMAIFRB1	−79.30	22	−61.30	15.35	0.80	0.80	90	2	58.7		
EQAC0001	−94.80	22	−78.31	−1.52	1.48	1.15	65	1	63.3	9/GR19	
EQAG0001	−94.80	22	−90.36	−0.57	0.94	0.89	99	1	61.2	9/GR19	
HWA00002	−165.80	22	−165.79	23.32	4.20	0.80	160	2	59.0	9/GR1	10
HWA00003	−174.80	22	−166.10	23.42	4.25	0.80	159	2	59.0	9/GR2	10
MEX01NTE	−77.80	22	−105.80	25.99	2.88	2.07	155	2	60.7	1	
MEX02NTE	−135.80	22	−107.36	26.32	3.80	1.57	149	2	61.4	1	10
MEX02SUR	−126.80	22	−96.39	19.88	3.19	1.87	158	2	62.8	1	10
NCG00003	−107.30	22	−84.99	12.90	1.05	1.01	176	1	63.6		
PRU00004	−85.80	22	−74.19	−8.39	3.74	2.45	112	2	63.1		
PTRVIR01	−100.80	22	−65.85	18.12	0.80	0.80	90	2	60.8	1 6 9/GR20	
PTRVIR02	−109.80	22	−65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21	
USAEH001	−61.30	22	−85.16	36.21	5.63	3.32	22	2	62.1	1 5 6	
USAEH002	−100.80	22	−89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20	10
USAEH003	−109.80	22	−90.12	36.11	5.55	3.56	161	2	62.3	1 6 9/GR21	10
USAEH004	−118.80	22	−91.16	36.05	5.38	3.24	153	2	62.9	1 5 6	10
USAPSA02	−165.80	22	−117.79	40.58	4.04	0.82	135	2	63.5	9/GR1	
USAPSA03	−174.80	22	−118.20	40.15	3.63	0.80	136	2	65.3	9/GR2	
USAWH101	−147.80	22	−109.70	38.13	5.52	1.96	142	2	62.3	10	
USAWH102	−156.80	22	−111.40	38.57	5.51	1.55	138	2	63.5	10	
VEN11VEN	−103.80	22	−66.79	6.90	2.50	1.77	122	2	65.5	10	

12 544.76 MHz (23)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	23	−149.66	58.37	3.76	1.24	170	1	60.0	9/GR1	10
ALS00003	−175.20	23	−150.98	58.53	3.77	1.11	167	1	60.2	9/GR2	10
ARGINSU4	−94.20	23	−52.98	−59.81	3.40	0.80	19	1	60.1	9/GR3	
ARGINSU5	−55.20	23	−44.17	−59.91	3.77	0.80	13	1	59.5	9/GR4	
ARGSUR04	−94.20	23	−65.04	−43.33	3.32	1.50	40	1	60.9	9/GR3	
ARGSUR05	−55.20	23	−63.68	−43.01	2.54	2.38	152	1	60.3	9/GR4	
B CE311	−64.20	23	−40.60	−6.07	3.04	2.06	174	1	61.9	8 9/GR7	
B CE312	−45.20	23	−40.27	−6.06	3.44	2.09	174	1	61.3	8 9/GR9	10 11
B CE411	−64.20	23	−50.97	−15.27	3.86	1.38	49	1	62.9	8 9/GR7	
B CE412	−45.20	23	−50.71	−15.30	3.57	1.56	52	1	63.1	8 9/GR9	10 12
B CE511	−64.20	23	−53.10	−2.90	2.44	2.13	104	1	63.4	8 9/GR7	
B NO611	−74.20	23	−59.60	−11.62	2.85	1.69	165	2	63.2	8 9/GR8	
B NO711	−74.20	23	−60.70	−1.78	3.54	1.78	126	2	63.2	8 9/GR8	
B NO811	−74.20	23	−68.76	−4.71	2.37	1.65	73	2	63.1	8 9/GR8	
B SU111	−81.20	23	−51.12	−25.63	2.76	1.05	50	1	63.2	8 9/GR6	
B SU112	−45.20	23	−50.75	−25.62	2.47	1.48	56	1	62.6	8 9/GR9	11
B SU211	−81.20	23	−44.51	−16.95	3.22	1.36	60	1	62.8	8 9/GR6	
B SU212	−45.20	23	−44.00	−16.87	3.20	1.96	58	1	61.6	8 9/GR9	12
BERBERMU	−96.20	23	−64.77	32.32	0.80	0.80	90	2	57.0		
BOLAND01	−115.20	23	−65.04	−16.76	2.49	1.27	76	1	68.1	9/GR5	
BOL00001	−87.20	23	−64.61	−16.71	2.52	2.19	85	1	64.2		
BRB00001	−92.70	23	−59.85	12.93	0.80	0.80	90	2	59.4		
CAN01101	−138.20	23	−125.63	57.24	3.45	1.27	157	1	59.7	9/GR10	10
CAN01201	−138.20	23	−112.04	55.95	3.35	0.97	151	1	59.8	9/GR10	10
CAN01202	−72.70	23	−107.70	55.63	2.74	1.12	32	1	59.8		
CAN01203	−129.20	23	−111.48	55.61	3.08	1.15	151	1	59.7	9/GR12	10
CAN01303	−129.20	23	−102.42	57.12	3.54	0.91	154	1	60.3	9/GR12	10
CAN01304	−91.20	23	−99.12	57.36	1.98	1.72	2	1	60.1	9/GR13	
CAN01403	−129.20	23	−89.75	52.02	4.68	0.80	148	1	62.1	9/GR12	10
CAN01404	−91.20	23	−84.82	52.42	3.10	2.05	152	1	60.6	9/GR13	
CAN01405	−82.20	23	−84.00	52.39	2.84	2.29	172	1	60.5	9/GR14	
CAN01504	−91.20	23	−72.66	53.77	3.57	1.67	156	1	60.4	9/GR13	
CAN01505	−82.20	23	−71.77	53.79	3.30	1.89	162	1	60.4	9/GR14	
CAN01605	−82.20	23	−61.50	49.55	2.65	1.40	143	1	60.5	9/GR14	
CAN01606	−70.70	23	−61.30	49.55	2.40	1.65	148	1	60.5		
CHLCONT5	−106.20	23	−72.23	−35.57	2.60	0.80	55	1	59.6	9/GR17	
CHLPAC02	−106.20	23	−80.06	−30.06	1.36	0.80	69	1	59.4	9/GR17	
CLMAND01	−115.20	23	−74.72	5.93	3.85	1.63	114	1	65.4	9/GR5	10
CLM00001	−103.20	23	−74.50	5.87	3.98	1.96	118	1	63.9	10	
CUB00001	−89.20	23	−79.81	21.62	2.24	0.80	168	1	61.3		
EQACAND1	−115.20	23	−78.40	−1.61	1.37	0.95	75	1	64.4	9/GR5	
EQAGAND1	−115.20	23	−90.34	−0.62	0.90	0.81	89	1	61.6	9/GR5	
GRD00059	−57.20	23	−61.58	12.29	0.80	0.80	90	1	58.7		
GRLDNK01	−53.20	23	−44.89	66.56	2.70	0.82	173	1	60.2	2	
GUY00201	−84.70	23	−59.19	4.78	1.44	0.85	95	1	63.8		
HWA00002	−166.20	23	−165.79	23.42	4.20	0.80	160	1	59.0	9/GR1	10
HWA00003	−175.20	23	−166.10	23.42	4.25	0.80	159	1	59.0	9/GR2	10
MEX01NTE	−78.20	23	−105.81	26.01	2.89	2.08	155	1	60.8	1	
MEX01SUR	−69.20	23	−94.84	19.82	3.05	2.09	4	1	62.5	1	
MEX02NTE	−136.20	23	−107.21	26.31	3.84	1.55	148	1	61.5	1	10
MEX02SUR	−127.20	23	−96.39	19.88	3.18	1.87	157	1	62.8	1	10
MSR00001	−79.70	23	−61.73	16.75	0.80	0.80	90	1	58.9	4	
PAQPAC01	−106.20	23	−109.18	−27.53	0.80	0.80	90	1	56.4	9/GR17	
PRG00002	−99.20	23	−58.66	−23.32	1.45	1.04	76	1	60.5		
PRUAND02	−115.20	23	−74.69	−8.39	3.41	1.79	95	1	64.3	9/GR5	
PTRVIR01	−101.20	23	−65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20	
PTRVIR02	−110.20	23	−65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21	
URG00001	−71.70	23	−56.22	−32.52	1.02	0.89	11	1	60.2		
USAEH001	−61.70	23	−85.19	36.21	5.63	3.33	22	1	62.1	1 5 6	
USAEH002	−101.20	23	−89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20	10
USAEH003	−110.20	23	−90.14	36.11	5.55	3.55	161	1	62.4	1 6 9/GR21	10
USAEH004	−119.20	23	−91.16	36.05	5.38	3.24	152	1	62.9	1 5 6	10
USAPSA02	−166.20	23	−117.80	40.58	4.03	0.82	135	1	63.6	9/GR1	
USAPSA03	−175.20	23	−118.27	40.12	3.62	0.80	136	1	65.4	9/GR2	
USAWH101	−148.20	23	−109.65	38.13	5.53	1.95	142	1	62.4	10	
USAWH102	−157.20	23	−111.41	38.57	5.51	1.54	138	1	63.5	10	
VENAND03	−115.20	23	−67.04	6.91	2.37	1.43	111	1	67.7	9/GR5	10

12 559.34 MHz (24)

1	2	3	4		5		6	7	8	9	
ALS00002	–165.80	24	–149.63	58.52	3.81	1.23	171	2	59.9	9/GR1	10
ALS00003	–174.80	24	–150.95	58.54	3.77	1.11	167	2	60.2	9/GR2	10
ARGNORT4	–93.80	24	–63.96	–30.01	3.86	1.99	48	2	66.1		
ARGNORT5	–54.80	24	–62.85	–29.80	3.24	2.89	47	2	63.9		
B CE311	–63.80	24	–40.60	–6.07	3.04	2.06	174	2	61.9	8 9/GR7	
B CE312	–44.80	24	–40.26	–6.06	3.44	2.09	174	2	61.3	8 9/GR9	10 11
B CE411	–63.80	24	–50.97	–15.26	3.86	1.38	49	2	62.9	8 9/GR7	
B CE412	–44.80	24	–50.71	–15.30	3.57	1.56	52	2	63.1	8 9/GR9	10 12
B CE511	–63.80	24	–53.11	–2.98	2.42	2.15	107	2	63.4	8 9/GR7	
B NO611	–73.80	24	–59.60	–11.62	2.86	1.69	165	1	63.2	8 9/GR8	
B NO711	–73.80	24	–60.70	–1.78	3.54	1.78	126	1	63.2	8 9/GR8	
B NO811	–73.80	24	–68.75	–4.71	2.37	1.65	73	1	63.2	8 9/GR8	
B SE911	–101.80	24	–45.99	–19.09	2.22	0.80	62	2	65.7	8	
B SU111	–80.80	24	–51.10	–25.64	2.76	1.06	50	2	63.2	8 9/GR6	
B SU112	–44.80	24	–50.76	–25.62	2.47	1.48	56	2	62.6	8 9/GR9	11
B SU211	–80.80	24	–44.51	–16.94	3.22	1.37	60	2	62.8	8 9/GR6	
B SU212	–44.80	24	–43.99	–16.97	3.27	1.92	59	2	61.6	8 9/GR9	12
CAN01101	–137.80	24	–125.60	57.24	3.45	1.27	157	2	59.7	9/GR10	10
CAN01201	–137.80	24	–111.92	55.89	3.33	0.98	151	2	59.8	9/GR10	10
CAN01202	–72.30	24	–107.64	55.62	2.75	1.11	32	2	59.8		
CAN01203	–128.80	24	–111.43	55.56	3.07	1.15	151	2	59.7	9/GR12	10
CAN01303	–128.80	24	–102.39	57.12	3.54	0.92	154	2	60.3	9/GR12	10
CAN01304	–90.80	24	–99.00	57.33	1.96	1.73	1	2	60.0	9/GR13	
CAN01403	–128.80	24	–89.70	52.02	4.67	0.80	148	2	62.1	9/GR12	10
CAN01404	–90.80	24	–84.78	52.41	3.09	2.06	153	2	60.6	9/GR13	
CAN01405	–81.80	24	–84.02	52.34	2.82	2.30	172	2	60.5	9/GR14	
CAN01504	–90.80	24	–72.68	53.78	3.57	1.67	157	2	60.4	9/GR13	
CAN01505	–81.80	24	–71.76	53.76	3.30	1.89	162	2	60.4	9/GR14	
CAN01605	–81.80	24	–61.54	49.50	2.66	1.39	144	2	60.5	9/GR14	
CAN01606	–70.30	24	–61.32	49.51	2.41	1.65	148	2	60.5		
CHLCONT4	–105.80	24	–69.59	–23.20	2.21	0.80	68	2	59.3	9/GR16	
CHLCONT6	–105.80	24	–73.52	–55.52	3.65	1.31	39	2	59.8	9/GR16	
CRBBAH01	–92.30	24	–76.09	24.13	1.83	0.80	141	1	62.0	9/GR18	
CRBBER01	–92.30	24	–64.76	32.13	0.80	0.80	90	1	57.0	9/GR18	
CRBBLZ01	–92.30	24	–88.61	17.26	0.80	0.80	90	1	58.9	9/GR18	
CRBEC001	–92.30	24	–60.07	8.26	4.20	0.86	115	1	64.6	9/GR18	
CRBJMC01	–92.30	24	–79.45	17.97	0.99	0.80	151	1	61.4	9/GR18	
EQAC0001	–94.80	24	–78.31	–1.52	1.48	1.15	65	1	63.3	9/GR19	
EQAG0001	–94.80	24	–90.36	–0.57	0.94	0.89	99	1	61.3	9/GR19	
GRD00003	–79.30	24	–61.62	12.34	0.80	0.80	90	2	58.9		
GTMIFRB2	–107.30	24	–90.50	15.64	1.03	0.80	84	1	61.4		
GUFMGG02	–52.80	24	–56.42	8.47	4.16	0.81	123	2	63.0	2 7	
HWA00002	–165.80	24	–165.79	23.32	4.20	0.80	160	2	59.0	9/GR1	10
HWA00003	–174.80	24	–166.10	23.42	4.25	0.80	159	2	59.0	9/GR2	10
MEX01NTE	–77.80	24	–105.80	25.99	2.88	2.07	155	2	60.8	1	
MEX02NTE	–135.80	24	–107.36	26.32	3.80	1.57	149	2	61.5	1	10
MEX02SUR	–126.80	24	–96.39	19.88	3.19	1.87	158	2	62.8	1	10
PNRIFRB2	–121.00	24	–80.15	8.46	1.01	0.80	170	1	65.1		
PRU00004	–85.80	24	–74.19	–8.39	3.74	2.45	112	2	63.2		
PTRVIR01	–100.80	24	–65.85	18.12	0.80	0.80	90	2	60.9	1 6 9/GR20	
PTRVIR02	–109.80	24	–65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21	
USAEH001	–61.30	24	–85.16	36.21	5.63	3.32	22	2	62.1	1 5 6	
USAEH002	–100.80	24	–89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20	10
USAEH003	–109.80	24	–90.12	36.11	5.55	3.56	161	2	62.4	1 6 9/GR21	10
USAEH004	–118.80	24	–91.16	36.05	5.38	3.24	153	2	62.9	1 5 6	10
USAPSA02	–165.80	24	–117.79	40.58	4.04	0.82	135	2	63.6	9/GR1	
USAPSA03	–174.80	24	–118.20	40.15	3.63	0.80	136	2	65.3	9/GR2	
USAWH101	–147.80	24	–109.70	38.13	5.52	1.96	142	2	62.4	10	
USAWH102	–156.80	24	–111.40	38.57	5.51	1.55	138	2	63.5	10	
VEN02VEN	–103.80	24	–63.50	15.50	0.80	0.80	90	2	60.1	9/GR22	
VEN11VEN	–103.80	24	–66.79	6.90	2.50	1.77	122	2	65.6	9/GR22	10

12 573,92 MHz (25)

1	2	3	4		5		6	7	8	9	
ALS00002	–166.20	25	–149.66	58.37	3.76	1.24	170	1	59.9	9/GR1	10
ALS00003	–175.20	25	–150.98	58.53	3.77	1.11	167	1	60.2	9/GR2	10
ARGINSU4	–94.20	25	–52.98	–59.81	3.40	0.80	19	1	60.1	9/GR3	
ARGINSU5	–55.20	25	–44.17	–59.91	3.77	0.80	13	1	59.5	9/GR4	
ARGSUR04	–94.20	25	–65.04	–43.33	3.32	1.50	40	1	60.9	9/GR3	
ARGSUR05	–55.20	25	–63.68	–43.01	2.54	2.38	152	1	60.2	9/GR4	
B CE311	–64.20	25	–40.60	–6.07	3.04	2.06	174	1	61.9	8 9/GR7	
B CE312	–45.20	25	–40.27	–6.06	3.44	2.09	174	1	61.2	8 9/GR9	10 11
B CE411	–64.20	25	–50.97	–15.27	3.86	1.38	49	1	62.9	8 9/GR7	
B CE412	–45.20	25	–50.71	–15.30	3.57	1.56	52	1	63.0	8 9/GR9	10 12
B CE511	–64.20	25	–53.10	–2.90	2.44	2.13	104	1	63.4	8 9/GR7	
B NO611	–74.20	25	–59.60	–11.62	2.85	1.69	165	2	63.1	8 9/GR8	
B NO711	–74.20	25	–60.70	–1.78	3.54	1.78	126	2	63.1	8 9/GR8	
B NO811	–74.20	25	–68.76	–4.71	2.37	1.65	73	2	63.1	8 9/GR8	
B SU111	–81.20	25	–51.12	–25.63	2.76	1.05	50	1	63.2	8 9/GR6	
B SU112	–45.20	25	–50.75	–25.62	2.47	1.48	56	1	62.5	8 9/GR9	11
B SU211	–81.20	25	–44.51	–16.95	3.22	1.36	60	1	62.8	8 9/GR6	
B SU212	–45.20	25	–44.00	–16.87	3.20	1.96	58	1	61.6	8 9/GR9	12
BERBERMU	–96.20	25	–64.77	32.32	0.80	0.80	90	2	57.0		
BOLAND01	–115.20	25	–65.04	–16.76	2.49	1.27	76	1	68.0	9/GR5	
CAN01101	–138.20	25	–125.63	57.24	3.45	1.27	157	1	59.7	9/GR10	10
CAN01201	–138.20	25	–112.04	55.95	3.35	0.97	151	1	59.8	9/GR10	10
CAN01202	–72.70	25	–107.70	55.63	2.74	1.12	32	1	59.8		
CAN01203	–129.20	25	–111.48	55.61	3.08	1.15	151	1	59.7	9/GR12	10
CAN01303	–129.20	25	–102.42	57.12	3.54	0.91	154	1	60.2	9/GR12	10
CAN01304	–91.20	25	–99.12	57.36	1.98	1.72	2	1	60.0	9/GR13	
CAN01403	–129.20	25	–89.75	52.02	4.68	0.80	148	1	62.1	9/GR12	10
CAN01404	–91.20	25	–84.82	52.42	3.10	2.05	152	1	60.6	9/GR13	
CAN01405	–82.20	25	–84.00	52.39	2.84	2.29	172	1	60.5	9/GR14	
CAN01504	–91.20	25	–72.66	53.77	3.57	1.67	156	1	60.4	9/GR13	
CAN01505	–82.20	25	–71.77	53.79	3.30	1.89	162	1	60.3	9/GR14	
CAN01605	–82.20	25	–61.50	49.55	2.65	1.40	143	1	60.5	9/GR14	
CAN01606	–70.70	25	–61.30	49.55	2.40	1.65	148	1	60.4		
CHLCONT5	–106.20	25	–72.23	–35.57	2.60	0.80	55	1	59.6	9/GR17	
CHLPAC02	–106.20	25	–80.06	–30.06	1.36	0.80	69	1	59.4	9/GR17	
CLMAND01	–115.20	25	–74.72	5.93	3.85	1.63	114	1	65.3	9/GR5	10
CLM00001	–103.20	25	–74.50	5.87	3.98	1.96	118	1	63.9	10	
EQACAND1	–115.20	25	–78.40	–1.61	1.37	0.95	75	1	64.4	9/GR5	
EQAGAND1	–115.20	25	–90.34	–0.62	0.90	0.81	89	1	61.5	9/GR5	
HWA00002	–166.20	25	–165.79	23.42	4.20	0.80	160	1	59.0	9/GR1	10
HWA00003	–175.20	25	–166.10	23.42	4.25	0.80	159	1	58.9	9/GR2	10
JMC00002	–92.70	25	–77.30	18.12	0.80	0.80	90	2	60.1		
MEX01NTE	–78.20	25	–105.81	26.01	2.89	2.08	155	1	60.7	1	
MEX01SUR	–69.20	25	–94.84	19.82	3.05	2.09	4	1	62.5	1	
MEX02NTE	–136.20	25	–107.21	26.31	3.84	1.55	148	1	61.4	1	10
MEX02SUR	–127.20	25	–96.39	19.88	3.18	1.87	157	1	62.8	1	10
PAQPAC01	–106.20	25	–109.18	–27.53	0.80	0.80	90	1	56.4	9/GR17	
PRG00002	–99.20	25	–58.66	–23.32	1.45	1.04	76	1	60.4		
PRUAND02	–115.20	25	–74.69	–8.39	3.41	1.79	95	1	64.3	9/GR5	
PTRVIR01	–101.20	25	–65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20	
PTRVIR02	–110.20	25	–65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21	
SCN00001	–79.70	25	–62.46	17.44	0.80	0.80	90	1	58.6		
SPMFRAN3	–53.20	25	–67.24	47.51	3.16	0.80	7	1	60.6	2 7	
SURINAM2	–84.70	25	–55.69	4.35	1.00	0.80	86	1	63.5		
URG00001	–71.70	25	–56.22	–32.52	1.02	0.89	11	1	60.2		
USAEH001	–61.70	25	–85.19	36.21	5.63	3.33	22	1	62.1	1 5 6	
USAEH002	–101.20	25	–89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20	10
USAEH003	–110.20	25	–90.14	36.11	5.55	3.55	161	1	62.3	1 6 9/GR21	10
USAEH004	–119.20	25	–91.16	36.05	5.38	3.24	152	1	62.9	1 5 6	10
USAPSA02	–166.20	25	–117.80	40.58	4.03	0.82	135	1	63.5	9/GR1	
USAPSA03	–175.20	25	–118.27	40.12	3.62	0.80	136	1	65.3	9/GR2	
USAWH101	–148.20	25	–109.65	38.13	5.53	1.95	142	1	62.3	10	
USAWH102	–157.20	25	–111.41	38.57	5.51	1.54	138	1	63.5	10	
VENAND03	–115.20	25	–67.04	6.91	2.37	1.43	111	1	67.6	9/GR5	10

12 588.50 MHz (26)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	26	−149.63	58.52	3.81	1.23	171	2	59.9	9/GR1	10
ALS00003	−174.80	26	−150.95	58.54	3.77	1.11	167	2	60.2	9/GR2	10
ARGNORT4	−93.80	26	−63.96	−30.01	3.86	1.99	48	2	66.0		
ARGNORT5	−54.80	26	−62.85	−29.80	3.24	2.89	47	2	63.8		
ATNBEAM1	−52.80	26	−66.44	14.87	1.83	0.80	39	2	61.3		
B CE311	−63.80	26	−40.60	−6.07	3.04	2.06	174	2	61.9	8 9/GR7	
B CE312	−44.80	26	−40.26	−6.06	3.44	2.09	174	2	61.2	8 9/GR9	10 11
B CE411	−63.80	26	−50.97	−15.26	3.86	1.38	49	2	62.9	8 9/GR7	
B CE412	−44.80	26	−50.71	−15.30	3.57	1.56	52	2	63.0	8 9/GR9	10 12
B CE511	−63.80	26	−53.11	−2.98	2.42	2.15	107	2	63.4	8 9/GR7	
B NO611	−73.80	26	−59.60	−11.62	2.86	1.69	165	1	63.1	8 9/GR8	
B NO711	−73.80	26	−60.70	−1.78	3.54	1.78	126	1	63.1	8 9/GR8	
B NO811	−73.80	26	−68.75	−4.71	2.37	1.65	73	1	63.1	8 9/GR8	
B SE911	−101.80	26	−45.99	−19.09	2.22	0.80	62	2	65.7	8	
B SU111	−80.80	26	−51.10	−25.64	2.76	1.06	50	2	63.1	8 9/GR6	
B SU112	−44.80	26	−50.76	−25.62	2.47	1.48	56	2	62.6	8 9/GR9	11
B SU211	−80.80	26	−44.51	−16.94	3.22	1.37	60	2	62.8	8 9/GR6	
B SU212	−44.80	26	−43.99	−16.97	3.27	1.92	59	2	61.6	8 9/GR9	12
BLZ00001	−115.80	26	−88.68	17.27	0.80	0.80	90	2	59.2		
CAN01101	−137.80	26	−125.60	57.24	3.45	1.27	157	2	59.7	9/GR10	10
CAN01201	−137.80	26	−111.92	55.89	3.33	0.98	151	2	59.8	9/GR10	10
CAN01202	−72.30	26	−107.64	55.62	2.75	1.11	32	2	59.8		
CAN01203	−128.80	26	−111.43	55.56	3.07	1.15	151	2	59.7	9/GR12	10
CAN01303	−128.80	26	−102.39	57.12	3.54	0.92	154	2	60.3	9/GR12	10
CAN01304	−90.80	26	−99.00	57.33	1.96	1.73	1	2	60.0	9/GR13	
CAN01403	−128.80	26	−89.70	52.02	4.67	0.80	148	2	62.1	9/GR12	10
CAN01404	−90.80	26	−84.78	52.41	3.09	2.06	153	2	60.6	9/GR13	
CAN01405	−81.80	26	−84.02	52.34	2.82	2.30	172	2	60.5	9/GR14	
CAN01504	−90.80	26	−72.68	53.78	3.57	1.67	157	2	60.4	9/GR13	
CAN01505	−81.80	26	−71.76	53.76	3.30	1.89	162	2	60.3	9/GR14	
CAN01605	−81.80	26	−61.54	49.50	2.66	1.39	144	2	60.5	9/GR14	
CAN01606	−70.30	26	−61.32	49.51	2.41	1.65	148	2	60.4		
CHLCONT4	−105.80	26	−69.59	−23.20	2.21	0.80	68	2	59.3	9/GR16	
CHLCONT6	−105.80	26	−73.52	−55.52	3.65	1.31	39	2	59.7	9/GR16	
CRBBAH01	−92.30	26	−76.09	24.13	1.83	0.80	141	1	61.9	9/GR18	
CRBBER01	−92.30	26	−64.76	32.13	0.80	0.80	90	1	56.9	9/GR18	
CRBBLZ01	−92.30	26	−88.61	17.26	0.80	0.80	90	1	58.9	9/GR18	
CRBEC001	−92.30	26	−60.07	8.26	4.20	0.86	115	1	64.6	9/GR18	
CRBJMC01	−92.30	26	−79.45	17.97	0.99	0.80	151	1	61.3	9/GR18	
CTR00201	−130.80	26	−84.33	9.67	0.82	0.80	119	2	66.0		
DMAIFRB1	−79.30	26	−61.30	15.35	0.80	0.80	90	2	58.7		
EQAC0001	−94.80	26	−78.31	−1.52	1.48	1.15	65	1	63.3	9/GR19	
EQAG0001	−94.80	26	−90.36	−0.57	0.94	0.89	99	1	61.2	9/GR19	
HWA00002	−165.80	26	−165.79	23.32	4.20	0.80	160	2	59.0	9/GR1	10
HWA00003	−174.80	26	−166.10	23.42	4.25	0.80	159	2	59.0	9/GR2	10
MEX01NTE	−77.80	26	−105.80	25.99	2.88	2.07	155	2	60.7	1	
MEX02NTE	−135.80	26	−107.36	26.32	3.80	1.57	149	2	61.4	1	10
MEX02SUR	−126.80	26	−96.39	19.88	3.19	1.87	158	2	62.8	1	10
NCG00003	−107.30	26	−84.99	12.90	1.05	1.01	176	1	63.6		
PRU00004	−85.80	26	−74.19	−8.39	3.74	2.45	112	2	63.1		
PTRVIR01	−100.80	26	−65.85	18.12	0.80	0.80	90	2	60.8	1 6 9/GR20	
PTRVIR02	−109.80	26	−65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21	
USAEH001	−61.30	26	−85.16	36.21	5.63	3.32	22	2	62.1	1 5 6	
USAEH002	−100.80	26	−89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20	10
USAEH003	−109.80	26	−90.12	36.11	5.55	3.56	161	2	62.3	1 6 9/GR21	10
USAEH004	−118.80	26	−91.16	36.05	5.38	3.24	153	2	62.9	1 5 6	10
USAPSA02	−165.80	26	−117.79	40.58	4.04	0.82	135	2	63.5	9/GR1	
USAPSA03	−174.80	26	−118.20	40.15	3.63	0.80	136	2	65.3	9/GR2	
USAWH101	−147.80	26	−109.70	38.13	5.52	1.96	142	2	62.3	10	
USAWH102	−156.80	26	−111.40	38.57	5.51	1.55	138	2	63.5	10	
VEN11VEN	−103.80	26	−66.79	6.90	2.50	1.77	122	2	65.5	10	

12 603.08 MHz (27)

1	2	3	4		5		6	7	8	9	
ALS00002	–166.20	27	–149.66	58.37	3.76	1.24	170	1	60.0	9/GR1	10
ALS00003	–175.20	27	–150.98	58.53	3.77	1.11	167	1	60.2	9/GR2	10
ARGINSU4	–94.20	27	–52.98	–59.81	3.40	0.80	19	1	60.1	9/GR3	
ARGINSU5	–55.20	27	–44.17	–59.91	3.77	0.80	13	1	59.5	9/GR4	
ARGSUR04	–94.20	27	–65.04	–43.33	3.32	1.50	40	1	60.9	9/GR3	
ARGSUR05	–55.20	27	–63.68	–43.01	2.54	2.38	152	1	60.3	9/GR4	
B CE311	–64.20	27	–40.60	–6.07	3.04	2.06	174	1	61.9	8 9/GR7	
B CE312	–45.20	27	–40.27	–6.06	3.44	2.09	174	1	61.3	8 9/GR9	10 11
B CE411	–64.20	27	–50.97	–15.27	3.86	1.38	49	1	62.9	8 9/GR7	
B CE412	–45.20	27	–50.71	–15.30	3.57	1.56	52	1	63.1	8 9/GR9	10 12
B CE511	–64.20	27	–53.10	–2.90	2.44	2.13	104	1	63.4	8 9/GR7	
B NO611	–74.20	27	–59.60	–11.62	2.85	1.69	165	2	63.2	8 9/GR8	
B NO711	–74.20	27	–60.70	–1.78	3.54	1.78	126	2	63.2	8 9/GR8	
B NO811	–74.20	27	–68.76	–4.71	2.37	1.65	73	2	63.1	8 9/GR8	
B SU111	–81.20	27	–51.12	–25.63	2.76	1.05	50	1	63.2	8 9/GR6	
B SU112	–45.20	27	–50.75	–25.62	2.47	1.48	56	1	62.6	8 9/GR9	11
B SU211	–81.20	27	–44.51	–16.95	3.22	1.36	60	1	62.8	8 9/GR6	
B SU212	–45.20	27	–44.00	–16.87	3.20	1.96	58	1	61.6	8 9/GR9	12
BERBERMU	–96.20	27	–64.77	32.32	0.80	0.80	90	2	57.0		
BOLAND01	–115.20	27	–65.04	–16.76	2.49	1.27	76	1	68.1	9/GR5	
BOL00001	–87.20	27	–64.61	–16.71	2.52	2.19	85	1	64.2		
BRB00001	–92.70	27	–59.85	12.93	0.80	0.80	90	2	59.4		
CAN01101	–138.20	27	–125.63	57.24	3.45	1.27	157	1	59.7	9/GR10	10
CAN01201	–138.20	27	–112.04	55.95	3.35	0.97	151	1	59.8	9/GR10	10
CAN01202	–72.70	27	–107.70	55.63	2.74	1.12	32	1	59.8		
CAN01203	–129.20	27	–111.48	55.61	3.08	1.15	151	1	59.7	9/GR12	10
CAN01303	–129.20	27	–102.42	57.12	3.54	0.91	154	1	60.3	9/GR12	10
CAN01304	–91.20	27	–99.12	57.36	1.98	1.72	2	1	60.1	9/GR13	
CAN01403	–129.20	27	–89.75	52.02	4.68	0.80	148	1	62.1	9/GR12	10
CAN01404	–91.20	27	–84.82	52.42	3.10	2.05	152	1	60.6	9/GR13	
CAN01405	–82.20	27	–84.00	52.39	2.84	2.29	172	1	60.5	9/GR14	
CAN01504	–91.20	27	–72.66	53.77	3.57	1.67	156	1	60.4	9/GR13	
CAN01505	–82.20	27	–71.77	53.79	3.30	1.89	162	1	60.4	9/GR14	
CAN01605	–82.20	27	–61.50	49.55	2.65	1.40	143	1	60.5	9/GR14	
CAN01606	–70.70	27	–61.30	49.55	2.40	1.65	148	1	60.5		
CHLCONT5	–106.20	27	–72.23	–35.57	2.60	0.80	55	1	59.6	9/GR17	
CHLPAC02	–106.20	27	–80.06	–30.06	1.36	0.80	69	1	59.4	9/GR17	
CLMAND01	–115.20	27	–74.72	5.93	3.85	1.63	114	1	65.4	9/GR5	10
CLM00001	–103.20	27	–74.50	5.87	3.98	1.96	118	1	63.9	10	
CUB00001	–89.20	27	–79.81	21.62	2.24	0.80	168	1	61.3		
EQACAND1	–115.20	27	–78.40	–1.61	1.37	0.95	75	1	64.4	9/GR5	
EQAGAND1	–115.20	27	–90.34	–0.62	0.90	0.81	89	1	61.6	9/GR5	
GRD00059	–57.20	27	–61.58	12.29	0.80	0.80	90	1	58.7		
GRLDNK01	–53.20	27	–44.89	66.56	2.70	0.82	173	1	60.2	2	
GUY00201	–84.70	27	–59.19	4.78	1.44	0.85	95	1	63.8		
HWA00002	–166.20	27	–165.79	23.42	4.20	0.80	160	1	59.0	9/GR1	10
HWA00003	–175.20	27	–166.10	23.42	4.25	0.80	159	1	59.0	9/GR2	10
MEX01NTE	–78.20	27	–105.81	26.01	2.89	2.08	155	1	60.8	1	
MEX01SUR	–69.20	27	–94.84	19.82	3.05	2.09	4	1	62.5	1	
MEX02NTE	–136.20	27	–107.21	26.31	3.84	1.55	148	1	61.5	1	10
MEX02SUR	–127.20	27	–96.39	19.88	3.18	1.87	157	1	62.8	1	10
MSR00001	–79.70	27	–61.73	16.75	0.80	0.80	90	1	58.9	4	
PAQPAC01	–106.20	27	–109.18	–27.53	0.80	0.80	90	1	56.4	9/GR17	
PRG00002	–99.20	27	–58.66	–23.32	1.45	1.04	76	1	60.5		
PRUAND02	–115.20	27	–74.69	–8.39	3.41	1.79	95	1	64.3	9/GR5	
PTRVIR01	–101.20	27	–65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20	
PTRVIR02	–110.20	27	–65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21	
URG00001	–71.70	27	–56.22	–32.52	1.02	0.89	11	1	60.2		
USAEH001	–61.70	27	–85.19	36.21	5.63	3.33	22	1	62.1	1 5 6	
USAEH002	–101.20	27	–89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20	10
USAEH003	–110.20	27	–90.14	36.11	5.55	3.55	161	1	62.4	1 6 9/GR21	10
USAEH004	–119.20	27	–91.16	36.05	5.38	3.24	152	1	62.9	1 5 6	10
USAPSA02	–166.20	27	–117.80	40.58	4.03	0.82	135	1	63.6	9/GR1	
USAPSA03	–175.20	27	–118.27	40.12	3.62	0.80	136	1	65.4	9/GR2	
USAWH101	–148.20	27	–109.65	38.13	5.53	1.95	142	1	62.4	10	
USAWH102	–157.20	27	–111.41	38.57	5.51	1.54	138	1	63.5	10	
VENAND03	–115.20	27	–67.04	6.91	2.37	1.43	111	1	67.7	9/GR5	10

12 617.66 MHz (28)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	28	−149.63	58.52	3.81	1.23	171	2	59.9	9/GR1	10
ALS00003	−174.80	28	−150.95	58.54	3.77	1.11	167	2	60.2	9/GR2	10
ARGNORT4	−93.80	28	−63.96	−30.01	3.86	1.99	48	2	66.1		
ARGNORT5	−54.80	28	−62.85	−29.80	3.24	2.89	47	2	63.9		
B CE311	−63.80	28	−40.60	−6.07	3.04	2.06	174	2	61.9	8 9/GR7	
B CE312	−44.80	28	−40.26	−6.06	3.44	2.09	174	2	61.3	8 9/GR9	10 11
B CE411	−63.80	28	−50.97	−15.26	3.86	1.38	49	2	62.9	8 9/GR7	
B CE412	−44.80	28	−50.71	−15.30	3.57	1.56	52	2	63.1	8 9/GR9	10 12
B CE511	−63.80	28	−53.11	−2.98	2.42	2.15	107	2	63.4	8 9/GR7	
B NO611	−73.80	28	−59.60	−11.62	2.86	1.69	165	1	63.2	8 9/GR8	
B NO711	−73.80	28	−60.70	−1.78	3.54	1.78	126	1	63.2	8 9/GR8	
B NO811	−73.80	28	−68.75	−4.71	2.37	1.65	73	1	63.2	8 9/GR8	
B SE911	−101.80	28	−45.99	−19.09	2.22	0.80	62	2	65.7	8	
B SU111	−80.80	28	−51.10	−25.64	2.76	1.06	50	2	63.2	8 9/GR6	
B SU112	−44.80	28	−50.76	−25.62	2.47	1.48	56	2	62.6	8 9/GR9	11
B SU211	−80.80	28	−44.51	−16.94	3.22	1.37	60	2	62.8	8 9/GR6	
B SU212	−44.80	28	−43.99	−16.97	3.27	1.92	59	2	61.6	8 9/GR9	12
CAN01101	−137.80	28	−125.60	57.24	3.45	1.27	157	2	59.7	9/GR10	10
CAN01201	−137.80	28	−111.92	55.89	3.33	0.98	151	2	59.8	9/GR10	10
CAN01202	−72.30	28	−107.64	55.62	2.75	1.11	32	2	59.8		
CAN01203	−128.80	28	−111.43	55.56	3.07	1.15	151	2	59.7	9/GR12	10
CAN01303	−128.80	28	−102.39	57.12	3.54	0.92	154	2	60.3	9/GR12	10
CAN01304	−90.80	28	−99.00	57.33	1.96	1.73	1	2	60.0	9/GR13	
CAN01403	−128.80	28	−89.70	52.02	4.67	0.80	148	2	62.1	9/GR12	10
CAN01404	−90.80	28	−84.78	52.41	3.09	2.06	153	2	60.6	9/GR13	
CAN01405	−81.80	28	−84.02	52.34	2.82	2.30	172	2	60.5	9/GR14	
CAN01504	−90.80	28	−72.68	53.78	3.57	1.67	157	2	60.4	9/GR13	
CAN01505	−81.80	28	−71.76	53.76	3.30	1.89	162	2	60.4	9/GR14	
CAN01605	−81.80	28	−61.54	49.50	2.66	1.39	144	2	60.5	9/GR14	
CAN01606	−70.30	28	−61.32	49.51	2.41	1.65	148	2	60.5		
CHLCONT4	−105.80	28	−69.59	−23.20	2.21	0.80	68	2	59.3	9/GR16	
CHLCONT6	−105.80	28	−73.52	−55.52	3.65	1.31	39	2	59.8	9/GR16	
CRBBAH01	−92.30	28	−76.09	24.13	1.83	0.80	141	1	62.0	9/GR18	
CRBBER01	−92.30	28	−64.76	32.13	0.80	0.80	90	1	57.0	9/GR18	
CRBBLZ01	−92.30	28	−88.61	17.26	0.80	0.80	90	1	58.9	9/GR18	
CRBEC001	−92.30	28	−60.07	8.26	4.20	0.86	115	1	64.6	9/GR18	
CRBJMC01	−92.30	28	−79.45	17.97	0.99	0.80	151	1	61.4	9/GR18	
EQAC0001	−94.80	28	−78.31	−1.52	1.48	1.15	65	1	63.3	9/GR19	
EQAG0001	−94.80	28	−90.36	−0.57	0.94	0.89	99	1	61.3	9/GR19	
GRD00003	−79.30	28	−61.62	12.34	0.80	0.80	90	2	58.9		
GTMIFRB2	−107.30	28	−90.50	15.64	1.03	0.80	84	1	61.4		
GUFMGG02	−52.80	28	−56.42	8.47	4.16	0.81	123	2	63.0	2 7	
HWA00002	−165.80	28	−165.79	23.32	4.20	0.80	160	2	59.0	9/GR1	10
HWA00003	−174.80	28	−166.10	23.42	4.25	0.80	159	2	59.0	9/GR2	10
MEX01NTE	−77.80	28	−105.80	25.99	2.88	2.07	155	2	60.8	1	
MEX02NTE	−135.80	28	−107.36	26.32	3.80	1.57	149	2	61.5	1	10
MEX02SUR	−126.80	28	−96.39	19.88	3.19	1.87	158	2	62.8	1	10
PNRIFRB2	−121.00	28	−80.15	8.46	1.01	0.80	170	1	65.1		
PRU00004	−85.80	28	−74.19	−8.39	3.74	2.45	112	2	63.2		
PTRVIR01	−100.80	28	−65.85	18.12	0.80	0.80	90	2	60.9	1 6 9/GR20	
PTRVIR02	−109.80	28	−65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21	
USAEH001	−61.30	28	−85.16	36.21	5.63	3.32	22	2	62.1	1 5 6	
USAEH002	−100.80	28	−89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20	10
USAEH003	−109.80	28	−90.12	36.11	5.55	3.56	161	2	62.4	1 6 9/GR21	10
USAEH004	−118.80	28	−91.16	36.05	5.38	3.24	153	2	62.9	1 5 6	10
USAPSA02	−165.80	28	−117.79	40.58	4.04	0.82	135	2	63.6	9/GR1	
USAPSA03	−174.80	28	−118.20	40.15	3.63	0.80	136	2	65.3	9/GR2	
USAWH101	−147.80	28	−109.70	38.13	5.52	1.96	142	2	62.4	10	
USAWH102	−156.80	28	−111.40	38.57	5.51	1.55	138	2	63.5	10	
VEN02VEN	−103.80	28	−63.50	15.50	0.80	0.80	90	2	60.1	9/GR22	
VEN11VEN	−103.80	28	−66.79	6.90	2.50	1.77	122	2	65.6	9/GR22	10

12 632.24 MHz (29)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	29	−149.66	58.37	3.76	1.24	170	1	59.9	9/GR1	10
ALS00003	−175.20	29	−150.98	58.53	3.77	1.11	167	1	60.2	9/GR2	10
ARGINSU4	−94.20	29	−52.98	−59.81	3.40	0.80	19	1	60.1	9/GR3	
ARGINSU5	−55.20	29	−44.17	−59.91	3.77	0.80	13	1	59.5	9/GR4	
ARGSUR04	−94.20	29	−65.04	−43.33	3.32	1.50	40	1	60.9	9/GR3	
ARGSUR05	−55.20	29	−63.68	−43.01	2.54	2.38	152	1	60.2	9/GR4	
B CE311	−64.20	29	−40.60	−6.07	3.04	2.06	174	1	61.9	8 9/GR7	
B CE312	−45.20	29	−40.27	−6.06	3.44	2.09	174	1	61.2	8 9/GR9	10 11
B CE411	−64.20	29	−50.97	−15.27	3.86	1.38	49	1	62.9	8 9/GR7	
B CE412	−45.20	29	−50.71	−15.30	3.57	1.56	52	1	63.0	8 9/GR9	10 12
B CE511	−64.20	29	−53.10	−2.90	2.44	2.13	104	1	63.4	8 9/GR7	
B NO611	−74.20	29	−59.60	−11.62	2.85	1.69	165	2	63.1	8 9/GR8	
B NO711	−74.20	29	−60.70	−1.78	3.54	1.78	126	2	63.1	8 9/GR8	
B NO811	−74.20	29	−68.76	−4.71	2.37	1.65	73	2	63.1	8 9/GR8	
B SU111	−81.20	29	−51.12	−25.63	2.76	1.05	50	1	63.2	8 9/GR6	
B SU112	−45.20	29	−50.75	−25.62	2.47	1.48	56	1	62.5	8 9/GR9	11
B SU211	−81.20	29	−44.51	−16.95	3.22	1.36	60	1	62.8	8 9/GR6	
B SU212	−45.20	29	−44.00	−16.87	3.20	1.96	58	1	61.6	8 9/GR9	12
BERBERMU	−96.20	29	−64.77	32.32	0.80	0.80	90	2	57.0		
BOLAND01	−115.20	29	−65.04	−16.76	2.49	1.27	76	1	68.0	9/GR5	
CAN01101	−138.20	29	−125.63	57.24	3.45	1.27	157	1	59.7	9/GR10	10
CAN01201	−138.20	29	−112.04	55.95	3.35	0.97	151	1	59.8	9/GR10	10
CAN01202	−72.70	29	−107.70	55.63	2.74	1.12	32	1	59.8		
CAN01203	−129.20	29	−111.48	55.61	3.08	1.15	151	1	59.7	9/GR12	10
CAN01303	−129.20	29	−102.42	57.12	3.54	0.91	154	1	60.2	9/GR12	10
CAN01304	−91.20	29	−99.12	57.36	1.98	1.72	2	1	60.0	9/GR13	
CAN01403	−129.20	29	−89.75	52.02	4.68	0.80	148	1	62.1	9/GR12	10
CAN01404	−91.20	29	−84.82	52.42	3.10	2.05	152	1	60.6	9/GR13	
CAN01405	−82.20	29	−84.00	52.39	2.84	2.29	172	1	60.5	9/GR14	
CAN01504	−91.20	29	−72.66	53.77	3.57	1.67	156	1	60.4	9/GR13	
CAN01505	−82.20	29	−71.77	53.79	3.30	1.89	162	1	60.3	9/GR14	
CAN01605	−82.20	29	−61.50	49.55	2.65	1.40	143	1	60.5	9/GR14	
CAN01606	−70.70	29	−61.30	49.55	2.40	1.65	148	1	60.4		
CHLCONT5	−106.20	29	−72.23	−35.57	2.60	0.80	55	1	59.6	9/GR17	
CHLPAC02	−106.20	29	−80.06	−30.06	1.36	0.80	69	1	59.4	9/GR17	
CLMAND01	−115.20	29	−74.72	5.93	3.85	1.63	114	1	65.3	9/GR5	10
CLM00001	−103.20	29	−74.50	5.87	3.98	1.96	118	1	63.9	10	
EQACAND1	−115.20	29	−78.40	−1.61	1.37	0.95	75	1	64.4	9/GR5	
EQAGAND1	−115.20	29	−90.34	−0.62	0.90	0.81	89	1	61.5	9/GR5	
HWA00002	−166.20	29	−165.79	23.42	4.20	0.80	160	1	59.0	9/GR1	10
HWA00003	−175.20	29	−166.10	23.42	4.25	0.80	159	1	58.9	9/GR2	10
JMC00002	−92.70	29	−77.30	18.12	0.80	0.80	90	2	60.1		
MEX01NTE	−78.20	29	−105.81	26.01	2.89	2.08	155	1	60.7	1	
MEX01SUR	−69.20	29	−94.84	19.82	3.05	2.09	4	1	62.5	1	
MEX02NTE	−136.20	29	−107.21	26.31	3.84	1.55	148	1	61.4	1	10
MEX02SUR	−127.20	29	−96.39	19.88	3.18	1.87	157	1	62.8	1	10
PAQPAC01	−106.20	29	−109.18	−27.53	0.80	0.80	90	1	56.4	9/GR17	
PRG00002	−99.20	29	−58.66	−23.32	1.45	1.04	76	1	60.4		
PRUAND02	−115.20	29	−74.69	−8.39	3.41	1.79	95	1	64.3	9/GR5	
PTRVIR01	−101.20	29	−65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20	
PTRVIR02	−110.20	29	−65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21	
SCN00001	−79.70	29	−62.46	17.44	0.80	0.80	90	1	58.6		
SPMFRAN3	−53.20	29	−67.24	47.51	3.16	0.80	7	1	60.6	2 7	
SURINAM2	−84.70	29	−55.69	4.35	1.00	0.80	86	1	63.5		
URG00001	−71.70	29	−56.22	−32.52	1.02	0.89	11	1	60.2		
USAEH001	−61.70	29	−85.19	36.21	5.63	3.33	22	1	62.1	1 5 6	
USAEH002	−101.20	29	−89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20	10
USAEH003	−110.20	29	−90.14	36.11	5.55	3.55	161	1	62.3	1 6 9/GR21	10
USAEH004	−119.20	29	−91.16	36.05	5.38	3.24	152	1	62.9	1 5 6	10
USAPSA02	−166.20	29	−117.80	40.58	4.03	0.82	135	1	63.5	9/GR1	
USAPSA03	−175.20	29	−118.27	40.12	3.62	0.80	136	1	65.3	9/GR2	
USAWH101	−148.20	29	−109.65	38.13	5.53	1.95	142	1	62.3	10	
USAWH102	−157.20	29	−111.41	38.57	5.51	1.54	138	1	63.5	10	
VENAND03	−115.20	29	−67.04	6.91	2.37	1.43	111	1	67.6	9/GR5	10

12 646.82 MHz (30)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	30	−149.63	58.52	3.81	1.23	171	2	59.9	9/GR1	10
ALS00003	−174.80	30	−150.95	58.54	3.77	1.11	167	2	60.2	9/GR2	10
ARGNORT4	−93.80	30	−63.96	−30.01	3.86	1.99	48	2	66.0		
ARGNORT5	−54.80	30	−62.85	−29.80	3.24	2.89	47	2	63.8		
ATNBEAM1	−52.80	30	−66.44	14.87	1.83	0.80	39	2	61.3		
B CE311	−63.80	30	−40.60	−6.07	3.04	2.06	174	2	61.9	8 9/GR7	
B CE312	−44.80	30	−40.26	−6.06	3.44	2.09	174	2	61.2	8 9/GR9	10 11
B CE411	−63.80	30	−50.97	−15.26	3.86	1.38	49	2	62.9	8 9/GR7	
B CE412	−44.80	30	−50.71	−15.30	3.57	1.56	52	2	63.0	8 9/GR9	10 12
B CE511	−63.80	30	−53.11	−2.98	2.42	2.15	107	2	63.4	8 9/GR7	
B NO611	−73.80	30	−59.60	−11.62	2.86	1.69	165	1	63.1	8 9/GR8	
B NO711	−73.80	30	−60.70	−1.78	3.54	1.78	126	1	63.1	8 9/GR8	
B NO811	−73.80	30	−68.75	−4.71	2.37	1.65	73	1	63.1	8 9/GR8	
B SE911	−101.80	30	−45.99	−19.09	2.22	0.80	62	2	65.7	8	
B SU111	−80.80	30	−51.10	−25.64	2.76	1.06	50	2	63.1	8 9/GR6	
B SU112	−44.80	30	−50.76	−25.62	2.47	1.48	56	2	62.6	8 9/GR9	11
B SU211	−80.80	30	−44.51	−16.94	3.22	1.37	60	2	62.8	8 9/GR6	
B SU212	−44.80	30	−43.99	−16.97	3.27	1.92	59	2	61.6	8 9/GR9	12
BLZ00001	−115.80	30	−88.68	17.27	0.80	0.80	90	2	59.2		
CAN01101	−137.80	30	−125.60	57.24	3.45	1.27	157	2	59.7	9/GR10	10
CAN01201	−137.80	30	−111.92	55.89	3.33	0.98	151	2	59.8	9/GR10	10
CAN01202	−72.30	30	−107.64	55.62	2.75	1.11	32	2	59.8		
CAN01203	−128.80	30	−111.43	55.56	3.07	1.15	151	2	59.7	9/GR12	10
CAN01303	−128.80	30	−102.39	57.12	3.54	0.92	154	2	60.3	9/GR12	10
CAN01304	−90.80	30	−99.00	57.33	1.96	1.73	1	2	60.0	9/GR13	
CAN01403	−128.80	30	−89.70	52.02	4.67	0.80	148	2	62.1	9/GR12	10
CAN01404	−90.80	30	−84.78	52.41	3.09	2.06	153	2	60.6	9/GR13	
CAN01405	−81.80	30	−84.02	52.34	2.82	2.30	172	2	60.5	9/GR14	
CAN01504	−90.80	30	−72.68	53.78	3.57	1.67	157	2	60.4	9/GR13	
CAN01505	−81.80	30	−71.76	53.76	3.30	1.89	162	2	60.3	9/GR14	
CAN01605	−81.80	30	−61.54	49.50	2.66	1.39	144	2	60.5	9/GR14	
CAN01606	−70.30	30	−61.32	49.51	2.41	1.65	148	2	60.4		
CHLCONT4	−105.80	30	−69.59	−23.20	2.21	0.80	68	2	59.3	9/GR16	
CHLCONT6	−105.80	30	−73.52	−55.52	3.65	1.31	39	2	59.7	9/GR16	
CRBBAH01	−92.30	30	−76.09	24.13	1.83	0.80	141	1	61.9	9/GR18	
CRBBER01	−92.30	30	−64.76	32.13	0.80	0.80	90	1	56.9	9/GR18	
CRBBLZ01	−92.30	30	−88.61	17.26	0.80	0.80	90	1	58.9	9/GR18	
CRBEC001	−92.30	30	−60.07	8.26	4.20	0.86	115	1	64.6	9/GR18	
CRBJMC01	−92.30	30	−79.45	17.97	0.99	0.80	151	1	61.3	9/GR18	
CTR00201	−130.80	30	−84.33	9.67	0.82	0.80	119	2	66.0		
DMAIFRB1	−79.30	30	−61.30	15.35	0.80	0.80	90	2	58.7		
EQAC0001	−94.80	30	−78.31	−1.52	1.48	1.15	65	1	63.3	9/GR19	
EQAG0001	−94.80	30	−90.36	−0.57	0.94	0.89	99	1	61.2	9/GR19	
HWA00002	−165.80	30	−165.79	23.32	4.20	0.80	160	2	59.0	9/GR1	10
HWA00003	−174.80	30	−166.10	23.42	4.25	0.80	159	2	59.0	9/GR2	10
MEX01NTE	−77.80	30	−105.80	25.99	2.88	2.07	155	2	60.7	1	
MEX02NTE	−135.80	30	−107.36	26.32	3.80	1.57	149	2	61.4	1	10
MEX02SUR	−126.80	30	−96.39	19.88	3.19	1.87	158	2	62.8	1	10
NCG00003	−107.30	30	−84.99	12.90	1.05	1.01	176	1	63.6		
PRU00004	−85.80	30	−74.19	−8.39	3.74	2.45	112	2	63.1		
PTRVIR01	−100.80	30	−65.85	18.12	0.80	0.80	90	2	60.8	1 6 9/GR20	
PTRVIR02	−109.80	30	−65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21	
USAEH001	−61.30	30	−85.16	36.21	5.63	3.32	22	2	62.1	1 5 6	
USAEH002	−100.80	30	−89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20	10
USAEH003	−109.80	30	−90.12	36.11	5.55	3.56	161	2	62.3	1 6 9/GR21	10
USAEH004	−118.80	30	−91.16	36.05	5.38	3.24	153	2	62.9	1 5 6	10
USAPSA02	−165.80	30	−117.79	40.58	4.04	0.82	135	2	63.5	9/GR1	
USAPSA03	−174.80	30	−118.20	40.15	3.63	0.80	136	2	65.3	9/GR2	
USAWH101	−147.80	30	−109.70	38.13	5.52	1.96	142	2	62.3	10	
USAWH102	−156.80	30	−111.40	38.57	5.51	1.55	138	2	63.5	10	
VEN11VEN	−103.80	30	−66.79	6.90	2.50	1.77	122	2	65.5	10	

12 661.40 MHz (31)

1	2	3	4		5		6	7	8	9	
ALS00002	−166.20	31	−149.66	58.37	3.76	1.24	170	1	60.0	9/GR1	10
ALS00003	−175.20	31	−150.98	58.53	3.77	1.11	167	1	60.2	9/GR2	10
ARGINSU4	−94.20	31	−52.98	−59.81	3.40	0.80	19	1	60.1	9/GR3	
ARGINSU5	−55.20	31	−44.17	−59.91	3.77	0.80	13	1	59.5	9/GR4	
ARGSUR04	−94.20	31	−65.04	−43.33	3.32	1.50	40	1	60.9	9/GR3	
ARGSUR05	−55.20	31	−63.68	−43.01	2.54	2.38	152	1	60.3	9/GR4	
B CE311	−64.20	31	−40.60	−6.07	3.04	2.06	174	1	61.9	8 9/GR7	
B CE312	−45.20	31	−40.27	−6.06	3.44	2.09	174	1	61.3	8 9/GR9	10 11
B CE411	−64.20	31	−50.97	−15.27	3.86	1.38	49	1	62.9	8 9/GR7	
B CE412	−45.20	31	−50.71	−15.30	3.57	1.56	52	1	63.1	8 9/GR9	10 12
B CE511	−64.20	31	−53.10	−2.90	2.44	2.13	104	1	63.4	8 9/GR7	
B NO611	−74.20	31	−59.60	−11.62	2.85	1.69	165	2	63.2	8 9/GR8	
B NO711	−74.20	31	−60.70	−1.78	3.54	1.78	126	2	63.2	8 9/GR8	
B NO811	−74.20	31	−68.76	−4.71	2.37	1.65	73	2	63.1	8 9/GR8	
B SU111	−81.20	31	−51.12	−25.63	2.76	1.05	50	1	63.2	8 9/GR6	
B SU112	−45.20	31	−50.75	−25.62	2.47	1.48	56	1	62.6	8 9/GR9	11
B SU211	−81.20	31	−44.51	−16.95	3.22	1.36	60	1	62.8	8 9/GR6	
B SU212	−45.20	31	−44.00	−16.87	3.20	1.96	58	1	61.6	8 9/GR9	12
BERBERMU	−96.20	31	−64.77	32.32	0.80	0.80	90	2	57.0		
BOLAND01	−115.20	31	−65.04	−16.76	2.49	1.27	76	1	68.1	9/GR5	
BOL00001	−87.20	31	−64.61	−16.71	2.52	2.19	85	1	64.2		
BRB00001	−92.70	31	−59.85	12.93	0.80	0.80	90	2	59.4		
CAN01101	−138.20	31	−125.63	57.24	3.45	1.27	157	1	59.7	9/GR10	10
CAN01201	−138.20	31	−112.04	55.95	3.35	0.97	151	1	59.8	9/GR10	10
CAN01202	−72.70	31	−107.70	55.63	2.74	1.12	32	1	59.8		
CAN01203	−129.20	31	−111.48	55.61	3.08	1.15	151	1	59.7	9/GR12	10
CAN01303	−129.20	31	−102.42	57.12	3.54	0.91	154	1	60.3	9/GR12	10
CAN01304	−91.20	31	−99.12	57.36	1.98	1.72	2	1	60.1	9/GR13	
CAN01403	−129.20	31	−89.75	52.02	4.68	0.80	148	1	62.1	9/GR12	10
CAN01404	−91.20	31	−84.82	52.42	3.10	2.05	152	1	60.6	9/GR13	
CAN01405	−82.20	31	−84.00	52.39	2.84	2.29	172	1	60.5	9/GR14	
CAN01504	−91.20	31	−72.66	53.77	3.57	1.67	156	1	60.4	9/GR13	
CAN01505	−82.20	31	−71.77	53.79	3.30	1.89	162	1	60.4	9/GR14	
CAN01605	−82.20	31	−61.50	49.55	2.65	1.40	143	1	60.5	9/GR14	
CAN01606	−70.70	31	−61.30	49.55	2.40	1.65	148	1	60.5		
CHLCONT5	−106.20	31	−72.23	−35.57	2.60	0.80	55	1	59.6	9/GR17	
CHLPAC02	−106.20	31	−80.06	−30.06	1.36	0.80	69	1	59.4	9/GR17	
CLMAND01	−115.20	31	−74.72	5.93	3.85	1.63	114	1	65.4	9/GR5	10
CLM00001	−103.20	31	−74.50	5.87	3.98	1.96	118	1	63.9	10	
CUB00001	−89.20	31	−79.81	21.62	2.24	0.80	168	1	61.3		
EQACAND1	−115.20	31	−78.40	−1.61	1.37	0.95	75	1	64.4	9/GR5	
EQAGAND1	−115.20	31	−90.34	−0.62	0.90	0.81	89	1	61.6	9/GR5	
GRD00059	−57.20	31	−61.58	12.29	0.80	0.80	90	1	58.7		
GRLDNK01	−53.20	31	−44.89	66.56	2.70	0.82	173	1	60.2	2	
GUY00201	−84.70	31	−59.19	4.78	1.44	0.85	95	1	63.8		
HWA00002	−166.20	31	−165.79	23.42	4.20	0.80	160	1	59.0	9/GR1	10
HWA00003	−175.20	31	−166.10	23.42	4.25	0.80	159	1	59.0	9/GR2	10
MEX01NTE	−78.20	31	−105.81	26.01	2.89	2.08	155	1	60.8	1	
MEX01SUR	−69.20	31	−94.84	19.82	3.05	2.09	4	1	62.5	1	
MEX02NTE	−136.20	31	−107.21	26.31	3.84	1.55	148	1	61.5	1	10
MEX02SUR	−127.20	31	−96.39	19.88	3.18	1.87	157	1	62.8	1	10
MSR00001	−79.70	31	−61.73	16.75	0.80	0.80	90	1	58.9	4	
PAQPAC01	−106.20	31	−109.18	−27.53	0.80	0.80	90	1	56.4	9/GR17	
PRG00002	−99.20	31	−58.66	−23.32	1.45	1.04	76	1	60.5		
PRUAND02	−115.20	31	−74.69	−8.39	3.41	1.79	95	1	64.3	9/GR5	
PTRVIR01	−101.20	31	−65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20	
PTRVIR02	−110.20	31	−65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21	
URG00001	−71.70	31	−56.22	−32.52	1.02	0.89	11	1	60.2		
USAEH001	−61.70	31	−85.19	36.21	5.63	3.33	22	1	62.1	1 5 6	
USAEH002	−101.20	31	−89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20	10
USAEH003	−110.20	31	−90.14	36.11	5.55	3.55	161	1	62.4	1 6 9/GR21	10
USAEH004	−119.20	31	−91.16	36.05	5.38	3.24	152	1	62.9	1 5 6	10
USAPSA02	−166.20	31	−117.80	40.58	4.03	0.82	135	1	63.6	9/GR1	
USAPSA03	−175.20	31	−118.27	40.12	3.62	0.80	136	1	65.4	9/GR2	
USAWH101	−148.20	31	−109.65	38.13	5.53	1.95	142	1	62.4	10	
USAWH102	−157.20	31	−111.41	38.57	5.51	1.54	138	1	63.5	10	
VENAND03	−115.20	31	−67.04	6.91	2.37	1.43	111	1	67.7	9/GR5	10

12 675.98 MHz (32)

1	2	3	4		5		6	7	8	9	
ALS00002	−165.80	32	−149.63	58.52	3.81	1.23	171	2	59.9	9/GR1	10
ALS00003	−174.80	32	−150.95	58.54	3.77	1.11	167	2	60.2	9/GR2	10
ARGNORT4	−93.80	32	−63.96	−30.01	3.86	1.99	48	2	66.1		
ARGNORT5	−54.80	32	−62.85	−29.80	3.24	2.89	47	2	63.9		
B CE311	−63.80	32	−40.60	−6.07	3.04	2.06	174	2	61.9	8 9/GR7	
B CE312	−44.80	32	−40.26	−6.06	3.44	2.09	174	2	61.3	8 9/GR9	10 11
B CE411	−63.80	32	−50.97	−15.26	3.86	1.38	49	2	62.9	8 9/GR7	
B CE412	−44.80	32	−50.71	−15.30	3.57	1.56	52	2	63.1	8 9/GR9	10 12
B CE511	−63.80	32	−53.11	−2.98	2.42	2.15	107	2	63.4	8 9/GR7	
B NO611	−73.80	32	−59.60	−11.62	2.86	1.69	165	1	63.2	8 9/GR8	
B NO711	−73.80	32	−60.70	−1.78	3.54	1.78	126	1	63.2	8 9/GR8	
B NO811	−73.80	32	−68.75	−4.71	2.37	1.65	73	1	63.2	8 9/GR8	
B SE911	−101.80	32	−45.99	−19.09	2.22	0.80	62	2	65.7	8	
B SU111	−80.80	32	−51.10	−25.64	2.76	1.06	50	2	63.2	8 9/GR6	
B SU112	−44.80	32	−50.76	−25.62	2.47	1.48	56	2	62.6	8 9/GR9	11
B SU211	−80.80	32	−44.51	−16.94	3.22	1.37	60	2	62.8	8 9/GR6	
B SU212	−44.80	32	−43.99	−16.97	3.27	1.92	59	2	61.6	8 9/GR9	12
CAN01101	−137.80	32	−125.60	57.24	3.45	1.27	157	2	59.7	9/GR10	10
CAN01201	−137.80	32	−111.92	55.89	3.33	0.98	151	2	59.8	9/GR10	10
CAN01202	−72.30	32	−107.64	55.62	2.75	1.11	32	2	59.8		
CAN01203	−128.80	32	−111.43	55.56	3.07	1.15	151	2	59.7	9/GR12	10
CAN01303	−128.80	32	−102.39	57.12	3.54	0.92	154	2	60.3	9/GR12	10
CAN01304	−90.80	32	−99.00	57.33	1.96	1.73	1	2	60.0	9/GR13	
CAN01403	−128.80	32	−89.70	52.02	4.67	0.80	148	2	62.1	9/GR12	10
CAN01404	−90.80	32	−84.78	52.41	3.09	2.06	153	2	60.6	9/GR13	
CAN01405	−81.80	32	−84.02	52.34	2.82	2.30	172	2	60.5	9/GR14	
CAN01504	−90.80	32	−72.68	53.78	3.57	1.67	157	2	60.4	9/GR13	
CAN01505	−81.80	32	−71.76	53.76	3.30	1.89	162	2	60.4	9/GR14	
CAN01605	−81.80	32	−61.54	49.50	2.66	1.39	144	2	60.5	9/GR14	
CAN01606	−70.30	32	−61.32	49.51	2.41	1.65	148	2	60.5		
CHLCONT4	−105.80	32	−69.59	−23.20	2.21	0.80	68	2	59.3	9/GR16	
CHLCONT6	−105.80	32	−73.52	−55.52	3.65	1.31	39	2	59.8	9/GR16	
CRBBAH01	−92.30	32	−76.09	24.13	1.83	0.80	141	1	62.0	9/GR18	
CRBBER01	−92.30	32	−64.76	32.13	0.80	0.80	90	1	57.0	9/GR18	
CRBBLZ01	−92.30	32	−88.61	17.26	0.80	0.80	90	1	58.9	9/GR18	
CRBEC001	−92.30	32	−60.07	8.26	4.20	0.86	115	1	64.6	9/GR18	
CRBJMC01	−92.30	32	−79.45	17.97	0.99	0.80	151	1	61.4	9/GR18	
EQAC0001	−94.80	32	−78.31	−1.52	1.48	1.15	65	1	63.3	9/GR19	
EQAG0001	−94.80	32	−90.36	−0.57	0.94	0.89	99	1	61.3	9/GR19	
GRD00003	−79.30	32	−61.62	12.34	0.80	0.80	90	2	58.9		
GTMIFRB2	−107.30	32	−90.50	15.64	1.03	0.80	84	1	61.4		
GUFMGG02	−52.80	32	−56.42	8.47	4.16	0.81	123	2	63.0	2 7	
HWA00002	−165.80	32	−165.79	23.32	4.20	0.80	160	2	59.0	9/GR1	10
HWA00003	−174.80	32	−166.10	23.42	4.25	0.80	159	2	59.0	9/GR2	10
MEX01NTE	−77.80	32	−105.80	25.99	2.88	2.07	155	2	60.8	1	
MEX02NTE	−135.80	32	−107.36	26.32	3.80	1.57	149	2	61.5	1	10
MEX02SUR	−126.80	32	−96.39	19.88	3.19	1.87	158	2	62.8	1	10
PNRIFRB2	−121.00	32	−80.15	8.46	1.01	0.80	170	1	65.1		
PRU00004	−85.80	32	−74.19	−8.39	3.74	2.45	112	2	63.2		
PTRVIR01	−100.80	32	−65.85	18.12	0.80	0.80	90	2	60.9	1 6 9/GR20	
PTRVIR02	−109.80	32	−65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21	
USAEH001	−61.30	32	−85.16	36.21	5.63	3.32	22	2	62.1	1 5 6	
USAEH002	−100.80	32	−89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20	10
USAEH003	−109.80	32	−90.12	36.11	5.55	3.56	161	2	62.4	1 6 9/GR21	10
USAEH004	−118.80	32	−91.16	36.05	5.38	3.24	153	2	62.9	1 5 6	10
USAPSA02	−165.80	32	−117.79	40.58	4.04	0.82	135	2	63.6	9/GR1	
USAPSA03	−174.80	32	−118.20	40.15	3.63	0.80	136	2	65.3	9/GR2	
USAWH101	−147.80	32	−109.70	38.13	5.52	1.96	142	2	62.4	10	
USAWH102	−156.80	32	−111.40	38.57	5.51	1.55	138	2	63.5	10	
VEN02VEN	−103.80	32	−63.50	15.50	0.80	0.80	90	2	60.1	9/GR22	
VEN11VEN	−103.80	32	−66.79	6.90	2.50	1.77	122	2	65.6	9/GR22	10

ARTICLE 11

Plan for the broadcasting-satellite service in the frequency bands 11.7-12.2 GHz in Region 3 and 11.7-12.5 GHz in Region 1

11.1 COLUMN HEADINGS OF THE PLAN

Col. 1 *Notifying administration symbol*.

Col. 2 *Beam identification* (Column 2, normally, contains the symbol designating the country or the geographical area taken from Table B1 of the Preface to the International Frequency List, followed by the symbol designating the service area).

Col. 3 *Nominal orbital position*, in degrees and hundredths of a degree from the Greenwich meridian (negative values indicate longitudes which are west of the Greenwich meridian; positive values indicate longitudes which are east of the Greenwich meridian).

Col. 4 *Channel number*.

Col. 5 *Nominal intersection of the beam axis with the Earth* (boresight or aim point in the case of a non-elliptical beam), longitude and latitude, in degrees and hundredths of a degree.

Col. 6 *Space station transmitting antenna characteristics* (elliptical beams). This column contains three numerical values corresponding to the major axis, the minor axis and the major axis orientation respectively of the elliptical cross-section half-power beamwidth, in degrees and hundredths of a degree. Orientation of the ellipse is determined as follows: in a plane normal to the beam axis, the direction of a major axis of the ellipse is specified as the angle measured anticlockwise from a line parallel to the equatorial plane to the major axis of the ellipse, to the nearest degree.

Col. 7 *Space station transmitting antenna pattern code*.

The codes used for the antenna pattern of the transmitting space station (downlink) antenna are defined as follows:

R13TSS	Figure 9 and § 3.13.3 in Annex 5
R123FR	Figure 11 and § 3.13.3 in Annex 5
RAD_TSS	RADIOSAT-3 antenna pattern (antenna pattern data supplied by the administration of France)

In cases where the “Space station transmitting antenna pattern” field is blank, the necessary antenna pattern data are provided by shaped beam data submitted by the administration. These data are stored in Column 8. A particular shaped beam is

identified by the combination of Column 1, Column 8 and Column 14. In such cases the maximum cross-polar gain is given in the “Cross-polar gain” field.

Col. 8 *Space station transmitting antenna shaped (non-elliptical) beam identification*.

Col. 9 *Maximum space station transmitting antenna co-polar and cross-polar (in the case of shaped beam) isotropic gain*, in dBi.

Col. 10 *Earth station receiving antenna pattern code*.

The codes used for receiving earth station (downlink) antenna patterns are defined as follows:

R13RES	Figure 7 and § 3.7.2 in Annex 5
MODRES	Recommendation ITU-R BO.1213

Col. 11 *Polarization* (CL – circular left, CR – circular right, LE – linear referenced to the equatorial plane) and polarization angle in degrees and hundredths of a degree (in the case of linear polarization only).

Col. 12 *e.i.r.p.* in the direction of maximum radiation, in dBW.

Col. 13 *Designation of emission*.

Col. 14 *Identity of the space station*.

Col. 15 *Group code* (An identification code which indicates that all assignments with the same group identification code will be treated as a group)

Group code: If an assignment is part of the group:

a) The equivalent protection margin to be used for the application of Article 4 of this Appendix shall be calculated on the following basis:

– for the calculation of interference to assignments that are part of a group, only the interference contributions from assignments that are not part of the same group are to be included; and

– for the calculation of interference from assignments belonging to a group of assignments that are not part of that same group, only the worst interference contribution from that group shall be used on a test point to test point basis.

b) If an administration notifies the same frequency in more than one beam of a group for use at the same time, the aggregate carrier-to-interference ratio (*C/I*) produced by all emissions from that group shall not exceed the *C/I* ratio calculated on the basis of § *a)* above.

Col. 16 *Assignment status*.

The assignment status codes used for beams are defined as follows:

P	Assignment in the Plan for which § 4.3.5 (in terms of 8 years lapsing period) of this Appendix does not apply
PE	Assignment in the Plan for which § 4.3.5 (in terms of 8 years lapsing period) of this Appendix does not apply. These assignments have been notified and brought into use and the date of bringing into use has been confirmed to the Bureau. For this category of assignments, the parameters in force before WRC-97 are applied
A	Assignment in the Plan for which § 4.3.5 (in terms of 8 years lapsing period) of this Appendix applies
AE	Assignment in the Plan for which § 4.3.5 (in terms of 8 years lapsing period) of this Appendix applies. These assignments have been notified and brought into use and the date of bringing into use has been confirmed to the Bureau. For this category of assignments, the parameters in force before WRC-97 are applied

Col. 17 *Remarks*.

11.2 TEXT FOR NOTES IN REMARKS COLUMN OF THE PLAN

1 To be dedicated to the Islamic programme envisaged in WARC SAT-77 documents.

2 This assignment results from a common requirement of the administrations of Denmark and Iceland. The service area includes the Faroe Islands and Iceland. The assignment may, after consultations between the two administrations, be used by either of them.

3 Provisional beam. This assignment has been included in the Plan by WRC-97. This assignment is for exclusive use by Palestine, subject to the Israeli-Palestinian Interim Agreement of 28 September 1995, Resolution 741 of the Council notwithstanding.

4 Assignment intended to ensure coverage of Algeria, Libya, Morocco, Mauritania and Tunisia, with the agreement of the countries concerned. If required, it may be used with the characteristics of the beam TUN15000.

5 This assignment shall be brought into use only when the limits given in Table 1 are not exceeded or with the agreement of the affected administrations identified in Table 2 with respect to:

a) assignments in the Region 2 Plan on 27 October 1997; or

b) assignments in the terrestrial services which are recorded in the Master Register with a favourable finding or received by the Bureau prior to 27 October 1997 for recording in the Master Register and which subsequently receive a favourable finding based on the Plan as it existed on 27 October 1997; or

c) assignments in the fixed-satellite service which: are recorded in the Master Register with a favourable finding; or those which have been coordinated under the provisions of No. **1060** or § 7.2.1 of Appendix **S30**; or those that are in process of coordination under the provisions of No. **1060** or § 7.2.1 of Appendix **S30** prior to 27 October 1997.

These administrations shall be informed by the notifying administration of changes in characteristics before these beams are brought into use.

6 This assignment shall not claim protection from the assignments of the administrations indicated in Table 3 which are in conformity with the Region 2 Plan on 27 October 1997.

7 This assignment shall not claim protection from the assignments of the administration indicated in Table 3 which are recorded in the Master Register with a favourable finding prior to 27 October 1997 to which No. **S5.487**/**838** and No. **S5.43**/**435** do not apply.

8 Pending clarification of bringing into service of the satellite network.

TABLE 1

Symbol	**Criteria**
a	§ 3 of Annex 1*
b	§ 4, 5 *a)* and 5 *b)* of Annex 1*
c	§ 6 of Annex 1*

* These paragraphs and this Annex are contained in the Radio Regulations in force at the time of WRC-97.

TABLE 2

Beam name	**Channels**	**Ref. Table 1**	**Affected administrations***
ARM06400	24	b	AZE GEO IRN RUS TUR
	28, 32, 36, 40	b	AZE GEO IRN TUR
	28, 32, 36, 40	c	CHN INS J PAK SNG THA TON UAE
AZE06400	4, 8, 12, 16, 20	b	ARM GEO IRN RUS TUR
AZR13400	33, 37	a	G
	21	c	CAN E MLA USA VEN/ASA
BHR2550A	23	b	QAT UAE
BIH14800	2, 6, 10, 14, 18	b	ALB AUT CZE GRC HNG HRV I ROU SVK SVN YUG

* Administrations whose assignment(s) may receive interference from the beam shown in the left-hand column.

TABLE 2 (*continued*)

Beam name	Channels	Ref. Table 1	Affected administrations*
BLR06200	1, 5, 9, 13, 17	b	LTU LVA MDA RUS SVK UKR
BRU3300A	16, 18	b	INS MLA
BTN03100	5, 9, 13	b	BGD IND NPL
	17	b	BGD CHN IND
CHN19000	1, 5, 9, 13	b	POR/MAC
COM2070A	19	b	F/MYT
CPV30100	24	c	MLA
CZE14400	23, 27, 31, 35, 39	b	AUT BIH D DNK HNG HRV I POL SVK SVN
	27, 31, 35, 39	c	UAE
ERI09200	23, 27, 31, 35, 39	b	ARS DJI ETH SDN SOM YEM
	27	c	INS J MLA PAK SNG TON UAE
	31, 35, 39	c	CHN INS J KOR MLA PAK SNG THA TON UAE USA
EST06100	1, 5, 9, 13, 17	c	FIN LTU LVA NOR RUS S
	1, 5, 9, 13	c	USA/IT
FJI1930A	13	b	F/WAL
FSM00000	3, 7, 11, 15	b	KIR MHL F/OCE PLW
	19	b	KIR MHL NRU F/OCE PLW
	3, 7, 11, 15, 19	c	ARG J MHL MLA USA/IT USA VEN/ASA
G UKDBS	30, 34, 38	a	GUY JMC
	22	b	BLR EST LTU LVA POL RUS
	26, 30, 34, 38	b	BLR EST LTU LVA POL
	22	c	CAN USA
GEO06400	22	b	ARM AZE IRN RUS TUR
	26, 30, 34, 38	b	ARM AZE IRN TUR
	26	c	J MLA PAK SNG TON UAE
	30, 34, 38	c	CHN INS J KOR MLA PAK PNG SNG THA TON UAE USA
HISPASA2	1, 2, 5, 7, 9, 11, 13, 15, 17, 19	b	KAZ
HRV14800	1, 5, 9, 13, 17	b	ALB AUT BIH BUL CZE D GRC HNG I MKD ROU SUI SVK SVN YUG
ISL04900	29	a	JMC
	33, 37	a	GUY JMC
ISR1100A	21	b	ARS AZE EGY IRN IRQ JOR LBN SYR TKM

TABLE 2 (*continued*)

Beam name	Channels	Ref. Table 1	Affected administrations*
KGZ07000	26, 30, 34, 38	b	AFG CHN KAZ MNG RUS TJK TKM UZB
	26	c	INS J MLA PAK SNG TON UAE
	30, 34, 38	c	CHN INS J KOR MLA PAK PNG SNG THA TON UAE USA
KIR00001	3, 7, 11	b	USA/HWL MHL NZL/TKL TUV
	3, 7, 11	c	ARG J MHL MLA USA/IT USA VEN/ASA
KIR00002	15, 19, 23	b	USA/JAR F/OCE USA/PLM
	15, 19, 23	c	ARG CAN J MHL MLA USA USA/IT VEN/ASA
LBR2440A	19	b	CTI GUI SRL
	19	c	ARG USA
LVA06100	21	b	BLR EST FIN LTU NOR POL RUS
	25, 29, 33, 37	b	BLR EST FIN LTU NOR POL
	29, 33, 37	c	UAE
MDA06300	4, 8, 12, 16, 20	b	ROU UKR
MKD14800	2, 6, 10, 14, 18	b	ALB BUL GRC HRV ROU YUG
MLA2280A	10	b	BRU INS PHL
MLT1470A	20	b	I TUN
NMB0250A	21	b	AGL BOT F/CRO LSO MAU MDG MOZ F/REU SWZ ZMB ZWE
	21	c	ARG E MEX MLA USA VEN/ASA
NPL1220A	23	b	BGD BTN CHN IND
POR13300	21, 25, 29, 33, 37	b	E
ROU13600	3, 7, 11, 15, 19	b	ALB BIH BLR BUL CZE HNG HRV MDA MKD POL TUR YUG
	3, 7, 11	c	USA/IT
RUS00400	25	b	CHN J KRE
	27, 31, 35, 39	b	J KRE
	25	c	G J MLA PAK SNG TON
	27	c	CHN G INS J PNG SNG THA TON
	31, 35	c	CHN G INS J KOR LAO PNG SNG THA TON USA
	39	c	CHN G INS J KOR LAO PNG SNG THA TON
SLM00000	1, 5, 9, 13	c	USA/IT
SVN14800	4, 8, 12, 16, 20	b	BIH CZE D HNG HRV I SMR SVK YUG
TJK06900	1, 5, 9, 13, 17	b	AFG CHN KAZ KGZ PAK TKM UZB

TABLE 2 (*end*)

Beam name	Channels	Ref. Table 1	Affected administrations*
TKM06800	23	b	AFG AZE GEO IRN KAZ KGZ RUS TJK UZB
	27, 31, 35, 39	b	AFG AZE GEO IRN KAZ KGZ TJK UZB
	27	c	INS J MLA PAK PNG SNG TON UAE
	31, 35, 39	c	CHN INS J KOR MLA PAK PNG SNG THA TON UAE USA
UKR06300	3, 7, 11, 15, 19	b	AUT BLR BUL CZE DNK/FRO GEO HNG HRV ISL LVA MDA NOR POL RUS TUR YUG
UZB07100	3, 7, 11, 15, 19	b	AFG CHN KAZ KGZ PAK TJK TKM
YYY00001	1, 5, 9, 13, 17	b	ARS EGY ISR JOR LBN SYR

TABLE 3

Beam name	Channels	Affecting administrations*
ARM06400	28, 32, 36, 40	PAK
AUS0040A	3, 7, 11	USA/IT
AUS0040B	3, 7, 11	USA/IT
AUS0040C	3, 7, 11	USA/IT
AUS0070A	15, 19, 23	J
	3, 7, 11	J USA/IT
AUS0090A	1, 5, 9, 13	J USA/IT
	17, 21	J
AUS0090B	1, 5, 9, 13	J USA/IT
	17, 21	J
AZE06400	4, 8, 12	USA/IT
AZR13400	21, 25	E
BFA10700	21, 25	E
BIH14800	2, 6, 10	USA/IT
BLR06200	1, 5, 9	USA/IT
BTN03100	5, 9	USA/IT
CPV30100	24	E USA/IT
CTI23700	22	E
D 08700	2, 6, 10	USA/IT
EST06100	1, 5, 9	USA/IT
FJI1930A	13	USA/IT

* Administrations whose assignment(s) may cause interference to the beam shown in the left-hand column.

TABLE 3 (*continued*)

Beam name	Channels	Affecting administrations*
FSM00000	11	J MHL USA/IT
	3, 7, 15, 19	J MHL
G 02700	4, 8, 12, 16, 20	USA/IT
G UKDBS	22, 26	USA/IT
	30, 34, 38	GUY JMC
GEO06400	26, 30, 34, 38	PAK
GNB30400	14, 18	E USA/IT
	2, 6, 10	USA/IT
HISPASA2	1, 3, 5, 7, 9, 11, 13	USA/IT
HRV14800	1, 5, 9	USA/IT
IRL21100	2, 6, 10, 14, 18	USA/IT
ISL04900	21, 25	USA/IT
	29	JMC
	33, 37	GUY JMC
ISR1100A	21	USA
KAZ06600	28, 32, 36, 40	THA UAE
KGZ07000	26	UAE
	30, 34, 38	THA UAE
KIR00001	3, 7, 11	USA/IT
LBR24400	3, 7, 11, 15	USA/IT
LBR2440A	19	USA/IT
LTU06100	3, 7, 11	USA/IT
MDA06300	4, 8, 12	USA/IT
MHL00000	10	J USA/IT
	2, 6, 14, 18	J
MKD14800	2, 6, 10	USA/IT
MLA2280A	10	USA/IT
MLD3060A	4, 8	USA/IT
MLT1470A	20	USA
PLW00000	4, 16, 20	J MHL
	8, 12	J MHL USA/IT
POR13300	21, 25	E
ROU13600	3, 7, 11	USA/IT
RUS00400	25	J
	27	CHN J SNG
	31, 35	CHN G J SNG
	39	CHN G J

TABLE 3 (*end*)

Beam name	Channels	Affecting administrations*
SLM00000	1, 5	J MHL
	9, 13	J MHL USA/IT
SRL25900	23	USA/IT
	27	GUY
	31, 35	GUY JMC
	39	JMC
SVN14800	4, 8, 12	USA/IT
TJK06900	1, 5, 9	USA/IT
TUV00000	2, 6, 10	USA/IT
UKR06300	3, 7, 11	USA/IT
UZB07100	3, 7, 11	USA/IT
VTN32500	3, 7, 11	USA/IT
YEM26600	2, 6, 10	USA/IT
YEM26700	1, 5, 9, 13	USA/IT
YYY00001	1, 5, 9, 13	USA/IT

11.3 TABLE SHOWING CORRESPONDENCE BETWEEN CHANNEL NUMBERS AND ASSIGNED FREQUENCIES

Channel No.	Assigned frequency (MHz)	Channel No.	Assigned frequency (MHz)
1	11 727.48	21	12 111.08
2	11 746.66	22	12 130.26
3	11 765.84	23	12 149.44
4	11 785.02	24	12 168.62
5	11 804.20	25	12 187.80
6	11 823.38	26	12 206.98
7	11 842.56	27	12 226.16
8	11 861.74	28	12 245.34
9	11 880.92	29	12 264.52
10	11 900.10	30	12 283.70
11	11 919.28	31	12 302.88
12	11 938.46	32	12 322.06
13	11 957.64	33	12 341.24
14	11 976.82	34	12 360.42
15	11 996.00	35	12 379.60
16	12 015.18	36	12 398.78
17	12 034.36	37	12 417.96
18	12 053.54	38	12 437.14
19	12 072.72	39	12 456.32
20	12 091.90	40	12 475.50

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
AFG	AFG24600	50.00	1	64.50	33.10	1.44	1.40	21.00	R13TSS		41.40		MODRES	CR		58.40	27M0F8W			P	
AUS	AUS00900	164.00	1	147.50	–32.10	2.31	1.43	187.00	R13TSS		39.25		MODRES	CR		59.25	27M0F8W		78	P	
AUS	AUS0090A	164.00	1	159.06	–31.52	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
AUS	AUS0090B	164.00	1	167.93	–29.02	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
BLR	BLR06200	38.00	1	27.91	53.06	1.21	0.60	11.47	R13TSS		45.83		MODRES	CL		58.93	27M0F8W			P	5, 7
CHN	CHN15500	62.00	1	88.30	31.50	3.38	1.45	162.00	R13TSS		37.54		MODRES	CL		57.94	27M0F8W			P	
CHN	CHN16200	92.00	1	115.90	21.00	2.74	2.42	23.00	R13TSS		36.23		MODRES	CL		58.93	27M0F8W			P	
CHN	CHN16300	79.80	1	116.00	39.20	1.20	0.80	132.00	R13TSS		44.62		MODRES	CR		59.42	27M0F8W			P	
CHN	CHN19000	122.00	1	114.17	23.32	0.91	0.60	2.88	R13TSS		47.08		MODRES	CR		58.88	27M0F8W			P	5
CME	CME30000	–13.00	1	12.70	6.20	2.54	1.68	87.00	R13TSS		38.15		MODRES	CR		58.45	27M0F8W			P	
E	HISPASA2	–30.00	1	–8.80	35.40	3.00	1.90	45.00	R13TSS		36.90		MODRES	CL		59.00	27M0F8W	HISPASAT-2		A	5, 7
EST	EST06100	23.00	1	25.01	58.47	0.72	0.60	9.93	R13TSS		48.09		MODRES	CL		58.89	27M0F8W			P	5, 7
F	F 09300	–19.00	1	2.60	45.90	2.50	0.98	160.00	R13TSS		40.56		R13RES	CR		63.76	27M0F8W		19	PE	
F	F 09306	–7.00	1	2.60	45.90	2.50	0.98	160.00	R13TSS		41.00		MODRES	CR		58.90	27M0F8W	RADIOSAT	19	A	
F	F3_A2751	–7.00	1	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3351	–7.00	1	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2751	–7.00	1	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3351	–7.00	1	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	1	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	1	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	1	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	1	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	1	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	1	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	1	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FJI	FJI19300	152.00	1	179.40	–17.90	1.04	0.98	67.00	R13TSS		44.36		MODRES	CR		58.66	27M0F8W			P	
GUI	GUI19200	–37.00	1	–11.00	10.20	1.58	1.04	147.00	R13TSS		42.29		MODRES	CL		58.39	27M0F8W			P	
HRV	HRV14800	34.00	1	16.74	44.54	0.88	0.69	5.30	R13TSS		46.57		MODRES	CL		58.87	27M0F8W			P	5, 7
IND	IND03900	56.00	1	72.70	11.20	1.26	0.60	107.00	R13TSS		45.66		MODRES	CR		58.06	27M0F8W			P	
IND	IND04401	68.00	1	79.50	22.30	2.19	1.42	146.00	R13TSS		39.52		MODRES	CR		58.32	27M0F8W			P	
INS	INS03500	104.00	1	124.30	–3.20	3.34	1.94	82.00	R13TSS		36.33		MODRES	CR		58.23	27M0F8W			P	
J	000BS-3N	109.85	1	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		63.20	27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	1	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		63.20	27M0F8W		33	PE	
LBY	LBY28000	–25.00	1	21.40	26.00	2.50	1.04	119.00	R13TSS		40.30		MODRES	CL		58.50	27M0F8W			P	
MDG	MDG23600	29.00	1	46.60	–18.80	2.72	1.14	65.00	R13TSS		39.53		MODRES	CL		58.33	27M0F8W			P	
NZL	NZL05500	158.00	1	172.30	–39.70	2.88	1.56	47.00	R13TSS		37.92		MODRES	CR		58.32	27M0F8W			P	
POL	POL13200	–1.00	1	19.30	51.80	1.46	0.64	162.00	R13TSS		44.74		MODRES	CL		59.14	27M0F8W			P	
QAT	QAT24700	17.00	1	51.10	25.30	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		56.78	27M0F8W			P	
SLM	SLM00000	146.00	1	159.32	–8.40	1.50	1.18	140.48	R13TSS		41.98		MODRES	CL		58.88	27M0F8W			P	5, 7

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
SMR	SMR31100	–37.00	1	12.60	43.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.38	27M0F8W			P	
SWZ	SWZ31300	–1.00	1	31.50	–26.50	0.62	0.60	66.00	R13TSS		48.74		MODRES	CR		57.84	27M0F8W			P	
THA	THA14200	74.00	1	100.70	13.20	2.82	1.54	106.00	R13TSS		38.07		MODRES	CL		58.57	27M0F8W			P	
TJK	TJK06900	44.00	1	71.14	38.37	1.25	0.76	159.15	R13TSS		44.65		MODRES	CL		58.85	27M0F8W			P	5, 7
TUR	TUR14500	5.00	1	34.40	38.90	2.68	1.04	168.00	R13TSS		40.00		MODRES	CR		58.70	27M0F8W			P	
USA	PLM33700	170.00	1	–161.40	7.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.38	27M0F8W		9	P	
USA	PLM33701	170.00	1	–161.40	7.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.38	27M0F8W		9	P	
USA	SMA33500	170.00	1	–170.10	–14.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.08	27M0F8W		13	P	
USA	SMA33501	170.00	1	–170.10	–14.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.08	27M0F8W		13	P	
USA	WAK33400	140.00	1	166.50	19.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.58	27M0F8W		11	P	
USA	WAK33401	140.00	1	166.50	19.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.58	27M0F8W		11	P	
YEM	YEM26700	11.00	1	48.61	14.42	1.68	1.44	157.35	R13TSS		40.61		MODRES	CL		58.91	27M0F8W			P	7
	YYY00001	11.00	1	34.99	31.86	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	3, 5, 7
ALG	ALG25100	–25.00	2	4.20	33.20	2.45	1.25	172.00	R13TSS		39.59		MODRES	CR		58.39	27M0F8W			P	
ARS	ARS27500	17.00	2	48.30	24.60	3.84	1.20	138.00	R13TSS		37.81		MODRES	CL		57.71	27M0F8W			P	
AUS	AUS00600	152.00	2	136.60	–30.90	2.41	1.52	161.00	R13TSS		38.80		MODRES	CL		58.40	27M0F8W			P	
AUS	AUS00800	164.00	2	145.90	–21.70	3.62	1.63	136.00	R13TSS		36.73		MODRES	CL		58.83	27M0F8W			P	
BIH	BIH14800	34.00	2	17.77	44.32	0.62	0.60	166.84	R13TSS		48.71		MODRES	CR		58.91	27M0F8W			P	5, 7
BOT	BOT29700	–1.00	2	23.30	–22.20	2.13	1.50	36.00	R13TSS		39.40		MODRES	CL		58.70	27M0F8W			P	
CHN	CHN15400	62.00	2	83.90	40.50	2.75	2.05	177.00	R13TSS		36.94		MODRES	CR		58.24	27M0F8W			P	
CHN	CHN16100	92.00	2	118.10	31.10	2.49	1.69	117.00	R13TSS		38.21		MODRES	CR		59.41	27M0F8W			P	
CLN	CLN21900	50.00	2	80.60	7.70	1.18	0.60	106.00	R13TSS		45.95		MODRES	CR		58.65	27M0F8W			P	
COD	ZAI32300	–19.00	2	21.30	–6.80	2.80	1.52	149.00	R13TSS		38.16		MODRES	CR		59.56	27M0F8W			P	
D	D 08700	–19.00	2	9.60	49.90	1.62	0.72	147.00	R13TSS		43.78		MODRES	CL		60.48	27M0F8W			P	7
F	F2_A2722	–7.00	2	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2722	–7.00	2	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2762	–7.00	2	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2722	–7.00	2	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A2762	–7.00	2	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3322	–7.00	2	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_A3362	–7.00	2	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2722	–7.00	2	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D2762	–7.00	2	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3322	–7.00	2	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	F3_D3362	–7.00	2	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	NCL10000	140.00	2	166.00	–21.00	1.14	0.72	146.00	R13TSS		45.30		MODRES	CR		58.70	27M0F8W		6	P	
F	NCL10001	140.00	2	166.00	–21.00	1.14	0.72	146.00	R13TSS		45.30		MODRES	CR		58.70	27M0F8W		6	P	
F	WAL10200	140.00	2	–176.80	–14.00	0.74	0.60	29.00	R13TSS		47.97		MODRES	CR		59.37	27M0F8W		8	P	
F	WAL10201	140.00	2	–176.80	–14.00	0.74	0.60	29.00	R13TSS		47.97		MODRES	CR		59.37	27M0F8W		8	P	
F /EUT	E2WA7DA2	29.00	2	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F /EUT	E2WA7DB2	29.00	2	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	2	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	2	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	2	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	2	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	2	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FIN	FIN10300	5.00	2	22.50	64.50	1.38	0.76	171.00	R13TSS		44.24		MODRES	CL		62.74	27M0F8W			P	
GNB	GNB30400	–30.00	2	–15.00	12.00	0.90	0.60	172.00	R13TSS		47.12		MODRES	CL		58.12	27M0F8W			P	7
IND	IND03700	68.00	2	93.00	25.50	1.46	1.13	40.00	R13TSS		42.27		MODRES	CL		58.87	27M0F8W			P	
IND	IND04501	56.00	2	76.20	19.50	1.58	1.58	21.00	R13TSS		40.47		MODRES	CL		58.47	27M0F8W			P	
INS	INS02800	80.20	2	101.50	0.00	3.00	1.20	133.00	R13TSS		38.88		MODRES	CL		58.28	27M0F8W			P	
IRL	IRL21100	–33.50	2	–8.20	53.20	0.84	0.60	162.00	R13TSS		47.42		MODRES	CR		59.22	27M0F8W			P	7
KOR	KO11201D	116.00	2	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.60	27M0G7W	KOREASAT-1	20	AE	
KOR	KOR11200	110.00	2	127.50	36.00	1.24	1.02	168.00	R13TSS		43.43		MODRES	CL		58.63	27M0F8W		20	P	
KOR	KOR11201	116.00	2	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.60	27M0F8W	KOREASAT-1	20	AE	
LAO	LAO28400	74.00	2	103.70	18.10	2.16	0.78	133.00	R13TSS		42.18		MODRES	CR		58.78	27M0F8W			P	
MAU	MAU24200	29.00	2	59.80	–18.90	1.62	1.24	55.00	R13TSS		41.42		MODRES	CR		59.02	27M0F8W			P	
MHL	MHL00000	146.00	2	167.64	9.83	2.07	0.90	157.42	R13TSS		41.75		MODRES	CR		58.95	27M0F8W			P	7
MKD	MKD14800	23.00	2	21.61	41.56	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5, 7
MLA	MLA22800	86.00	2	114.10	3.90	2.34	1.12	45.00	R13TSS		40.26		MODRES	CR		58.56	27M0F8W			P	
MLI	MLI32700	–37.00	2	–2.00	19.00	2.66	1.26	127.00	R13TSS		39.19		MODRES	CR		58.19	27M0F8W			P	
NOR	BIFROS22	–0.80	2	17.00	61.50					NO9	32.00	6.00	MODRES	CR		54.50	27M0FXF	BIFROST-2		A	
NZL	CKH05200	158.00	2	–161.00	–19.80	1.02	0.64	132.00	R13TSS		46.30		MODRES	CL		59.60	27M0F8W		3	P	
NZL	CKH05201	158.00	2	–161.00	–19.80	1.02	0.64	132.00	R13TSS		46.30		MODRES	CL		59.60	27M0F8W		3	P	
PAK	PAK12700	38.00	2	69.60	29.50	2.30	2.16	14.00	R13TSS		37.49		MODRES	CR		58.89	27M0F8W		73	P	
PAK	PAK12701	38.00	2	69.60	29.50	2.30	2.16	14.00	R13TSS		37.49		MODRES	CR		58.89	27M0F8W		73	P	
PNG	PNG13100	110.00	2	147.70	–6.30	2.50	2.18	169.00	R13TSS		37.08		MODRES	CR		59.38	27M0F8W			P	
TCD	TCD14300	–13.00	2	18.10	15.50	3.40	1.72	107.00	R13TSS		36.78		MODRES	CL		58.98	27M0F8W			P	
TGO	TGO22600	–25.00	2	0.80	8.60	1.52	0.60	105.00	R13TSS		44.85		MODRES	CL		58.45	27M0F8W			P	
TUV	TUV00000	176.00	2	177.61	–7.11	0.94	0.60	137.58	R13TSS		46.93		MODRES	CR		58.93	27M0F8W			P	7
USA	GUM33100	122.00	2	144.50	13.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.28	27M0F8W		15	P	
USA	GUM33101	122.00	2	144.50	13.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.28	27M0F8W		15	P	
YEM	YEM26600	11.00	2	44.00	15.67	0.80	0.60	114.88	R13TSS		47.66		MODRES	CR		58.86	27M0F8W			P	7
AFG	AFG24500	50.00	3	70.20	35.50	1.32	1.13	53.00	R13TSS		42.71		MODRES	CR		57.81	27M0F8W			P	
AUS	AUS00400	152.00	3	123.00	–24.20	3.06	2.17	102.00	R13TSS		36.22		MODRES	CR		58.22	27M0F8W		76	P	
AUS	AUS0040A	152.00	3	96.83	–12.19	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	7
AUS	AUS0040B	152.00	3	105.69	–10.45	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	7
AUS	AUS0040C	152.00	3	110.52	–66.28	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	7
AUS	AUS00700	164.00	3	145.20	–38.10	2.12	1.02	147.00	R13TSS		41.09		MODRES	CR		58.49	27M0F8W		77	P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
AUS	AUS0070A	164.00	3	158.94	–54.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		77	P	7
BEN	BEN23300	–19.00	3	2.20	9.50	1.44	0.68	97.00	R13TSS		44.54		MODRES	CL		58.34	27M0F8W			P	
CHN	CHN15700	62.00	3	102.30	27.80	2.56	1.58	127.00	R13TSS		38.38		MODRES	CL		60.08	27M0F8W			P	
CHN	CHN16000	92.00	3	122.80	45.30	2.50	1.45	150.00	R13TSS		38.85		MODRES	CL		60.05	27M0F8W			P	
COM	COM20700	29.00	3	44.10	–12.10	0.76	0.60	149.00	R13TSS		47.86		MODRES	CL		58.06	27M0F8W			P	
E	HISPASA2	–30.00	3	–8.80	35.40	3.00	1.90	45.00	R13TSS		36.90		MODRES	CL		59.00	27M0F8W	HISPASAT-2		A	5, 7
F	F2_A2733	–7.00	3	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CR		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2773	–7.00	3	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CR		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2773	–7.00	3	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3373	–7.00	3	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2773	–7.00	3	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3373	–7.00	3	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	3	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	3	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	3	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	3	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	3	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	3	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	3	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FSM	FSM00000	146.00	3	151.67	5.42	5.34	1.51	166.52	R13TSS		35.37		MODRES	CL		58.87	27M0F8W			P	5, 7
GAB	GAB26000	–13.00	3	11.80	–0.60	1.43	1.12	64.00	R13TSS		42.40		MODRES	CR		58.30	27M0F8W			P	
GMB	GMB30200	–37.00	3	–15.10	13.40	0.79	0.60	4.00	R13TSS		47.69		MODRES	CL		58.29	27M0F8W			P	
GRC	GRC10500	5.00	3	24.70	38.20	1.78	0.98	156.00	R13TSS		42.03		MODRES	CR		58.33	27M0F8W			P	
IND	IND04300	56.00	3	77.80	11.10	1.36	1.28	172.00	R13TSS		42.04		MODRES	CR		58.34	27M0F8W			P	
IND	IND04701	68.00	3	93.30	11.10	1.92	0.60	96.00	R13TSS		43.83		MODRES	CR		58.43	27M0F8W			P	
INS	INS03600	104.00	3	135.20	–3.80	2.46	2.00	147.00	R13TSS		37.53		MODRES	CR		58.83	27M0F8W			P	
IRN	IRN10900	34.00	3	54.20	32.40	3.82	1.82	149.00	R13TSS		36.03		MODRES	CL		57.83	27M0F8W		72	P	
IRN	IRN10901	34.00	3	54.20	32.40	3.82	1.82	149.00	R13TSS		36.03		MODRES	CL		57.83	27M0F8W		72	P	
J	000BS-3N	109.85	3	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.20	27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	3	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.20	27M0F8W		33	PE	
KIR	KIR00001	176.00	3	177.16	–0.79	4.47	1.27	163.00	R13TSS		36.91		MODRES	CL		58.91	27M0F8W			P	5, 7
LBN	LBN27900	11.00	3	35.80	33.90	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.58	27M0F8W			P	
LBR	LBR24400	–33.50	3	–9.30	6.60	1.22	0.70	133.00	R13TSS		45.13		MODRES	CR		58.23	27M0F8W			P	7
LBY	LBY32100	–25.00	3	13.10	27.20	2.36	1.12	129.00	R13TSS		40.23		MODRES	CL		58.03	27M0F8W			P	
LIE	LIE25300	–37.00	3	9.50	47.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.38	27M0F8W			P	
LTU	LTU06100	23.00	3	23.79	55.66	0.70	0.60	176.00	R13TSS		48.21		MODRES	CL		58.91	27M0F8W			P	7
LUX	LUX11400	–19.00	3	6.00	49.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.88	27M0F8W			P	
NRU	NRU30900	134.00	3	167.00	–0.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		57.48	27M0F8W			P	
ROU	ROU13600	–1.00	3	25.00	45.70	1.38	0.66	155.00	R13TSS		44.85		MODRES	CL		58.75	27M0F8W			P	5, 7
SMO	SMO05700	158.00	3	–172.30	–13.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.58	27M0F8W			P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
SNG	SNG15100	74.00	3	103.80	1.30	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.48	27M0F8W			P	
SOM	SOM31200	23.00	3	45.00	6.40	3.26	1.54	71.00	R13TSS		37.44		MODRES	CR		57.34	27M0F8W			P	
SVK	SVK14400	17.00	3	19.65	48.69	0.82	0.60	5.20	R13TSS		47.53		MODRES	CR		58.93	27M0F8W			P	
UGA	UGA05100	11.00	3	32.30	1.20	1.46	1.12	60.00	R13TSS		42.31		MODRES	CR		58.21	27M0F8W			P	
UKR	UKR06300	38.00	3	31.74	48.22	2.29	0.96	177.78	R13TSS		41.01		MODRES	CL		58.91	27M0F8W			P	5, 7
USA	MRA33200	122.00	3	145.90	16.90	1.20	0.60	76.00	R13TSS		45.87		MODRES	CR		58.47	27M0F8W		14	P	
USA	MRA33201	122.00	3	145.90	16.90	1.20	0.60	76.00	R13TSS		45.87		MODRES	CR		58.47	27M0F8W		14	P	
UZB	UZB07100	44.00	3	64.01	41.21	2.67	0.96	163.32	R13TSS		40.37		MODRES	CL		58.87	27M0F8W			P	5, 7
VTN	VTN32500	86.00	3	108.00	14.80	3.80	1.90	126.00	R123FR		35.86		MODRES	CL		58.36	27M0F8W			P	7
VUT	VUT12800	140.00	3	168.00	–16.40	1.52	0.68	87.00	R13TSS		44.30		MODRES	CL		57.80	27M0F8W			P	
ZMB	ZMB31400	–1.00	3	27.50	–13.10	2.38	1.48	39.00	R13TSS		38.98		MODRES	CR		58.68	27M0F8W			P	
ALG	ALG25200	–25.00	4	1.60	25.50	3.64	2.16	152.00	R13TSS		35.49		MODRES	CR		57.79	27M0F8W			P	
AND	AND34100	–37.00	4	1.60	42.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.48	27M0F8W			P	
ARS	ARS00300	17.00	4	41.10	23.80	3.52	1.68	134.00	R13TSS		36.73		MODRES	CL		57.73	27M0F8W		70	P	
ARS	ARS00301	17.00	4	41.10	23.80	3.52	1.68	134.00	R13TSS		36.73		MODRES	CL		57.73	27M0F8W		70	P	
AUS	AUS00500	152.00	4	133.90	–18.40	2.82	1.74	105.00	R13TSS		37.53		MODRES	CL		59.43	27M0F8W			P	
AUT	AUT01600	–19.00	4	12.20	47.50	1.14	0.63	166.00	R13TSS		45.88		MODRES	CL		59.08	27M0F8W			P	
AZE	AZE06400	23.00	4	47.47	40.14	0.93	0.60	158.14	R13TSS		46.98		MODRES	CR		58.88	27M0F8W			P	5, 7
BUL	BUL02000	–1.00	4	25.00	43.00	1.04	0.60	165.00	R13TSS		46.50		MODRES	CR		58.60	27M0F8W			P	
CHN	CHN15600	62.00	4	97.80	36.30	2.56	1.58	157.00	R13TSS		38.38		MODRES	CR		58.48	27M0F8W			P	
CHN	CHN16100	92.00	4	118.10	31.10	2.49	1.69	117.00	R13TSS		38.21		MODRES	CR		59.41	27M0F8W			P	
COD	ZAI32200	–19.00	4	22.40	0.00	2.16	1.88	48.00	R13TSS		38.36		MODRES	CR		59.66	27M0F8W			P	
EGY	EGY02600	–7.00	4	29.70	26.80	2.33	1.72	136.00	R13TSS		38.42		MODRES	CL		58.12	27M0F8W			P	
F	F2_A2744	–7.00	4	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2784	–7.00	4	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2784	–7.00	4	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3384	–7.00	4	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2784	–7.00	4	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3384	–7.00	4	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	OCE10100	–160.00	4	–145.00	–16.30	4.34	3.54	4.00	R13TSS		32.58		MODRES	CL		58.48	27M0F8W			P	
F /EUT	E2WA7DA2	29.00	4	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	4	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	4	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	4	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	4	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	4	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	4	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
G	G 02700	–33.50	4	–3.50	53.80	1.84	0.72	142.00	R13TSS		43.23		MODRES	CR		60.03	27M0F8W			P	7
IND	IND04001	56.00	4	73.00	25.00	1.82	1.48	58.00	R13TSS		40.14		MODRES	CL		58.64	27M0F8W			P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
IND	IND04800	68.00	4	86.20	25.00	1.56	0.90	120.00	R13TSS		42.97		MODRES	CL		58.67	27M0F8W			P	
INS	INS02800	80.20	4	101.50	0.00	3.00	1.20	133.00	R13TSS		38.88		MODRES	CL		58.28	27M0F8W			P	
KOR	KO11201D	116.00	4	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.60	27M0G7W	KOREASAT-1	20	AE	
KOR	KOR11200	110.00	4	127.50	36.00	1.24	1.02	168.00	R13TSS		43.43		MODRES	CL		58.63	27M0F8W		20	P	
KOR	KOR11201	116.00	4	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.60	27M0F8W	KOREASAT-1	20	AE	
LAO	LAO28400	74.00	4	103.70	18.10	2.16	0.78	133.00	R13TSS		42.18		MODRES	CR		58.78	27M0F8W			P	
MAU	MAU24300	29.00	4	56.80	–13.90	1.56	1.38	65.00	R13TSS		41.12		MODRES	CR		58.72	27M0F8W			P	
MDA	MDA06300	38.00	4	28.41	46.99	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5, 7
MLA	MLA22800	86.00	4	114.10	3.90	2.34	1.12	45.00	R13TSS		40.26		MODRES	CR		58.56	27M0F8W			P	
MLD	MLD3060A	44.00	4	73.10	6.00	0.96	0.60	90.00	R13TSS		46.84		MODRES	CR		58.74	27M0F8W			P	7
MLI	MLI32800	–37.00	4	–7.60	13.20	1.74	1.24	171.00	R13TSS		41.11		MODRES	CR		58.71	27M0F8W			P	
MLT	MLT14700	–13.00	4	14.30	35.90	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		55.98	27M0F8W			P	
MOZ	MOZ30700	–1.00	4	34.00	–18.00	3.57	1.38	55.00	R13TSS		37.52		MODRES	CL		59.22	27M0F8W			P	
NZL	CKH05300	158.00	4	–163.00	–11.20	1.76	0.72	30.00	R13TSS		43.42		MODRES	CL		59.32	27M0F8W		4	P	
NZL	CKH05301	158.00	4	–163.00	–11.20	1.76	0.72	30.00	R13TSS		43.42		MODRES	CL		59.32	27M0F8W		4	P	
PAK	PAK28300	38.00	4	74.70	33.90	1.34	1.13	160.00	R13TSS		42.65		MODRES	CR		59.35	27M0F8W		75	P	
PAK	PAK28301	38.00	4	74.70	33.90	1.34	1.13	160.00	R13TSS		42.65		MODRES	CR		59.35	27M0F8W		75	P	
PLW	PLW00000	146.00	4	132.99	5.52	1.29	0.60	55.84	R13TSS		45.55		MODRES	CR		58.85	27M0F8W			P	7
PNG	PNG27100	128.00	4	148.00	–6.70	2.80	2.05	155.00	R13TSS		36.86		MODRES	CR		58.36	27M0F8W			P	
RRW	RRW31000	11.00	4	30.00	–2.10	0.66	0.60	42.00	R13TSS		48.47		MODRES	CL		59.77	27M0F8W			P	
S	S 13800	5.00	4	16.20	61.00	1.04	0.98	14.00	R13TSS		44.36		MODRES	CL		62.06	27M0F8W		27	P	
S	SIRIUS01	5.20	4	14.00	63.00	1.30	0.70	142.00	R13TSS		42.50		R13RES	CR		59.50	27M0F8W	SIRIUS	27	AE	
STP	STP24100	–13.00	4	7.00	0.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.38	27M0F8W			P	
SVN	SVN14800	34.00	4	15.01	46.18	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5, 7
TON	TON21500	170.00	4	–174.70	–18.00	1.41	0.68	85.00	R13TSS		44.63		MODRES	CR		58.33	27M0F8W			P	
AFG	AFG24600	50.00	5	64.50	33.10	1.44	1.40	21.00	R13TSS		41.40		MODRES	CR		58.40	27M0F8W			P	
AUS	AUS00900	164.00	5	147.50	–32.10	2.31	1.43	187.00	R13TSS		39.25		MODRES	CR		59.25	27M0F8W		78	P	
AUS	AUS0090A	164.00	5	159.06	–31.52	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
AUS	AUS0090B	164.00	5	167.93	–29.02	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
BLR	BLR06200	38.00	5	27.91	53.06	1.21	0.60	11.47	R13TSS		45.83		MODRES	CL		58.93	27M0F8W			P	5, 7
BTN	BTN03100	86.00	5	90.44	27.05	0.72	0.60	175.47	R13TSS		48.11		MODRES	CR		58.91	27M0F8W			P	5, 7
CHN	CHN15500	62.00	5	88.30	31.50	3.38	1.45	162.00	R13TSS		37.54		MODRES	CL		57.94	27M0F8W			P	
CHN	CHN16200	92.00	5	115.90	21.00	2.74	2.42	23.00	R13TSS		36.23		MODRES	CL		59.03	27M0F8W			P	
CHN	CHN16400	79.80	5	112.20	37.40	1.06	0.76	111.00	R13TSS		45.39		MODRES	CR		59.19	27M0F8W			P	
CHN	CHN19000	122.00	5	114.17	23.32	0.91	0.60	2.88	R13TSS		47.08		MODRES	CR		58.88	27M0F8W			P	5
CME	CME30000	–13.00	5	12.70	6.20	2.54	1.68	87.00	R13TSS		38.15		MODRES	CR		58.55	27M0F8W			P	
E	HISPASA2	–30.00	5	–8.80	35.40	3.00	1.90	45.00	R13TSS		36.90		MODRES	CL		59.00	27M0F8W	HISPASAT-2		A	5, 7
EST	EST06100	23.00	5	25.01	58.47	0.72	0.60	9.93	R13TSS		48.09		MODRES	CL		58.89	27M0F8W			P	5, 7
F	F 09300	–19.00	5	2.60	45.90	2.50	0.98	160.00	R13TSS		40.56		R13RES	CR		63.76	27M0F8W		19	PE	
F	F 09306	–7.00	5	2.60	45.90	2.50	0.98	160.00	R13TSS		41.00		MODRES	CR		58.90	27M0F8W	RADIOSAT	19	A	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F	F3_A2751	–7.00	5	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3351	–7.00	5	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2751	–7.00	5	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3351	–7.00	5	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	5	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	5	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	5	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	5	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	5	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	5	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	5	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FJI	FJI19300	152.00	5	179.40	–17.90	1.04	0.98	67.00	R13TSS		44.36		MODRES	CR		58.66	27M0F8W			P	
GUI	GUI19200	–37.00	5	–11.00	10.20	1.58	1.04	147.00	R13TSS		42.29		MODRES	CL		58.49	27M0F8W			P	
HRV	HRV14800	34.00	5	16.74	44.54	0.88	0.69	5.30	R13TSS		46.57		MODRES	CL		58.87	27M0F8W			P	5, 7
IND	IND03901	56.00	5	72.70	11.20	1.26	0.60	107.00	R13TSS		45.66		MODRES	CR		58.06	27M0F8W			P	
IND	IND04400	68.00	5	79.50	22.30	2.19	1.42	146.00	R13TSS		39.52		MODRES	CR		58.42	27M0F8W			P	
INS	INS03500	104.00	5	124.30	–3.20	3.34	1.94	82.00	R13TSS		36.33		MODRES	CR		58.23	27M0F8W			P	
J	000BS-3N	109.85	5	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.20	27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	5	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.20	27M0F8W		33	PE	
LBY	LBY28000	–25.00	5	21.40	26.00	2.50	1.04	119.00	R13TSS		40.30		MODRES	CL		58.50	27M0F8W			P	
MDG	MDG23600	29.00	5	46.60	–18.80	2.72	1.14	65.00	R13TSS		39.53		MODRES	CL		58.43	27M0F8W			P	
NZL	NZL05500	158.00	5	172.30	–39.70	2.88	1.56	47.00	R13TSS		37.92		MODRES	CR		58.42	27M0F8W			P	
POL	POL13200	–1.00	5	19.30	51.80	1.46	0.64	162.00	R13TSS		44.74		MODRES	CL		59.24	27M0F8W			P	
QAT	QAT24700	17.00	5	51.10	25.30	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		56.78	27M0F8W			P	
SLM	SLM00000	146.00	5	159.32	–8.40	1.50	1.18	140.48	R13TSS		41.98		MODRES	CL		58.88	27M0F8W			P	5, 7
SMR	SMR31100	–37.00	5	12.60	43.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.48	27M0F8W			P	
SWZ	SWZ31300	–1.00	5	31.50	–26.50	0.62	0.60	66.00	R13TSS		48.74		MODRES	CR		57.84	27M0F8W			P	
THA	THA14200	74.00	5	100.70	13.20	2.82	1.54	106.00	R13TSS		38.07		MODRES	CL		58.67	27M0F8W			P	
TJK	TJK06900	44.00	5	71.14	38.37	1.25	0.76	159.15	R13TSS		44.65		MODRES	CL		58.85	27M0F8W			P	5, 7
TUR	TUR14500	5.00	5	34.40	38.90	2.68	1.04	168.00	R13TSS		40.00		MODRES	CR		58.80	27M0F8W			P	
USA	PLM33700	170.00	5	–161.40	7.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.38	27M0F8W		9	P	
USA	PLM33701	170.00	5	–161.40	7.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.38	27M0F8W		9	P	
USA	SMA33500	170.00	5	–170.10	–14.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.18	27M0F8W		13	P	
USA	SMA33501	170.00	5	–170.10	–14.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.18	27M0F8W		13	P	
USA	WAK33400	140.00	5	166.50	19.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.58	27M0F8W		11	P	
USA	WAK33401	140.00	5	166.50	19.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.58	27M0F8W		11	P	
YEM	YEM26700	11.00	5	48.61	14.42	1.68	1.44	157.35	R13TSS		40.61		MODRES	CL		58.91	27M0F8W			P	7
	YYY00001	11.00	5	34.99	31.86	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	3, 5, 7
ALG	ALG25100	–25.00	6	4.20	33.20	2.45	1.25	172.00	R13TSS		39.59		MODRES	CR		58.39	27M0F8W			P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
ARS	ARS27500	17.00	6	48.30	24.60	3.84	1.20	138.00	R13TSS		37.81		MODRES	CL		57.81	27M0F8W			P	
AUS	AUS00600	152.00	6	136.60	–30.90	2.41	1.52	161.00	R13TSS		38.80		MODRES	CL		58.40	27M0F8W			P	
AUS	AUS00800	164.00	6	145.90	–21.70	3.62	1.63	136.00	R13TSS		36.73		MODRES	CL		58.83	27M0F8W			P	
BIH	BIH14800	34.00	6	17.77	44.32	0.62	0.60	166.84	R13TSS		48.71		MODRES	CR		58.91	27M0F8W			P	5, 7
BOT	BOT29700	–1.00	6	23.30	–22.20	2.13	1.50	36.00	R13TSS		39.40		MODRES	CL		58.80	27M0F8W			P	
CHN	CHN15400	62.00	6	83.90	40.50	2.75	2.05	177.00	R13TSS		36.94		MODRES	CR		58.34	27M0F8W			P	
CHN	CHN16100	92.00	6	118.10	31.10	2.49	1.69	117.00	R13TSS		38.21		MODRES	CR		59.51	27M0F8W			P	
CLN	CLN21900	50.00	6	80.60	7.70	1.18	0.60	106.00	R13TSS		45.95		MODRES	CR		58.65	27M0F8W			P	
COD	ZAI32300	–19.00	6	21.30	–6.80	2.80	1.52	149.00	R13TSS		38.16		MODRES	CR		59.66	27M0F8W			P	
D	D 08700	–19.00	6	9.60	49.90	1.62	0.72	147.00	R13TSS		43.78		MODRES	CL		60.58	27M0F8W			P	7
F	F2_A2722	–7.00	6	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2722	–7.00	6	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2762	–7.00	6	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2722	–7.00	6	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A2762	–7.00	6	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3322	–7.00	6	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_A3362	–7.00	6	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2722	–7.00	6	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D2762	–7.00	6	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3322	–7.00	6	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	F3_D3362	–7.00	6	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	NCL10000	140.00	6	166.00	–21.00	1.14	0.72	146.00	R13TSS		45.30		MODRES	CR		58.80	27M0F8W		6	P	
F	NCL10001	140.00	6	166.00	–21.00	1.14	0.72	146.00	R13TSS		45.30		MODRES	CR		58.80	27M0F8W		6	P	
F	WAL10200	140.00	6	–176.80	–14.00	0.74	0.60	29.00	R13TSS		47.97		MODRES	CR		59.37	27M0F8W		8	P	
F	WAL10201	140.00	6	–176.80	–14.00	0.74	0.60	29.00	R13TSS		47.97		MODRES	CR		59.37	27M0F8W		8	P	
F /EUT	E2WA7DA2	29.00	6	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	6	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	6	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	6	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	6	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	6	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	6	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FIN	FIN10300	5.00	6	22.50	64.50	1.38	0.76	171.00	R13TSS		44.24		MODRES	CL		62.84	27M0F8W			P	
GNB	GNB30400	–30.00	6	–15.00	12.00	0.90	0.60	172.00	R13TSS		47.12		MODRES	CL		58.22	27M0F8W			P	7
IND	IND03701	68.00	6	93.00	25.50	1.46	1.13	40.00	R13TSS		42.27		MODRES	CL		58.97	27M0F8W			P	
IND	IND04500	56.00	6	76.20	19.50	1.58	1.58	21.00	R13TSS		40.47		MODRES	CL		58.57	27M0F8W			P	
INS	INS02800	80.20	6	101.50	0.00	3.00	1.20	133.00	R13TSS		38.88		MODRES	CL		58.28	27M0F8W			P	
IRL	IRL21100	–33.50	6	–8.20	53.20	0.84	0.60	162.00	R13TSS		47.42		MODRES	CR		59.32	27M0F8W			P	7
KOR	KO11201D	116.00	6	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.60	27M0G7W	KOREASAT-1	20	AE	
KOR	KOR11200	110.00	6	127.50	36.00	1.24	1.02	168.00	R13TSS		43.43		MODRES	CL		58.63	27M0F8W		20	P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
KOR	KOR11201	116.00	6	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.60	27M0F8W	KOREASAT-1	20	AE	
LAO	LAO28400	74.00	6	103.70	18.10	2.16	0.78	133.00	R13TSS		42.18		MODRES	CR		58.78	27M0F8W			P	
MAU	MAU24200	29.00	6	59.80	–18.90	1.62	1.24	55.00	R13TSS		41.42		MODRES	CR		59.02	27M0F8W			P	
MHL	MHL00000	146.00	6	167.64	9.83	2.07	0.90	157.42	R13TSS		41.75		MODRES	CR		58.95	27M0F8W			P	7
MKD	MKD14800	23.00	6	21.61	41.56	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5, 7
MLA	MLA22800	86.00	6	114.10	3.90	2.34	1.12	45.00	R13TSS		40.26		MODRES	CR		58.56	27M0F8W			P	
MLI	MLI32700	–37.00	6	–2.00	19.00	2.66	1.26	127.00	R13TSS		39.19		MODRES	CR		58.19	27M0F8W			P	
NOR	BIFROS22	–0.80	6	17.00	61.50					NO9	32.00	6.00	MODRES	CR		54.50	27M0FXF	BIFROST-2		A	
NZL	CKH05200	158.00	6	–161.00	–19.80	1.02	0.64	132.00	R13TSS		46.30		MODRES	CL		59.60	27M0F8W		3	P	
NZL	CKH05201	158.00	6	–161.00	–19.80	1.02	0.64	132.00	R13TSS		46.30		MODRES	CL		59.60	27M0F8W		3	P	
PAK	PAK12700	38.00	6	69.60	29.50	2.30	2.16	14.00	R13TSS		37.49		MODRES	CR		58.99	27M0F8W		73	P	
PAK	PAK12701	38.00	6	69.60	29.50	2.30	2.16	14.00	R13TSS		37.49		MODRES	CR		58.99	27M0F8W		73	P	
PNG	PNG13100	110.00	6	147.70	–6.30	2.50	2.18	169.00	R13TSS		37.08		MODRES	CR		59.38	27M0F8W			P	
TCD	TCD14300	–13.00	6	18.10	15.50	3.40	1.72	107.00	R13TSS		36.78		MODRES	CL		58.98	27M0F8W			P	
TGO	TGO22600	–25.00	6	0.80	8.60	1.52	0.60	105.00	R13TSS		44.85		MODRES	CL		58.45	27M0F8W			P	
TUV	TUV00000	176.00	6	177.61	–7.11	0.94	0.60	137.58	R13TSS		46.93		MODRES	CR		58.93	27M0F8W			P	7
USA	GUM33100	122.00	6	144.50	13.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.38	27M0F8W		15	P	
USA	GUM33101	122.00	6	144.50	13.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.38	27M0F8W		15	P	
YEM	YEM26600	11.00	6	44.00	15.67	0.80	0.60	114.88	R13TSS		47.66		MODRES	CR		58.86	27M0F8W			P	7
AFG	AFG24500	50.00	7	70.20	35.50	1.32	1.13	53.00	R13TSS		42.71		MODRES	CR		57.91	27M0F8W			P	
AUS	AUS00400	152.00	7	123.00	–24.20	3.06	2.17	102.00	R13TSS		36.22		MODRES	CR		58.22	27M0F8W		76	P	
AUS	AUS0040A	152.00	7	96.83	–12.19	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	7
AUS	AUS0040B	152.00	7	105.69	–10.45	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	7
AUS	AUS0040C	152.00	7	110.52	–66.28	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	7
AUS	AUS00700	164.00	7	145.20	–38.10	2.12	1.02	147.00	R13TSS		41.09		MODRES	CR		58.49	27M0F8W		77	P	
AUS	AUS0070A	164.00	7	158.94	–54.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		77	P	7
BEN	BEN23300	–19.00	7	2.20	9.50	1.44	0.68	97.00	R13TSS		44.54		MODRES	CL		58.34	27M0F8W			P	
CHN	CHN15700	62.00	7	102.30	27.80	2.56	1.58	127.00	R13TSS		38.38		MODRES	CL		60.08	27M0F8W			P	
CHN	CHN16000	92.00	7	122.80	45.30	2.50	1.45	150.00	R13TSS		38.85		MODRES	CL		60.05	27M0F8W			P	
COM	COM20700	29.00	7	44.10	–12.10	0.76	0.60	149.00	R13TSS		47.86		MODRES	CL		58.06	27M0F8W			P	
E	HISPASA2	–30.00	7	–8.80	35.40	3.00	1.90	45.00	R13TSS		36.90		MODRES	CL		59.00	27M0F8W	HISPASAT-2		A	5, 7
F	F2_A2733	–7.00	7	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CR		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2773	–7.00	7	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CR		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2773	–7.00	7	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3373	–7.00	7	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2773	–7.00	7	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3373	–7.00	7	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	7	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	7	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F /EUT	E2WA7DC1	29.00	7	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	7	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	7	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	7	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	7	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FSM	FSM00000	146.00	7	151.67	5.42	5.34	1.51	166.52	R13TSS		35.37		MODRES	CL		58.87	27M0F8W			P	5, 7
GAB	GAB26000	–13.00	7	11.80	–0.60	1.43	1.12	64.00	R13TSS		42.40		MODRES	CR		58.40	27M0F8W			P	
GMB	GMB30200	–37.00	7	–15.10	13.40	0.79	0.60	4.00	R13TSS		47.69		MODRES	CL		58.39	27M0F8W			P	
GRC	GRC10500	5.00	7	24.70	38.20	1.78	0.98	156.00	R13TSS		42.03		MODRES	CR		58.43	27M0F8W			P	
IND	IND04301	56.00	7	77.80	11.10	1.36	1.28	172.00	R13TSS		42.04		MODRES	CR		58.44	27M0F8W			P	
IND	IND04700	68.00	7	93.30	11.10	1.92	0.60	96.00	R13TSS		43.83		MODRES	CR		58.53	27M0F8W			P	
INS	INS03600	104.00	7	135.20	–3.80	2.46	2.00	147.00	R13TSS		37.53		MODRES	CR		58.83	27M0F8W			P	
IRN	IRN10900	34.00	7	54.20	32.40	3.82	1.82	149.00	R13TSS		36.03		MODRES	CL		57.83	27M0F8W		72	P	
IRN	IRN10901	34.00	7	54.20	32.40	3.82	1.82	149.00	R13TSS		36.03		MODRES	CL		57.83	27M0F8W		72	P	
J	000BS-3N	109.85	7	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.20	27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	7	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.20	27M0F8W		33	PE	
KIR	KIR00001	176.00	7	177.16	–0.79	4.47	1.27	163.00	R13TSS		36.91		MODRES	CL		58.91	27M0F8W			P	5, 7
LBN	LBN27900	11.00	7	35.80	33.90	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.68	27M0F8W			P	
LBR	LBR24400	–33.50	7	–9.30	6.60	1.22	0.70	133.00	R13TSS		45.13		MODRES	CR		58.33	27M0F8W			P	7
LBY	LBY32100	–25.00	7	13.10	27.20	2.36	1.12	129.00	R13TSS		40.23		MODRES	CL		58.13	27M0F8W			P	
LIE	LIE25300	–37.00	7	9.50	47.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.48	27M0F8W			P	
LTU	LTU06100	23.00	7	23.79	55.66	0.70	0.60	176.00	R13TSS		48.21		MODRES	CL		58.91	27M0F8W			P	7
LUX	LUX11400	–19.00	7	6.00	49.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.98	27M0F8W			P	
NRU	NRU30900	134.00	7	167.00	–0.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		57.58	27M0F8W			P	
ROU	ROU13600	–1.00	7	25.00	45.70	1.38	0.66	155.00	R13TSS		44.85		MODRES	CL		58.85	27M0F8W			P	5, 7
SMO	SMO05700	158.00	7	–172.30	–13.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.68	27M0F8W			P	
SNG	SNG15100	74.00	7	103.80	1.30	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.58	27M0F8W			P	
SOM	SOM31200	23.00	7	45.00	6.40	3.26	1.54	71.00	R13TSS		37.44		MODRES	CR		57.44	27M0F8W			P	
SVK	SVK14400	17.00	7	19.65	48.69	0.82	0.60	5.20	R13TSS		47.53		MODRES	CR		58.93	27M0F8W			P	
UGA	UGA05100	11.00	7	32.30	1.20	1.46	1.12	60.00	R13TSS		42.31		MODRES	CR		58.31	27M0F8W			P	
UKR	UKR06300	38.00	7	31.74	48.22	2.29	0.96	177.78	R13TSS		41.01		MODRES	CL		58.91	27M0F8W			P	5, 7
USA	MRA33200	122.00	7	145.90	16.90	1.20	0.60	76.00	R13TSS		45.87		MODRES	CR		58.47	27M0F8W		14	P	
USA	MRA33201	122.00	7	145.90	16.90	1.20	0.60	76.00	R13TSS		45.87		MODRES	CR		58.47	27M0F8W		14	P	
UZB	UZB07100	44.00	7	64.01	41.21	2.67	0.96	163.32	R13TSS		40.37		MODRES	CL		58.87	27M0F8W			P	5, 7
VTN	VTN32500	86.00	7	108.00	14.80	3.80	1.90	126.00	R123FR		35.86		MODRES	CL		58.36	27M0F8W			P	7
VUT	VUT12800	140.00	7	168.00	–16.40	1.52	0.68	87.00	R13TSS		44.30		MODRES	CL		57.90	27M0F8W			P	
ZMB	ZMB31400	–1.00	7	27.50	–13.10	2.38	1.48	39.00	R13TSS		38.98		MODRES	CR		58.78	27M0F8W			P	
ALG	ALG25200	–25.00	8	1.60	25.50	3.64	2.16	152.00	R13TSS		35.49		MODRES	CR		57.79	27M0F8W			P	
AND	AND34100	–37.00	8	1.60	42.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.48	27M0F8W			P	
ARS	ARS00300	17.00	8	41.10	23.80	3.52	1.68	134.00	R13TSS		36.73		MODRES	CL		57.83	27M0F8W		70	P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
AUS	AUS00500	152.00	8	133.90	–18.40	2.82	1.74	105.00	R13TSS		37.53		MODRES	CL		59.43	27M0F8W			P	
AUT	AUT01600	–19.00	8	12.20	47.50	1.14	0.63	166.00	R13TSS		45.88		MODRES	CL		59.18	27M0F8W			P	
AZE	AZE06400	23.00	8	47.47	40.14	0.93	0.60	158.14	R13TSS		46.98		MODRES	CR		58.88	27M0F8W			P	5, 7
BUL	BUL02000	–1.00	8	25.00	43.00	1.04	0.60	165.00	R13TSS		46.50		MODRES	CR		58.70	27M0F8W			P	
CHN	CHN15600	62.00	8	97.80	36.30	2.56	1.58	157.00	R13TSS		38.38		MODRES	CR		58.48	27M0F8W			P	
CHN	CHN17300	92.00	8	115.70	27.40	1.14	0.94	99.00	R13TSS		44.15		MODRES	CR		59.05	27M0F8W			P	
COD	ZAI32200	–19.00	8	22.40	0.00	2.16	1.88	48.00	R13TSS		38.36		MODRES	CR		59.76	27M0F8W			P	
EGY	EGY02600	–7.00	8	29.70	26.80	2.33	1.72	136.00	R13TSS		38.42		MODRES	CL		58.22	27M0F8W			P	
F	F2_A2744	–7.00	8	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2784	–7.00	8	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2784	–7.00	8	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3384	–7.00	8	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2784	–7.00	8	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3384	–7.00	8	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	OCE10100	–160.00	8	–145.00	–16.30	4.34	3.54	4.00	R13TSS		32.58		MODRES	CL		58.58	27M0F8W			P	
F /EUT	E2WA7DA2	29.00	8	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	8	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	8	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	8	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	8	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	8	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	8	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
G	G 02700	–33.50	8	–3.50	53.80	1.84	0.72	142.00	R13TSS		43.23		MODRES	CR		60.13	27M0F8W			P	7
IND	IND04000	56.00	8	73.00	25.00	1.82	1.48	58.00	R13TSS		40.14		MODRES	CL		58.74	27M0F8W			P	
IND	IND04801	68.00	8	86.20	25.00	1.56	0.90	120.00	R13TSS		42.97		MODRES	CL		58.67	27M0F8W			P	
INS	INS02800	80.20	8	101.50	0.00	3.00	1.20	133.00	R13TSS		38.88		MODRES	CL		58.38	27M0F8W			P	
KOR	KO11201D	116.00	8	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.70	27M0G7W	KOREASAT-1	20	AE	
KOR	KOR11200	110.00	8	127.50	36.00	1.24	1.02	168.00	R13TSS		43.43		MODRES	CL		58.73	27M0F8W		20	P	
KOR	KOR11201	116.00	8	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.70	27M0F8W	KOREASAT-1	20	AE	
LAO	LAO28400	74.00	8	103.70	18.10	2.16	0.78	133.00	R13TSS		42.18		MODRES	CR		58.78	27M0F8W			P	
MAU	MAU24300	29.00	8	56.80	–13.90	1.56	1.38	65.00	R13TSS		41.12		MODRES	CR		58.82	27M0F8W			P	
MDA	MDA06300	38.00	8	28.41	46.99	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5, 7
MLA	MLA22800	86.00	8	114.10	3.90	2.34	1.12	45.00	R13TSS		40.26		MODRES	CR		58.66	27M0F8W			P	
MLD	MLD3060A	44.00	8	73.10	6.00	0.96	0.60	90.00	R13TSS		46.84		MODRES	CR		58.74	27M0F8W			P	7
MLI	MLI32800	–37.00	8	–7.60	13.20	1.74	1.24	171.00	R13TSS		41.11		MODRES	CR		58.81	27M0F8W			P	
MLT	MLT14700	–13.00	8	14.30	35.90	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		55.98	27M0F8W			P	
MOZ	MOZ30700	–1.00	8	34.00	–18.00	3.57	1.38	55.00	R13TSS		37.52		MODRES	CL		59.22	27M0F8W			P	
NZL	CKH05300	158.00	8	–163.00	–11.20	1.76	0.72	30.00	R13TSS		43.42		MODRES	CL		59.32	27M0F8W		4	P	
NZL	CKH05301	158.00	8	–163.00	–11.20	1.76	0.72	30.00	R13TSS		43.42		MODRES	CL		59.32	27M0F8W		4	P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
PAK	PAK28300	38.00	8	74.70	33.90	1.34	1.13	160.00	R13TSS		42.65		MODRES	CR		59.35	27M0F8W		75	P	
PAK	PAK28301	38.00	8	74.70	33.90	1.34	1.13	160.00	R13TSS		42.65		MODRES	CR		59.35	27M0F8W		75	P	
PLW	PLW00000	146.00	8	132.99	5.52	1.29	0.60	55.84	R13TSS		45.55		MODRES	CR		58.85	27M0F8W			P	7
PNG	PNG27100	128.00	8	148.00	–6.70	2.80	2.05	155.00	R13TSS		36.86		MODRES	CR		58.36	27M0F8W			P	
RRW	RRW31000	11.00	8	30.00	–2.10	0.66	0.60	42.00	R13TSS		48.47		MODRES	CL		59.87	27M0F8W			P	
S	S 13800	5.00	8	16.20	61.00	1.04	0.98	14.00	R13TSS		44.36		MODRES	CL		62.06	27M0F8W		27	P	
S	SIRIUS01	5.20	8	14.00	63.00	1.30	0.70	142.00	R13TSS		42.50		R13RES	CR		59.50	27M0F8W	SIRIUS	27	AE	
STP	STP24100	–13.00	8	7.00	0.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.48	27M0F8W			P	
SVN	SVN14800	34.00	8	15.01	46.18	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5, 7
TON	TON21500	170.00	8	–174.70	–18.00	1.41	0.68	85.00	R13TSS		44.63		MODRES	CR		58.33	27M0F8W			P	
AFG	AFG24600	50.00	9	64.50	33.10	1.44	1.40	21.00	R13TSS		41.40		MODRES	CR		58.40	27M0F8W			P	
AUS	AUS00900	164.00	9	147.50	–32.10	2.31	1.43	187.00	R13TSS		39.25		MODRES	CR		59.25	27M0F8W		78	P	
AUS	AUS0090A	164.00	9	159.06	–31.52	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
AUS	AUS0090B	164.00	9	167.93	–29.02	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
BLR	BLR06200	38.00	9	27.91	53.06	1.21	0.60	11.47	R13TSS		45.83		MODRES	CL		58.93	27M0F8W			P	5, 7
BTN	BTN03100	86.00	9	90.44	27.05	0.72	0.60	175.47	R13TSS		48.11		MODRES	CR		58.91	27M0F8W			P	5, 7
CHN	CHN15500	62.00	9	88.30	31.50	3.38	1.45	162.00	R13TSS		37.54		MODRES	CL		58.04	27M0F8W			P	
CHN	CHN16200	92.00	9	115.90	21.00	2.74	2.42	23.00	R13TSS		36.23		MODRES	CL		59.03	27M0F8W			P	
CHN	CHN16500	79.80	9	111.40	41.80	1.58	1.20	15.00	R13TSS		41.67		MODRES	CR		58.57	27M0F8W			P	
CHN	CHN19000	122.00	9	114.17	23.32	0.91	0.60	2.88	R13TSS		47.08		MODRES	CR		58.88	27M0F8W			P	5
CME	CME30000	–13.00	9	12.70	6.20	2.54	1.68	87.00	R13TSS		38.15		MODRES	CR		58.55	27M0F8W			P	
E	HISPASA2	–30.00	9	–8.80	35.40	3.00	1.90	45.00	R13TSS		36.90		MODRES	CL		59.00	27M0F8W	HISPASAT-2		A	5, 7
EST	EST06100	23.00	9	25.01	58.47	0.72	0.60	9.93	R13TSS		48.09		MODRES	CL		58.89	27M0F8W			P	5, 7
F	F 09300	–19.00	9	2.60	45.90	2.50	0.98	160.00	R13TSS		40.56		R13RES	CR		63.86	27M0F8W		19	PE	
F	F 09306	–7.00	9	2.60	45.90	2.50	0.98	160.00	R13TSS		41.00		MODRES	CR		58.90	27M0F8W	RADIOSAT	19	A	
F	F3_A2751	–7.00	9	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3351	–7.00	9	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2751	–7.00	9	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3351	–7.00	9	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	9	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	9	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	9	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	9	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	9	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	9	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	9	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FJI	FJI19300	152.00	9	179.40	–17.90	1.04	0.98	67.00	R13TSS		44.36		MODRES	CR		58.76	27M0F8W			P	
GUI	GUI19200	–37.00	9	–11.00	10.20	1.58	1.04	147.00	R13TSS		42.29		MODRES	CL		58.49	27M0F8W			P	
HRV	HRV14800	34.00	9	16.74	44.54	0.88	0.69	5.30	R13TSS		46.57		MODRES	CL		58.87	27M0F8W			P	5, 7
IND	IND03900	56.00	9	72.70	11.20	1.26	0.60	107.00	R13TSS		45.66		MODRES	CR		58.16	27M0F8W			P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
IND	IND04401	68.00	9	79.50	22.30	2.19	1.42	146.00	R13TSS		39.52		MODRES	CR		58.52	27M0F8W			P	
INS	INS03500	104.00	9	124.30	–3.20	3.34	1.94	82.00	R13TSS		36.33		MODRES	CR		58.33	27M0F8W			P	
J	000BS-3N	109.85	9	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.30	27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	9	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.30	27M0F8W		33	PE	
LBY	LBY28000	–25.00	9	21.40	26.00	2.50	1.04	119.00	R13TSS		40.30		MODRES	CL		58.60	27M0F8W			P	
MDG	MDG23600	29.00	9	46.60	–18.80	2.72	1.14	65.00	R13TSS		39.53		MODRES	CL		58.43	27M0F8W			P	
NZL	NZL05500	158.00	9	172.30	–39.70	2.88	1.56	47.00	R13TSS		37.92		MODRES	CR		58.42	27M0F8W			P	
POL	POL13200	–1.00	9	19.30	51.80	1.46	0.64	162.00	R13TSS		44.74		MODRES	CL		59.24	27M0F8W			P	
QAT	QAT24700	17.00	9	51.10	25.30	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		56.88	27M0F8W			P	
SLM	SLM00000	146.00	9	159.32	–8.40	1.50	1.18	140.48	R13TSS		41.98		MODRES	CL		58.88	27M0F8W			P	5, 7
SMR	SMR31100	–37.00	9	12.60	43.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.48	27M0F8W			P	
SWZ	SWZ31300	–1.00	9	31.50	–26.50	0.62	0.60	66.00	R13TSS		48.74		MODRES	CR		57.94	27M0F8W			P	
THA	THA14200	74.00	9	100.70	13.20	2.82	1.54	106.00	R13TSS		38.07		MODRES	CL		58.67	27M0F8W			P	
TJK	TJK06900	44.00	9	71.14	38.37	1.25	0.76	159.15	R13TSS		44.65		MODRES	CL		58.85	27M0F8W			P	5, 7
TUR	TUR14500	5.00	9	34.40	38.90	2.68	1.04	168.00	R13TSS		40.00		MODRES	CR		58.80	27M0F8W			P	
USA	PLM33700	170.00	9	–161.40	7.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.48	27M0F8W		9	P	
USA	PLM33701	170.00	9	–161.40	7.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.48	27M0F8W		9	P	
USA	SMA33500	170.00	9	–170.10	–14.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.28	27M0F8W		13	P	
USA	SMA33501	170.00	9	–170.10	–14.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.28	27M0F8W		13	P	
USA	WAK33400	140.00	9	166.50	19.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.68	27M0F8W		11	P	
USA	WAK33401	140.00	9	166.50	19.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.68	27M0F8W		11	P	
YEM	YEM26700	11.00	9	48.61	14.42	1.68	1.44	157.35	R13TSS		40.61		MODRES	CL		58.91	27M0F8W			P	7
	YYY00001	11.00	9	34.99	31.86	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	3, 5, 7
ALG	ALG25100	–25.00	10	4.20	33.20	2.45	1.25	172.00	R13TSS		39.59		MODRES	CR		58.49	27M0F8W			P	
ARS	ARS27500	17.00	10	48.30	24.60	3.84	1.20	138.00	R13TSS		37.81		MODRES	CL		57.91	27M0F8W			P	
AUS	AUS00600	152.00	10	136.60	–30.90	2.41	1.52	161.00	R13TSS		38.80		MODRES	CL		58.40	27M0F8W			P	
AUS	AUS00800	164.00	10	145.90	–21.70	3.62	1.63	136.00	R13TSS		36.73		MODRES	CL		58.83	27M0F8W			P	
BIH	BIH14800	34.00	10	17.77	44.32	0.62	0.60	166.84	R13TSS		48.71		MODRES	CR		58.91	27M0F8W			P	5, 7
BOT	BOT29700	–1.00	10	23.30	–22.20	2.13	1.50	36.00	R13TSS		39.40		MODRES	CL		58.90	27M0F8W			P	
CHN	CHN15400	62.00	10	83.90	40.50	2.75	2.05	177.00	R13TSS		36.94		MODRES	CR		58.34	27M0F8W			P	
CHN	CHN17100	92.00	10	117.20	32.00	1.20	0.74	126.00	R13TSS		44.96		MODRES	CR		59.16	27M0F8W			P	
CHN	CHN18700	79.80	10	106.60	26.70	1.14	0.94	179.00	R13TSS		44.15		MODRES	CL		59.05	27M0F8W			P	
CLN	CLN21900	50.00	10	80.60	7.70	1.18	0.60	106.00	R13TSS		45.95		MODRES	CR		58.75	27M0F8W			P	
COD	ZAI32300	–19.00	10	21.30	–6.80	2.80	1.52	149.00	R13TSS		38.16		MODRES	CR		59.66	27M0F8W			P	
D	D 08700	–19.00	10	9.60	49.90	1.62	0.72	147.00	R13TSS		43.78		MODRES	CL		60.58	27M0F8W			P	7
F	F2_A2722	–7.00	10	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2722	–7.00	10	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2762	–7.00	10	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2722	–7.00	10	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F	F3_A2762	–7.00	10	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3322	–7.00	10	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_A3362	–7.00	10	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2722	–7.00	10	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D2762	–7.00	10	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3322	–7.00	10	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	F3_D3362	–7.00	10	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	NCL10000	140.00	10	166.00	–21.00	1.14	0.72	146.00	R13TSS		45.30		MODRES	CR		58.80	27M0F8W		6	P	
F	NCL10001	140.00	10	166.00	–21.00	1.14	0.72	146.00	R13TSS		45.30		MODRES	CR		58.80	27M0F8W		6	P	
F	WAL10200	140.00	10	–176.80	–14.00	0.74	0.60	29.00	R13TSS		47.97		MODRES	CR		59.47	27M0F8W		8	P	
F	WAL10201	140.00	10	–176.80	–14.00	0.74	0.60	29.00	R13TSS		47.97		MODRES	CR		59.47	27M0F8W		8	P	
F /EUT	E2WA7DA2	29.00	10	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	10	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	10	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	10	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	10	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	10	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	10	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FIN	FIN10300	5.00	10	22.50	64.50	1.38	0.76	171.00	R13TSS		44.24		MODRES	CL		62.94	27M0F8W			P	
GNB	GNB30400	–30.00	10	–15.00	12.00	0.90	0.60	172.00	R13TSS		47.12		MODRES	CL		58.22	27M0F8W			P	7
IND	IND03700	68.00	10	93.00	25.50	1.46	1.13	40.00	R13TSS		42.27		MODRES	CL		58.97	27M0F8W			P	
IND	IND04501	56.00	10	76.20	19.50	1.58	1.58	21.00	R13TSS		40.47		MODRES	CL		58.57	27M0F8W			P	
IRL	IRL21100	–33.50	10	–8.20	53.20	0.84	0.60	162.00	R13TSS		47.42		MODRES	CR		59.42	27M0F8W			P	7
KOR	KO11201D	116.00	10	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.70	27M0G7W	KOREASAT-1	20	AE	
KOR	KOR11200	110.00	10	127.50	36.00	1.24	1.02	168.00	R13TSS		43.43		MODRES	CL		58.73	27M0F8W		20	P	
KOR	KOR11201	116.00	10	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.70	27M0F8W	KOREASAT-1	20	AE	
LAO	LAO28400	74.00	10	103.70	18.10	2.16	0.78	133.00	R13TSS		42.18		MODRES	CR		58.88	27M0F8W			P	
MAU	MAU24200	29.00	10	59.80	–18.90	1.62	1.24	55.00	R13TSS		41.42		MODRES	CR		59.12	27M0F8W			P	
MHL	MHL00000	146.00	10	167.64	9.83	2.07	0.90	157.42	R13TSS		41.75		MODRES	CR		58.95	27M0F8W			P	7
MKD	MKD14800	23.00	10	21.61	41.56	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5, 7
MLA	MLA2280A	86.00	10	114.10	3.90	2.34	1.12	45.00	R13TSS		40.26		MODRES	CR		58.66	27M0F8W			P	5, 7
MLI	MLI32700	–37.00	10	–2.00	19.00	2.66	1.26	127.00	R13TSS		39.19		MODRES	CR		58.19	27M0F8W			P	
NOR	BIFROS22	–0.80	10	17.00	61.50					NO9	32.00	6.00	MODRES	CR		54.50	27M0FXF	BIFROST-2		A	
NZL	CKH05200	158.00	10	–161.00	–19.80	1.02	0.64	132.00	R13TSS		46.30		MODRES	CL		59.70	27M0F8W		3	P	
NZL	CKH05201	158.00	10	–161.00	–19.80	1.02	0.64	132.00	R13TSS		46.30		MODRES	CL		59.70	27M0F8W		3	P	
PAK	PAK12700	38.00	10	69.60	29.50	2.30	2.16	14.00	R13TSS		37.49		MODRES	CR		58.99	27M0F8W		73	P	
PNG	PNG13100	110.00	10	147.70	–6.30	2.50	2.18	169.00	R13TSS		37.08		MODRES	CR		59.48	27M0F8W			P	
TCD	TCD14300	–13.00	10	18.10	15.50	3.40	1.72	107.00	R13TSS		36.78		MODRES	CL		59.08	27M0F8W			P	
TGO	TGO22600	–25.00	10	0.80	8.60	1.52	0.60	105.00	R13TSS		44.85		MODRES	CL		58.55	27M0F8W			P	
TUV	TUV00000	176.00	10	177.61	–7.11	0.94	0.60	137.58	R13TSS		46.93		MODRES	CR		58.93	27M0F8W			P	7

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
USA	GUM33100	122.00	10	144.50	13.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.38	27M0F8W		15	P	
USA	GUM33101	122.00	10	144.50	13.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.38	27M0F8W		15	P	
YEM	YEM26600	11.00	10	44.00	15.67	0.80	0.60	114.88	R13TSS		47.66		MODRES	CR		58.86	27M0F8W			P	7
AFG	AFG24500	50.00	11	70.20	35.50	1.32	1.13	53.00	R13TSS		42.71		MODRES	CR		57.91	27M0F8W			P	
AUS	AUS00400	152.00	11	123.00	–24.20	3.06	2.17	102.00	R13TSS		36.22		MODRES	CR		58.22	27M0F8W		76	P	
AUS	AUS0040A	152.00	11	96.83	–12.19	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	7
AUS	AUS0040B	152.00	11	105.69	–10.45	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	7
AUS	AUS0040C	152.00	11	110.52	–66.28	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	7
AUS	AUS00700	164.00	11	145.20	–38.10	2.12	1.02	147.00	R13TSS		41.09		MODRES	CR		58.49	27M0F8W		77	P	
AUS	AUS0070A	164.00	11	158.94	–54.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		77	P	7
BEN	BEN23300	–19.00	11	2.20	9.50	1.44	0.68	97.00	R13TSS		44.54		MODRES	CL		58.44	27M0F8W			P	
CHN	CHN15700	62.00	11	102.30	27.80	2.56	1.58	127.00	R13TSS		38.38		MODRES	CL		60.18	27M0F8W			P	
CHN	CHN16000	92.00	11	122.80	45.30	2.50	1.45	150.00	R13TSS		38.85		MODRES	CL		60.15	27M0F8W			P	
COM	COM20700	29.00	11	44.10	–12.10	0.76	0.60	149.00	R13TSS		47.86		MODRES	CL		58.16	27M0F8W			P	
E	HISPASA2	–30.00	11	–8.80	35.40	3.00	1.90	45.00	R13TSS		36.90		MODRES	CL		59.00	27M0F8W	HISPASAT-2		A	5, 7
F	F2_A2733	–7.00	11	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CR		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2773	–7.00	11	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CR		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2773	–7.00	11	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3373	–7.00	11	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2773	–7.00	11	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3373	–7.00	11	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	11	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	11	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	11	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	11	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	11	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	11	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	11	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FSM	FSM00000	146.00	11	151.67	5.42	5.34	1.51	166.52	R13TSS		35.37		MODRES	CL		58.87	27M0F8W			P	5, 7
GAB	GAB26000	–13.00	11	11.80	–0.60	1.43	1.12	64.00	R13TSS		42.40		MODRES	CR		58.40	27M0F8W			P	
GMB	GMB30200	–37.00	11	–15.10	13.40	0.79	0.60	4.00	R13TSS		47.69		MODRES	CL		58.39	27M0F8W			P	
GRC	GRC10500	5.00	11	24.70	38.20	1.78	0.98	156.00	R13TSS		42.03		MODRES	CR		58.43	27M0F8W			P	
IND	IND04300	56.00	11	77.80	11.10	1.36	1.28	172.00	R13TSS		42.04		MODRES	CR		58.54	27M0F8W			P	
IND	IND04701	68.00	11	93.30	11.10	1.92	0.60	96.00	R13TSS		43.83		MODRES	CR		58.53	27M0F8W			P	
INS	INS03600	104.00	11	135.20	–3.80	2.46	2.00	147.00	R13TSS		37.53		MODRES	CR		58.93	27M0F8W			P	
IRN	IRN10900	34.00	11	54.20	32.40	3.82	1.82	149.00	R13TSS		36.03		MODRES	CL		57.93	27M0F8W		72	P	
IRN	IRN10901	34.00	11	54.20	32.40	3.82	1.82	149.00	R13TSS		36.03		MODRES	CL		57.93	27M0F8W		72	P	
J	000BS-3N	109.85	11	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.30	27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	11	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.30	27M0F8W		33	PE	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
KIR	KIR00001	176.00	11	177.16	–0.79	4.47	1.27	163.00	R13TSS		36.91		MODRES	CL		58.91	27M0F8W			P	5, 7
LBN	LBN27900	11.00	11	35.80	33.90	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.68	27M0F8W			P	
LBR	LBR24400	–33.50	11	–9.30	6.60	1.22	0.70	133.00	R13TSS		45.13		MODRES	CR		58.33	27M0F8W			P	7
LBY	LBY32100	–25.00	11	13.10	27.20	2.36	1.12	129.00	R13TSS		40.23		MODRES	CL		58.13	27M0F8W			P	
LIE	LIE25300	–37.00	11	9.50	47.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.48	27M0F8W			P	
LTU	LTU06100	23.00	11	23.79	55.66	0.70	0.60	176.00	R13TSS		48.21		MODRES	CL		58.91	27M0F8W			P	7
LUX	LUX11400	–19.00	11	6.00	49.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.98	27M0F8W			P	
NRU	NRU30900	134.00	11	167.00	–0.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		57.58	27M0F8W			P	
ROU	ROU13600	–1.00	11	25.00	45.70	1.38	0.66	155.00	R13TSS		44.85		MODRES	CL		58.85	27M0F8W			P	5, 7
SMO	SMO05700	158.00	11	–172.30	–13.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.78	27M0F8W			P	
SNG	SNG15100	74.00	11	103.80	1.30	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.68	27M0F8W			P	
SOM	SOM31200	23.00	11	45.00	6.40	3.26	1.54	71.00	R13TSS		37.44		MODRES	CR		57.44	27M0F8W			P	
SVK	SVK14400	17.00	11	19.65	48.69	0.82	0.60	5.20	R13TSS		47.53		MODRES	CR		58.93	27M0F8W			P	
UGA	UGA05100	11.00	11	32.30	1.20	1.46	1.12	60.00	R13TSS		42.31		MODRES	CR		58.31	27M0F8W			P	
UKR	UKR06300	38.00	11	31.74	48.22	2.29	0.96	177.78	R13TSS		41.01		MODRES	CL		58.91	27M0F8W			P	5, 7
USA	MRA33200	122.00	11	145.90	16.90	1.20	0.60	76.00	R13TSS		45.87		MODRES	CR		58.57	27M0F8W		14	P	
USA	MRA33201	122.00	11	145.90	16.90	1.20	0.60	76.00	R13TSS		45.87		MODRES	CR		58.57	27M0F8W		14	P	
UZB	UZB07100	44.00	11	64.01	41.21	2.67	0.96	163.32	R13TSS		40.37		MODRES	CL		58.87	27M0F8W			P	5, 7
VTN	VTN32500	86.00	11	108.00	14.80	3.80	1.90	126.00	R123FR		35.86		MODRES	CL		58.36	27M0F8W			P	7
VUT	VUT12800	140.00	11	168.00	–16.40	1.52	0.68	87.00	R13TSS		44.30		MODRES	CL		58.00	27M0F8W			P	
ZMB	ZMB31400	–1.00	11	27.50	–13.10	2.38	1.48	39.00	R13TSS		38.98		MODRES	CR		58.78	27M0F8W			P	
ALG	ALG25200	–25.00	12	1.60	25.50	3.64	2.16	152.00	R13TSS		35.49		MODRES	CR		57.89	27M0F8W			P	
AND	AND34100	–37.00	12	1.60	42.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.58	27M0F8W			P	
ARS	ARS00300	17.00	12	41.10	23.80	3.52	1.68	134.00	R13TSS		36.73		MODRES	CL		57.83	27M0F8W		70	P	
AUS	AUS00500	152.00	12	133.90	–18.40	2.82	1.74	105.00	R13TSS		37.53		MODRES	CL		59.43	27M0F8W			P	
AUT	AUT01600	–19.00	12	12.20	47.50	1.14	0.63	166.00	R13TSS		45.88		MODRES	CL		59.18	27M0F8W			P	
AZE	AZE06400	23.00	12	47.47	40.14	0.93	0.60	158.14	R13TSS		46.98		MODRES	CR		58.88	27M0F8W			P	5, 7
BRU	BRU3300A	74.00	12	114.70	4.40	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.48	27M0F8W			P	5, 7
BUL	BUL02000	–1.00	12	25.00	43.00	1.04	0.60	165.00	R13TSS		46.50		MODRES	CR		58.80	27M0F8W			P	
CHN	CHN15600	62.00	12	97.80	36.30	2.56	1.58	157.00	R13TSS		38.38		MODRES	CR		58.58	27M0F8W			P	
CHN	CHN17000	92.00	12	119.50	33.00	1.34	0.64	155.00	R13TSS		45.11		MODRES	CR		59.41	27M0F8W			P	
CHN	CHN17800	79.80	12	111.50	27.40	1.22	0.86	130.00	R13TSS		44.24		MODRES	CL		59.44	27M0F8W			P	
COD	ZAI32200	–19.00	12	22.40	0.00	2.16	1.88	48.00	R13TSS		38.36		MODRES	CR		59.76	27M0F8W			P	
DNK	DNK08900	5.00	12	12.30	57.10	1.20	0.60	177.00	R13TSS		45.87		MODRES	CL		59.27	27M0F8W		28	P	
EGY	EGY02600	–7.00	12	29.70	26.80	2.33	1.72	136.00	R13TSS		38.42		MODRES	CL		58.22	27M0F8W			P	
F	F2_A2744	–7.00	12	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2784	–7.00	12	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2784	–7.00	12	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3384	–7.00	12	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2784	–7.00	12	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F	F3_D3384	–7.00	12	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	OCE10100	–160.00	12	–145.00	–16.30	4.34	3.54	4.00	R13TSS		32.58		MODRES	CL		58.58	27M0F8W			P	
F /EUT	E2WA7DA2	29.00	12	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	12	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	12	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	12	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	12	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	12	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	12	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
G	G 02700	–33.50	12	–3.50	53.80	1.84	0.72	142.00	R13TSS		43.23		MODRES	CR		60.13	27M0F8W			P	7
IND	IND04001	56.00	12	73.00	25.00	1.82	1.48	58.00	R13TSS		40.14		MODRES	CL		58.84	27M0F8W			P	
IND	IND04800	68.00	12	86.20	25.00	1.56	0.90	120.00	R13TSS		42.97		MODRES	CL		58.77	27M0F8W			P	
KOR	KO11201D	116.00	12	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.70	27M0G7W	KOREASAT-1	20	AE	
KOR	KOR11200	110.00	12	127.50	36.00	1.24	1.02	168.00	R13TSS		43.43		MODRES	CL		58.73	27M0F8W		20	P	
KOR	KOR11201	116.00	12	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		R13RES	CL		63.70	27M0F8W	KOREASAT-1	20	AE	
MAU	MAU24300	29.00	12	56.80	–13.90	1.56	1.38	65.00	R13TSS		41.12		MODRES	CR		58.82	27M0F8W			P	
MDA	MDA06300	38.00	12	28.41	46.99	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5, 7
MLD	MLD30600	44.00	12	73.10	6.00	0.96	0.60	90.00	R13TSS		46.84		MODRES	CR		58.74	27M0F8W			P	
MLI	MLI32800	–37.00	12	–7.60	13.20	1.74	1.24	171.00	R13TSS		41.11		MODRES	CR		58.81	27M0F8W			P	
MLT	MLT14700	–13.00	12	14.30	35.90	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		56.08	27M0F8W			P	
MOZ	MOZ30700	–1.00	12	34.00	–18.00	3.57	1.38	55.00	R13TSS		37.52		MODRES	CL		59.32	27M0F8W			P	
NZL	CKH05300	158.00	12	–163.00	–11.20	1.76	0.72	30.00	R13TSS		43.42		MODRES	CL		59.42	27M0F8W		4	P	
NZL	CKH05301	158.00	12	–163.00	–11.20	1.76	0.72	30.00	R13TSS		43.42		MODRES	CL		59.42	27M0F8W		4	P	
PAK	PAK21000	38.00	12	72.10	30.80	1.16	0.72	90.00	R13TSS		45.23		MODRES	CR		58.53	27M0F8W		74	P	
PAK	PAK21001	38.00	12	72.10	30.80	1.16	0.72	90.00	R13TSS		45.23		MODRES	CR		58.53	27M0F8W		74	P	
PLW	PLW00000	146.00	12	132.99	5.52	1.29	0.60	55.84	R13TSS		45.55		MODRES	CR		58.85	27M0F8W			P	7
PNG	PNG27100	128.00	12	148.00	–6.70	2.80	2.05	155.00	R13TSS		36.86		MODRES	CR		58.46	27M0F8W			P	
RRW	RRW31000	11.00	12	30.00	–2.10	0.66	0.60	42.00	R13TSS		48.47		MODRES	CL		59.87	27M0F8W			P	
S	SIRIUS02	5.20	12	14.00	63.00	1.30	0.70	142.00	R13TSS		42.50		R13RES	CR		58.00	27M0F8W	SIRIUS	28	AE	
STP	STP24100	–13.00	12	7.00	0.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.48	27M0F8W			P	
SVN	SVN14800	34.00	12	15.01	46.18	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5, 7
TON	TON21500	170.00	12	–174.70	–18.00	1.41	0.68	85.00	R13TSS		44.63		MODRES	CR		58.43	27M0F8W			P	
AFG	AFG24600	50.00	13	64.50	33.10	1.44	1.40	21.00	R13TSS		41.40		MODRES	CR		58.40	27M0F8W			P	
AUS	AUS00900	164.00	13	147.50	–32.10	2.31	1.43	187.00	R13TSS		39.25		MODRES	CR		59.25	27M0F8W		78	P	
AUS	AUS0090A	164.00	13	159.06	–31.52	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
AUS	AUS0090B	164.00	13	167.93	–29.02	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
BLR	BLR06200	38.00	13	27.91	53.06	1.21	0.60	11.47	R13TSS		45.83		MODRES	CL		58.93	27M0F8W			P	5
BTN	BTN03100	86.00	13	90.44	27.05	0.72	0.60	175.47	R13TSS		48.11		MODRES	CR		58.91	27M0F8W			P	5
CHN	CHN15501	62.00	13	88.30	31.50	3.38	1.45	162.00	R13TSS		37.54		MODRES	CL		58.04	27M0F8W			P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
CHN	CHN18000	92.00	13	113.70	12.90	3.76	2.18	72.00	R13TSS		35.31		MODRES	CL		58.61	27M0F8W			P	
CHN	CHN19000	122.00	13	114.17	23.32	0.91	0.60	2.88	R13TSS		47.08		MODRES	CR		58.88	27M0F8W			P	5
CME	CME30000	–13.00	13	12.70	6.20	2.54	1.68	87.00	R13TSS		38.15		MODRES	CR		58.65	27M0F8W			P	
E	HISPASA2	–30.00	13	–8.80	35.40	3.00	1.90	45.00	R13TSS		36.90		MODRES	CL		59.00	27M0F8W	HISPASAT-2		A	5, 7
EST	EST06100	23.00	13	25.01	58.47	0.72	0.60	9.93	R13TSS		48.09		MODRES	CL		58.89	27M0F8W			P	5
F	F 09300	–19.00	13	2.60	45.90	2.50	0.98	160.00	R13TSS		40.56		R13RES	CR		63.96	27M0F8W		19	PE	
F	F 09306	–7.00	13	2.60	45.90	2.50	0.98	160.00	R13TSS		41.00		MODRES	CR		58.90	27M0F8W	RADIOSAT	19	A	
F	F3_A2751	–7.00	13	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3351	–7.00	13	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2751	–7.00	13	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3351	–7.00	13	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	13	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	13	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	13	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	13	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	13	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	13	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	13	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FJI	FJI1930A	152.00	13	179.40	–17.90	1.04	0.98	67.00	R13TSS		44.36		MODRES	CR		58.76	27M0F8W			P	5, 7
GUI	GUI19200	–37.00	13	–11.00	10.20	1.58	1.04	147.00	R13TSS		42.29		MODRES	CL		58.59	27M0F8W			P	
HRV	HRV14800	34.00	13	16.74	44.54	0.88	0.69	5.30	R13TSS		46.57		MODRES	CL		58.87	27M0F8W			P	5
IND	IND03901	56.00	13	72.70	11.20	1.26	0.60	107.00	R13TSS		45.66		MODRES	CR		58.26	27M0F8W			P	
IND	IND04400	68.00	13	79.50	22.30	2.19	1.42	146.00	R13TSS		39.52		MODRES	CR		58.52	27M0F8W			P	
INS	INS03500	104.00	13	124.30	–3.20	3.34	1.94	82.00	R13TSS		36.33		MODRES	CR		58.43	27M0F8W			P	
J	000BS-3N	109.85	13	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.30	27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	13	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.30	27M0F8W		33	PE	
LBY	LBY28000	–25.00	13	21.40	26.00	2.50	1.04	119.00	R13TSS		40.30		MODRES	CL		58.60	27M0F8W			P	
MDG	MDG23600	29.00	13	46.60	–18.80	2.72	1.14	65.00	R13TSS		39.53		MODRES	CL		58.53	27M0F8W			P	
NZL	NZL05500	158.00	13	172.30	–39.70	2.88	1.56	47.00	R13TSS		37.92		MODRES	CR		58.52	27M0F8W			P	
NZL	NZL28700	128.00	13	173.00	–41.00	3.30	1.28	48.00	R13TSS		38.19		MODRES	CR		59.79	27M0F8W			P	
POL	POL13200	–1.00	13	19.30	51.80	1.46	0.64	162.00	R13TSS		44.74		MODRES	CL		59.34	27M0F8W			P	
QAT	QAT24700	17.00	13	51.10	25.30	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		56.98	27M0F8W			P	
SLM	SLM00000	146.00	13	159.32	–8.40	1.50	1.18	140.48	R13TSS		41.98		MODRES	CL		58.88	27M0F8W			P	5, 7
SMR	SMR31100	–37.00	13	12.60	43.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W			P	
SWZ	SWZ31300	–1.00	13	31.50	–26.50	0.62	0.60	66.00	R13TSS		48.74		MODRES	CR		58.04	27M0F8W			P	
THA	THA14200	74.00	13	100.70	13.20	2.82	1.54	106.00	R13TSS		38.07		MODRES	CL		58.77	27M0F8W			P	
TJK	TJK06900	44.00	13	71.14	38.37	1.25	0.76	159.15	R13TSS		44.65		MODRES	CL		58.85	27M0F8W			P	5
TUR	TUR14500	5.00	13	34.40	38.90	2.68	1.04	168.00	R13TSS		40.00		MODRES	CR		58.90	27M0F8W			P	
USA	PLM33700	170.00	13	–161.40	7.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W		9	P	
USA	PLM33701	170.00	13	–161.40	7.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W		9	P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
USA	SMA33500	170.00	13	–170.10	–14.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.28	27M0F8W		13	P	
USA	SMA33501	170.00	13	–170.10	–14.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.28	27M0F8W		13	P	
USA	WAK33400	140.00	13	166.50	19.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.68	27M0F8W		11	P	
USA	WAK33401	140.00	13	166.50	19.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.68	27M0F8W		11	P	
YEM	YEM26700	11.00	13	48.61	14.42	1.68	1.44	157.35	R13TSS		40.61		MODRES	CL		58.91	27M0F8W			P	7
	YYY00001	11.00	13	34.99	31.86	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	3, 5, 7
ALG	ALG25100	–25.00	14	4.20	33.20	2.45	1.25	172.00	R13TSS		39.59		MODRES	CR		58.59	27M0F8W			P	
ARS	ARS27500	17.00	14	48.30	24.60	3.84	1.20	138.00	R13TSS		37.81		MODRES	CL		58.01	27M0F8W			P	
AUS	AUS00600	152.00	14	136.60	–30.90	2.41	1.52	161.00	R13TSS		38.80		MODRES	CL		58.40	27M0F8W			P	
AUS	AUS00800	164.00	14	145.90	–21.70	3.62	1.63	136.00	R13TSS		36.73		MODRES	CL		58.83	27M0F8W			P	
BIH	BIH14800	34.00	14	17.77	44.32	0.62	0.60	166.84	R13TSS		48.71		MODRES	CR		58.91	27M0F8W			P	5
BOT	BOT29700	–1.00	14	23.30	–22.20	2.13	1.50	36.00	R13TSS		39.40		MODRES	CL		58.90	27M0F8W			P	
BRU	BRU3300A	74.00	14	114.70	4.40	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W			P	5
CHN	CHN15401	62.00	14	83.90	40.50	2.75	2.05	177.00	R13TSS		36.94		MODRES	CR		58.44	27M0F8W			P	
CHN	CHN17200	92.00	14	120.40	29.10	0.96	0.84	123.00	R13TSS		45.38		MODRES	CR		59.28	27M0F8W			P	
CHN	CHN18100	79.80	14	108.50	23.80	1.41	1.08	153.00	R13TSS		42.62		MODRES	CL		59.12	27M0F8W			P	
CLN	CLN21900	50.00	14	80.60	7.70	1.18	0.60	106.00	R13TSS		45.95		MODRES	CR		58.85	27M0F8W			P	
COD	ZAI32300	–19.00	14	21.30	–6.80	2.80	1.52	149.00	R13TSS		38.16		MODRES	CR		59.76	27M0F8W			P	
D	D 08700	–19.00	14	9.60	49.90	1.62	0.72	147.00	R13TSS		43.78		MODRES	CL		60.68	27M0F8W			P	
F	F2_A2722	–7.00	14	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		57.70	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2722	–7.00	14	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		57.70	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2762	–7.00	14	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		57.70	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2722	–7.00	14	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A2762	–7.00	14	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3322	–7.00	14	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_A3362	–7.00	14	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2722	–7.00	14	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D2762	–7.00	14	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3322	–7.00	14	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	F3_D3362	–7.00	14	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	NCL10000	140.00	14	166.00	–21.00	1.14	0.72	146.00	R13TSS		45.30		MODRES	CR		58.90	27M0F8W		6	P	
F	NCL10001	140.00	14	166.00	–21.00	1.14	0.72	146.00	R13TSS		45.30		MODRES	CR		58.90	27M0F8W		6	P	
F	WAL10200	140.00	14	–176.80	–14.00	0.74	0.60	29.00	R13TSS		47.97		MODRES	CR		59.57	27M0F8W		8	P	
F	WAL10201	140.00	14	–176.80	–14.00	0.74	0.60	29.00	R13TSS		47.97		MODRES	CR		59.57	27M0F8W		8	P	
F /EUT	E2WA7DA2	29.00	14	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	14	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	14	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	14	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	14	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F /EUT	E2WA7DF2	29.00	14	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	14	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
GNB	GNB30400	–30.00	14	–15.00	12.00	0.90	0.60	172.00	R13TSS		47.12		MODRES	CL		58.32	27M0F8W			P	7
IND	IND03701	68.00	14	93.00	25.50	1.46	1.13	40.00	R13TSS		42.27		MODRES	CL		59.07	27M0F8W			P	
IND	IND04500	56.00	14	76.20	19.50	1.58	1.58	21.00	R13TSS		40.47		MODRES	CL		58.67	27M0F8W			P	
IRL	IRL21100	–33.50	14	–8.20	53.20	0.84	0.60	162.00	R13TSS		47.42		MODRES	CR		59.42	27M0F8W			P	7
KRE	KRE28600	110.00	14	127.00	39.10	1.30	1.10	31.00	R13TSS		42.89		MODRES	CL		58.99	27M0F8W			P	
MAU	MAU24200	29.00	14	59.80	–18.90	1.62	1.24	55.00	R13TSS		41.42		MODRES	CR		59.12	27M0F8W			P	
MHL	MHL00000	146.00	14	167.64	9.83	2.07	0.90	157.42	R13TSS		41.75		MODRES	CR		58.95	27M0F8W			P	7
MKD	MKD14800	23.00	14	21.61	41.56	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5
MLI	MLI32700	–37.00	14	–2.00	19.00	2.66	1.26	127.00	R13TSS		39.19		MODRES	CR		58.19	27M0F8W			P	
NOR	BIFROS22	–0.80	14	17.00	61.50					NO9	32.00	6.00	MODRES	CR		54.50	27M0FXF	BIFROST-2		A	
NOR	NOR12000	5.00	14	13.10	64.10	1.84	0.88	10.00	R13TSS		42.35		MODRES	CL		59.95	27M0F8W			P	
NZL	CKH05200	158.00	14	–161.00	–19.80	1.02	0.64	132.00	R13TSS		46.30		MODRES	CL		59.80	27M0F8W		3	P	
NZL	CKH05201	158.00	14	–161.00	–19.80	1.02	0.64	132.00	R13TSS		46.30		MODRES	CL		59.80	27M0F8W		3	P	
PAK	PAK21000	38.00	14	72.10	30.80	1.16	0.72	90.00	R13TSS		45.23		MODRES	CR		58.63	27M0F8W		74	P	
PNG	PNG13100	110.00	14	147.70	–6.30	2.50	2.18	169.00	R13TSS		37.08		MODRES	CR		59.58	27M0F8W			P	
TCD	TCD14300	–13.00	14	18.10	15.50	3.40	1.72	107.00	R13TSS		36.78		MODRES	CL		59.08	27M0F8W			P	
TGO	TGO22600	–25.00	14	0.80	8.60	1.52	0.60	105.00	R13TSS		44.85		MODRES	CL		58.55	27M0F8W			P	
TUV	TUV00000	176.00	14	177.61	–7.11	0.94	0.60	137.58	R13TSS		46.93		MODRES	CR		58.93	27M0F8W			P	
USA	GUM33100	122.00	14	144.50	13.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.48	27M0F8W		15	P	
USA	GUM33101	122.00	14	144.50	13.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.48	27M0F8W		15	P	
YEM	YEM26600	11.00	14	44.00	15.67	0.80	0.60	114.88	R13TSS		47.66		MODRES	CR		58.86	27M0F8W			P	
AFG	AFG24500	50.00	15	70.20	35.50	1.32	1.13	53.00	R13TSS		42.71		MODRES	CR		58.01	27M0F8W			P	
AUS	AUS00400	152.00	15	123.00	–24.20	3.06	2.17	102.00	R13TSS		36.22		MODRES	CR		58.22	27M0F8W		76	P	
AUS	AUS0040A	152.00	15	96.83	–12.19	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	
AUS	AUS0040B	152.00	15	105.69	–10.45	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	
AUS	AUS0040C	152.00	15	110.52	–66.28	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	
AUS	AUS00700	164.00	15	145.20	–38.10	2.12	1.02	147.00	R13TSS		41.09		MODRES	CR		58.49	27M0F8W		77	P	
AUS	AUS0070A	164.00	15	158.94	–54.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		77	P	7
BEN	BEN23300	–19.00	15	2.20	9.50	1.44	0.68	97.00	R13TSS		44.54		MODRES	CL		58.44	27M0F8W			P	
BGD	BGD22000	74.00	15	90.30	23.60	1.46	0.84	135.00	R13TSS		43.56		MODRES	CR		58.66	27M0F8W			P	
CHN	CHN15800	79.80	15	111.80	38.00	2.60	1.74	124.00	R13TSS		37.89		MODRES	CR		59.89	27M0F8W			P	
CHN	CHN17400	92.00	15	118.10	25.90	1.02	0.84	82.00	R13TSS		45.12		MODRES	CL		59.12	27M0F8W			P	
COM	COM20700	29.00	15	44.10	–12.10	0.76	0.60	149.00	R13TSS		47.86		MODRES	CL		58.26	27M0F8W			P	
E	HISPASA2	–30.00	15	–8.80	35.40	3.00	1.90	45.00	R13TSS		36.90		MODRES	CL		59.00	27M0F8W	HISPASAT-2		A	5
F	F2_A2733	–7.00	15	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CR		57.70	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2773	–7.00	15	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CR		57.70	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2773	–7.00	15	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3373	–7.00	15	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0F9W	RADIOSAT-3	19	A	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F	F3_D2773	–7.00	15	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3373	–7.00	15	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	15	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	15	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	15	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	15	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	15	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	15	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	15	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FSM	FSM00000	146.00	15	151.67	5.42	5.34	1.51	166.52	R13TSS		35.37		MODRES	CL		58.87	27M0F8W			P	5, 7
GAB	GAB26000	–13.00	15	11.80	–0.60	1.43	1.12	64.00	R13TSS		42.40		MODRES	CR		58.50	27M0F8W			P	
GMB	GMB30200	–37.00	15	–15.10	13.40	0.79	0.60	4.00	R13TSS		47.69		MODRES	CL		58.49	27M0F8W			P	
GRC	GRC10500	5.00	15	24.70	38.20	1.78	0.98	156.00	R13TSS		42.03		MODRES	CR		58.53	27M0F8W			P	
IND	IND04301	56.00	15	77.80	11.10	1.36	1.28	172.00	R13TSS		42.04		MODRES	CR		58.54	27M0F8W			P	
IND	IND04700	68.00	15	93.30	11.10	1.92	0.60	96.00	R13TSS		43.83		MODRES	CR		58.63	27M0F8W			P	
INS	INS03600	104.00	15	135.20	–3.80	2.46	2.00	147.00	R13TSS		37.53		MODRES	CR		58.93	27M0F8W			P	
IRN	IRN10900	34.00	15	54.20	32.40	3.82	1.82	149.00	R13TSS		36.03		MODRES	CL		58.03	27M0F8W		72	P	
J	000BS-3N	109.85	15	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.40	27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	15	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		R13RES	CR		64.40	27M0F8W		33	PE	
KIR	KIR00002	176.00	15	–157.78	–0.33	2.40	0.64	110.62	R13TSS		42.60		MODRES	CL		58.90	27M0F8W			P	5
LBN	LBN27900	11.00	15	35.80	33.90	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.78	27M0F8W			P	
LBR	LBR24400	–33.50	15	–9.30	6.60	1.22	0.70	133.00	R13TSS		45.13		MODRES	CR		58.43	27M0F8W			P	7
LBY	LBY32100	–25.00	15	13.10	27.20	2.36	1.12	129.00	R13TSS		40.23		MODRES	CL		58.23	27M0F8W			P	
LIE	LIE25300	–37.00	15	9.50	47.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W			P	
LTU	LTU06100	23.00	15	23.79	55.66	0.70	0.60	176.00	R13TSS		48.21		MODRES	CL		58.91	27M0F8W			P	
LUX	LUX11400	–19.00	15	6.00	49.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.08	27M0F8W			P	
NRU	NRU30900	134.00	15	167.00	–0.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		57.68	27M0F8W			P	
ROU	ROU13600	–1.00	15	25.00	45.70	1.38	0.66	155.00	R13TSS		44.85		MODRES	CL		58.95	27M0F8W			P	5
SMO	SMO05700	158.00	15	–172.30	–13.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.78	27M0F8W			P	
SNG	SNG15100	74.00	15	103.80	1.30	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.68	27M0F8W			P	
SOM	SOM31200	23.00	15	45.00	6.40	3.26	1.54	71.00	R13TSS		37.44		MODRES	CR		57.54	27M0F8W			P	
SVK	SVK14400	17.00	15	19.65	48.69	0.82	0.60	5.20	R13TSS		47.53		MODRES	CR		58.93	27M0F8W			P	
UGA	UGA05100	11.00	15	32.30	1.20	1.46	1.12	60.00	R13TSS		42.31		MODRES	CR		58.41	27M0F8W			P	
UKR	UKR06300	38.00	15	31.74	48.22	2.29	0.96	177.78	R13TSS		41.01		MODRES	CL		58.91	27M0F8W			P	5
USA	MRA33200	122.00	15	145.90	16.90	1.20	0.60	76.00	R13TSS		45.87		MODRES	CR		58.57	27M0F8W		14	P	
USA	MRA33201	122.00	15	145.90	16.90	1.20	0.60	76.00	R13TSS		45.87		MODRES	CR		58.57	27M0F8W		14	P	
UZB	UZB07100	44.00	15	64.01	41.21	2.67	0.96	163.32	R13TSS		40.37		MODRES	CL		58.87	27M0F8W			P	5
VTN	VTN32500	86.00	15	108.00	14.80	3.80	1.90	126.00	R123FR		35.86		MODRES	CL		58.36	27M0F8W			P	
VUT	VUT12800	140.00	15	168.00	–16.40	1.52	0.68	87.00	R13TSS		44.30		MODRES	CL		58.00	27M0F8W			P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
ZMB	ZMB31400	–1.00	15	27.50	–13.10	2.38	1.48	39.00	R13TSS		38.98		MODRES	CR		58.88	27M0F8W			P	
ALG	ALG25200	–25.00	16	1.60	25.50	3.64	2.16	152.00	R13TSS		35.49		MODRES	CR		57.99	27M0F8W			P	
AND	AND34100	–37.00	16	1.60	42.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.58	27M0F8W			P	
ARS	ARS00300	17.00	16	41.10	23.80	3.52	1.68	134.00	R13TSS		36.73		MODRES	CL		57.83	27M0F8W		70	P	
AUS	AUS00500	152.00	16	133.90	–18.40	2.82	1.74	105.00	R13TSS		37.53		MODRES	CL		59.43	27M0F8W			P	
AUT	AUT01600	–19.00	16	12.20	47.50	1.14	0.63	166.00	R13TSS		45.88		MODRES	CL		59.28	27M0F8W			P	
AZE	AZE06400	23.00	16	47.47	40.14	0.93	0.60	158.14	R13TSS		46.98		MODRES	CR		58.88	27M0F8W			P	5
BRU	BRU3300A	74.00	16	114.70	4.40	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W			P	5
BUL	BUL02000	–1.00	16	25.00	43.00	1.04	0.60	165.00	R13TSS		46.50		MODRES	CR		58.80	27M0F8W			P	
CHN	CHN16900	92.00	16	118.50	36.40	1.16	0.76	11.00	R13TSS		44.99		MODRES	CR		59.69	27M0F8W			P	
CHN	CHN18600	62.00	16	102.50	30.20	1.91	1.23	147.00	R13TSS		40.74		MODRES	CL		60.54	27M0F8W			P	
COD	ZAI32200	–19.00	16	22.40	0.00	2.16	1.88	48.00	R13TSS		38.36		MODRES	CR		59.86	27M0F8W			P	
DNK	DNK08900	5.00	16	12.30	57.10	1.20	0.60	177.00	R13TSS		45.87		MODRES	CL		59.37	27M0F8W		28	P	
EGY	EGY02600	–7.00	16	29.70	26.80	2.33	1.72	136.00	R13TSS		38.42		MODRES	CL		58.32	27M0F8W			P	
F	F2_A2744	–7.00	16	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2784	–7.00	16	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2784	–7.00	16	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3384	–7.00	16	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2784	–7.00	16	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3384	–7.00	16	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	OCE10100	–160.00	16	–145.00	–16.30	4.34	3.54	4.00	R13TSS		32.58		MODRES	CL		58.68	27M0F8W			P	
F /EUT	E2WA7DA2	29.00	16	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	16	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	16	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	16	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	16	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	16	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	16	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
G	G 02700	–33.50	16	–3.50	53.80	1.84	0.72	142.00	R13TSS		43.23		MODRES	CR		60.23	27M0F8W			P	7
IND	IND04000	56.00	16	73.00	25.00	1.82	1.48	58.00	R13TSS		40.14		MODRES	CL		58.84	27M0F8W			P	
IND	IND04801	68.00	16	86.20	25.00	1.56	0.90	120.00	R13TSS		42.97		MODRES	CL		60.47	27M0F8W			P	
KRE	KRE28600	110.00	16	127.00	39.10	1.30	1.10	31.00	R13TSS		42.89		MODRES	CL		58.99	27M0F8W			P	
MAU	MAU24300	29.00	16	56.80	–13.90	1.56	1.38	65.00	R13TSS		41.12		MODRES	CR		58.92	27M0F8W			P	
MDA	MDA06300	38.00	16	28.41	46.99	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5
MLA	MLA22700	86.00	16	102.10	4.10	1.62	0.82	135.00	R13TSS		43.21		MODRES	CR		58.21	27M0F8W			P	1
MLD	MLD30600	44.00	16	73.10	6.00	0.96	0.60	90.00	R13TSS		46.84		MODRES	CR		58.74	27M0F8W			P	
MLI	MLI32800	–37.00	16	–7.60	13.20	1.74	1.24	171.00	R13TSS		41.11		MODRES	CR		58.91	27M0F8W			P	
MLT	MLT14700	–13.00	16	14.30	35.90	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		56.18	27M0F8W			P	
MOZ	MOZ30700	–1.00	16	34.00	–18.00	3.57	1.38	55.00	R13TSS		37.52		MODRES	CL		59.42	27M0F8W			P	
NZL	CKH05300	158.00	16	–163.00	–11.20	1.76	0.72	30.00	R13TSS		43.42		MODRES	CL		59.52	27M0F8W		4	P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
NZL	CKH05301	158.00	16	–163.00	–11.20	1.76	0.72	30.00	R13TSS		43.42		MODRES	CL		59.52	27M0F8W		4	P	
PHL	PHL28500	98.00	16	121.30	11.10	3.46	1.76	99.00	R13TSS		36.60		MODRES	CL		58.70	27M0F8W			P	
PLW	PLW00000	146.00	16	132.99	5.52	1.29	0.60	55.84	R13TSS		45.55		MODRES	CR		58.85	27M0F8W			P	7
RRW	RRW31000	11.00	16	30.00	–2.10	0.66	0.60	42.00	R13TSS		48.47		MODRES	CL		59.97	27M0F8W			P	
S	SIRIUS02	5.20	16	14.00	63.00	1.30	0.70	142.00	R13TSS		42.50		R13RES	CR		58.00	27M0F8W	SIRIUS	28	AE	
STP	STP24100	–13.00	16	7.00	0.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.58	27M0F8W			P	
SVN	SVN14800	34.00	16	15.01	46.18	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5
TON	TON21500	170.00	16	–174.70	–18.00	1.41	0.68	85.00	R13TSS		44.63		MODRES	CR		58.53	27M0F8W			P	
AUS	AUS00900	164.00	17	147.50	–32.10	2.31	1.43	187.00	R13TSS		39.25		MODRES	CR		59.25	27M0F8W		78	P	
AUS	AUS0090A	164.00	17	159.06	–31.52	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
AUS	AUS0090B	164.00	17	167.93	–29.02	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
BLR	BLR06200	38.00	17	27.91	53.06	1.21	0.60	11.47	R13TSS		45.83		MODRES	CL		58.93	27M0F8W			P	5
BRM	BRM29800	74.00	17	97.10	19.10	3.58	1.48	104.00	R13TSS		37.21		MODRES	CL		58.91	27M0F8W			P	
BTN	BTN03100	86.00	17	90.44	27.05	0.72	0.60	175.47	R13TSS		48.11		MODRES	CR		58.91	27M0F8W			P	5
CHN	CHN16700	92.00	17	124.30	43.70	1.98	0.72	156.00	R13TSS		42.91		MODRES	CL		59.71	27M0F8W			P	
CHN	CHN18200	79.80	17	108.70	35.10	1.42	0.88	109.00	R13TSS		43.48		MODRES	CR		59.18	27M0F8W			P	
CME	CME30000	–13.00	17	12.70	6.20	2.54	1.68	87.00	R13TSS		38.15		MODRES	CR		58.65	27M0F8W			P	
E	HISPASA2	–30.00	17	–8.80	35.40	3.00	1.90	45.00	R13TSS		36.90		MODRES	CL		59.00	27M0F8W	HISPASAT-2		A	5
EST	EST06100	23.00	17	25.01	58.47	0.72	0.60	9.93	R13TSS		48.09		MODRES	CL		58.89	27M0F8W			P	5
F	F 09300	–19.00	17	2.60	45.90	2.50	0.98	160.00	R13TSS		40.56		R13RES	CR		63.96	27M0F8W		19	PE	
F	F 09306	–7.00	17	2.60	45.90	2.50	0.98	160.00	R13TSS		41.00		MODRES	CR		58.90	27M0F8W	RADIOSAT	19	A	
F	F3_A2751	–7.00	17	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3351	–7.00	17	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2751	–7.00	17	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3351	–7.00	17	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	17	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	17	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	17	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	17	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	17	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	17	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	17	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
GUI	GUI19200	–37.00	17	–11.00	10.20	1.58	1.04	147.00	R13TSS		42.29		MODRES	CL		58.69	27M0F8W			P	
HRV	HRV14800	34.00	17	16.74	44.54	0.88	0.69	5.30	R13TSS		46.57		MODRES	CL		58.87	27M0F8W			P	5
IND	IND03801	56.00	17	75.90	33.40	1.52	1.08	33.00	R13TSS		42.29		MODRES	CR		59.29	27M0F8W			P	
IND	IND04600	68.00	17	84.70	20.50	1.60	0.86	30.00	R13TSS		43.06		MODRES	CR		58.56	27M0F8W			P	
INS	INS03200	80.20	17	112.30	–0.30	2.66	2.32	109.00	R13TSS		36.54		MODRES	CL		59.04	27M0F8W			P	
LBY	LBY28000	–25.00	17	21.40	26.00	2.50	1.04	119.00	R13TSS		40.30		MODRES	CL		58.70	27M0F8W			P	
MDG	MDG23600	29.00	17	46.60	–18.80	2.72	1.14	65.00	R13TSS		39.53		MODRES	CL		58.53	27M0F8W			P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
NPL	NPL12200	50.00	17	83.70	28.30	1.72	0.60	163.00	R13TSS		44.31		MODRES	CL		59.61	27M0F8W			P	
NZL	NZL28700	128.00	17	173.00	–41.00	3.30	1.28	48.00	R13TSS		38.19		MODRES	CR		59.79	27M0F8W			P	
POL	POL13200	–1.00	17	19.30	51.80	1.46	0.64	162.00	R13TSS		44.74		MODRES	CL		59.34	27M0F8W			P	
QAT	QAT24700	17.00	17	51.10	25.30	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		56.98	27M0F8W			P	1
SMR	SMR31100	–37.00	17	12.60	43.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.68	27M0F8W			P	
SWZ	SWZ31300	–1.00	17	31.50	–26.50	0.62	0.60	66.00	R13TSS		48.74		MODRES	CR		58.04	27M0F8W			P	
TJK	TJK06900	44.00	17	71.14	38.37	1.25	0.76	159.15	R13TSS		44.65		MODRES	CL		58.85	27M0F8W			P	5
TUR	TUR14500	5.00	17	34.40	38.90	2.68	1.04	168.00	R13TSS		40.00		MODRES	CR		58.90	27M0F8W			P	
USA	PLM33700	170.00	17	–161.40	7.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W		9	P	
USA	PLM33701	170.00	17	–161.40	7.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W		9	P	
USA	SMA33500	170.00	17	–170.10	–14.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.38	27M0F8W		13	P	
USA	SMA33501	170.00	17	–170.10	–14.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.38	27M0F8W		13	P	
USA	WAK33400	140.00	17	166.50	19.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.78	27M0F8W		11	P	
USA	WAK33401	140.00	17	166.50	19.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.78	27M0F8W		11	P	
YEM	YEM26700	11.00	17	48.61	14.42	1.68	1.44	157.35	R13TSS		40.61		MODRES	CL		58.91	27M0F8W			P	
	YYY00001	11.00	17	34.99	31.86	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	3, 5
ALG	ALG25100	–25.00	18	4.20	33.20	2.45	1.25	172.00	R13TSS		39.59		MODRES	CR		58.59	27M0F8W			P	
ARS	ARS27500	17.00	18	48.30	24.60	3.84	1.20	138.00	R13TSS		37.81		MODRES	CL		58.01	27M0F8W			P	
AUS	AUS00600	152.00	18	136.60	–30.90	2.41	1.52	161.00	R13TSS		38.80		MODRES	CL		58.40	27M0F8W			P	
AUS	AUS00800	164.00	18	145.90	–21.70	3.62	1.63	136.00	R13TSS		36.73		MODRES	CL		58.83	27M0F8W			P	
BGD	BGD22000	74.00	18	90.30	23.60	1.46	0.84	135.00	R13TSS		43.56		MODRES	CR		58.66	27M0F8W			P	
BIH	BIH14800	34.00	18	17.77	44.32	0.62	0.60	166.84	R13TSS		48.71		MODRES	CR		58.91	27M0F8W			P	5
BOT	BOT29700	–1.00	18	23.30	–22.20	2.13	1.50	36.00	R13TSS		39.40		MODRES	CL		59.00	27M0F8W			P	
BRU	BRU3300A	74.00	18	114.70	4.40	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W			P	5
CBG	CBG29900	68.00	18	105.00	12.70	1.01	0.90	110.00	R13TSS		44.86		MODRES	CR		59.26	27M0F8W			P	
CHN	CHN15900	79.80	18	109.40	27.30	2.14	1.72	107.00	R13TSS		38.79		MODRES	CL		59.49	27M0F8W			P	
CHN	CHN18500	62.00	18	95.70	35.40	2.10	1.14	156.00	R13TSS		40.66		MODRES	CR		58.36	27M0F8W			P	
COD	ZAI32300	–19.00	18	21.30	–6.80	2.80	1.52	149.00	R13TSS		38.16		MODRES	CR		59.86	27M0F8W			P	
D	D 08700	–19.00	18	9.60	49.90	1.62	0.72	147.00	R13TSS		43.78		MODRES	CL		60.68	27M0F8W			P	
F	F2_A2722	–7.00	18	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		57.20	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2722	–7.00	18	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		57.20	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2762	–7.00	18	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		57.20	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2722	–7.00	18	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A2762	–7.00	18	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3322	–7.00	18	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_A3362	–7.00	18	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2722	–7.00	18	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D2762	–7.00	18	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3322	–7.00	18	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	F3_D3362	–7.00	18	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F /EUT	E2WA7DA2	29.00	18	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	18	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	18	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	18	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	18	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	18	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	18	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
GNB	GNB30400	–30.00	18	–15.00	12.00	0.90	0.60	172.00	R13TSS		47.12		MODRES	CL		58.32	27M0F8W			P	7
IND	IND04100	56.00	18	78.40	16.00	2.08	1.38	35.00	R13TSS		39.87		MODRES	CL		58.77	27M0F8W			P	
IND	IND04201	68.00	18	79.30	27.70	2.14	1.16	147.00	R13TSS		40.50		MODRES	CL		58.80	27M0F8W			P	
INS	INS03000	80.20	18	112.30	–8.10	3.14	1.46	169.00	R13TSS		37.83		MODRES	CR		59.23	27M0F8W			P	
IRL	IRL21100	–33.50	18	–8.20	53.20	0.84	0.60	162.00	R13TSS		47.42		MODRES	CR		59.52	27M0F8W			P	7
KRE	KRE28600	110.00	18	127.00	39.10	1.30	1.10	31.00	R13TSS		42.89		MODRES	CL		58.99	27M0F8W			P	
MAU	MAU24200	29.00	18	59.80	–18.90	1.62	1.24	55.00	R13TSS		41.42		MODRES	CR		59.22	27M0F8W			P	
MHL	MHL00000	146.00	18	167.64	9.83	2.07	0.90	157.42	R13TSS		41.75		MODRES	CR		58.95	27M0F8W			P	7
MKD	MKD14800	23.00	18	21.61	41.56	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5
MLA	MLA22700	86.00	18	102.10	4.10	1.62	0.82	135.00	R13TSS		43.21		MODRES	CR		58.31	27M0F8W			P	
MLI	MLI32700	–37.00	18	–2.00	19.00	2.66	1.26	127.00	R13TSS		39.19		MODRES	CR		58.19	27M0F8W			P	
NOR	BIFROS22	–0.80	18	17.00	61.50					NO9	32.00	6.00	MODRES	CR		54.50	27M0FXF	BIFROST-2		A	
NOR	NOR12000	5.00	18	13.10	64.10	1.84	0.88	10.00	R13TSS		42.35		MODRES	CL		59.95	27M0F8W			P	
PAK	PAK28100	38.00	18	65.20	27.90	1.52	1.42	28.00	R13TSS		41.11		MODRES	CR		58.01	27M0F8W			P	
PHL	PHL28500	98.00	18	121.30	11.10	3.46	1.76	99.00	R13TSS		36.60		MODRES	CL		58.70	27M0F8W			P	
TCD	TCD14300	–13.00	18	18.10	15.50	3.40	1.72	107.00	R13TSS		36.78		MODRES	CL		59.18	27M0F8W			P	
TGO	TGO22600	–25.00	18	0.80	8.60	1.52	0.60	105.00	R13TSS		44.85		MODRES	CL		58.65	27M0F8W			P	
USA	GUM33100	122.00	18	144.50	13.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.48	27M0F8W		15	P	
USA	GUM33101	122.00	18	144.50	13.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		58.48	27M0F8W		15	P	
YEM	YEM26600	11.00	18	44.00	15.67	0.80	0.60	114.88	R13TSS		47.66		MODRES	CR		58.86	27M0F8W			P	
AUS	AUS00400	152.00	19	123.00	–24.20	3.06	2.17	102.00	R13TSS		36.22		MODRES	CR		58.22	27M0F8W		76	P	
AUS	AUS0040A	152.00	19	96.83	–12.19	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	
AUS	AUS0040B	152.00	19	105.69	–10.45	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	
AUS	AUS0040C	152.00	19	110.52	–66.28	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	
AUS	AUS00700	164.00	19	145.20	–38.10	2.12	1.02	147.00	R13TSS		41.09		MODRES	CR		58.49	27M0F8W		77	P	
AUS	AUS0070A	164.00	19	158.94	–54.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		77	P	7
BEN	BEN23300	–19.00	19	2.20	9.50	1.44	0.68	97.00	R13TSS		44.54		MODRES	CL		58.54	27M0F8W			P	
BRM	BRM29800	74.00	19	97.10	19.10	3.58	1.48	104.00	R13TSS		37.21		MODRES	CL		58.91	27M0F8W			P	
CHN	CHN15800	79.80	19	111.80	38.00	2.60	1.74	124.00	R13TSS		37.89		MODRES	CR		59.89	27M0F8W			P	
CHN	CHN17900	92.00	19	112.20	21.90	1.84	1.22	37.00	R13TSS		40.94		MODRES	CL		58.84	27M0F8W			P	
COM	COM2070A	29.00	19	44.10	–12.10	0.76	0.60	149.00	R13TSS		47.86		MODRES	CL		58.26	27M0F8W			P	5
E	HISPASA2	–30.00	19	–8.80	35.40	3.00	1.90	45.00	R13TSS		36.90		MODRES	CL		59.00	27M0F8W	HISPASAT-2		A	5

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F	F2_A2733	–7.00	19	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CR		57.20	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2773	–7.00	19	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CR		57.20	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2773	–7.00	19	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3373	–7.00	19	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2773	–7.00	19	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3373	–7.00	19	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	68.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	19	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	19	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	19	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	19	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	19	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	19	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	19	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FSM	FSM00000	146.00	19	151.67	5.42	5.34	1.51	166.52	R13TSS		35.37		MODRES	CL		58.87	27M0F8W			P	5, 7
GAB	GAB26000	–13.00	19	11.80	–0.60	1.43	1.12	64.00	R13TSS		42.40		MODRES	CR		58.60	27M0F8W			P	
GMB	GMB30200	–37.00	19	–15.10	13.40	0.79	0.60	4.00	R13TSS		47.69		MODRES	CL		58.49	27M0F8W			P	
GRC	GRC10500	5.00	19	24.70	38.20	1.78	0.98	156.00	R13TSS		42.03		MODRES	CR		58.53	27M0F8W			P	
IND	IND03800	56.00	19	75.90	33.40	1.52	1.08	33.00	R13TSS		42.29		MODRES	CR		59.29	27M0F8W			P	
IND	IND04601	68.00	19	84.70	20.50	1.60	0.86	30.00	R13TSS		43.06		MODRES	CR		58.56	27M0F8W			P	
INS	INS03200	80.20	19	112.30	–0.30	2.66	2.32	109.00	R13TSS		36.54		MODRES	CL		59.14	27M0F8W			P	
INS	INS03600	104.00	19	135.20	–3.80	2.46	2.00	147.00	R13TSS		37.53		MODRES	CR		59.03	27M0F8W			P	1
IRN	IRN10900	34.00	19	54.20	32.40	3.82	1.82	149.00	R13TSS		36.03		MODRES	CL		58.03	27M0F8W		72	P	
KIR	KIR00002	176.00	19	–157.78	–0.33	2.40	0.64	110.62	R13TSS		42.60		MODRES	CL		58.90	27M0F8W			P	5
LBN	LBN27900	11.00	19	35.80	33.90	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.78	27M0F8W			P	
LBR	LBR2440A	–33.50	19	–9.30	6.60	1.22	0.70	133.00	R13TSS		45.13		MODRES	CR		58.43	27M0F8W			P	5, 7
LBY	LBY32100	–25.00	19	13.10	27.20	2.36	1.12	129.00	R13TSS		40.23		MODRES	CL		58.33	27M0F8W			P	
LIE	LIE25300	–37.00	19	9.50	47.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W			P	
LTU	LTU06100	23.00	19	23.79	55.66	0.70	0.60	176.00	R13TSS		48.21		MODRES	CL		58.91	27M0F8W			P	
LUX	LUX11400	–19.00	19	6.00	49.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.08	27M0F8W			P	
NPL	NPL12200	50.00	19	83.70	28.30	1.72	0.60	163.00	R13TSS		44.31		MODRES	CL		59.61	27M0F8W			P	
NZL	NIU05400	158.00	19	–169.80	–19.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		59.08	27M0F8W		2	P	
NZL	NIU05401	158.00	19	–169.80	–19.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		59.08	27M0F8W		2	P	
ROU	ROU13600	–1.00	19	25.00	45.70	1.38	0.66	155.00	R13TSS		44.85		MODRES	CL		58.95	27M0F8W			P	5
SOM	SOM31200	23.00	19	45.00	6.40	3.26	1.54	71.00	R13TSS		37.44		MODRES	CR		57.64	27M0F8W			P	
SVK	SVK14400	17.00	19	19.65	48.69	0.82	0.60	5.20	R13TSS		47.53		MODRES	CR		58.93	27M0F8W			P	
UGA	UGA05100	11.00	19	32.30	1.20	1.46	1.12	60.00	R13TSS		42.31		MODRES	CR		58.41	27M0F8W			P	
UKR	UKR06300	38.00	19	31.74	48.22	2.29	0.96	177.78	R13TSS		41.01		MODRES	CL		58.91	27M0F8W			P	5
USA	MRA33200	122.00	19	145.90	16.90	1.20	0.60	76.00	R13TSS		45.87		MODRES	CR		58.67	27M0F8W		14	P	
USA	MRA33201	122.00	19	145.90	16.90	1.20	0.60	76.00	R13TSS		45.87		MODRES	CR		58.67	27M0F8W		14	P	
UZB	UZB07100	44.00	19	64.01	41.21	2.67	0.96	163.32	R13TSS		40.37		MODRES	CL		58.87	27M0F8W			P	5

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
ZMB	ZMB31400	–1.00	19	27.50	–13.10	2.38	1.48	39.00	R13TSS		38.98		MODRES	CR		58.88	27M0F8W			P	
ALG	ALG25200	–25.00	20	1.60	25.50	3.64	2.16	152.00	R13TSS		35.49		MODRES	CR		57.99	27M0F8W			P	
AND	AND34100	–37.00	20	1.60	42.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.68	27M0F8W			P	
ARS	ARS00300	17.00	20	41.10	23.80	3.52	1.68	134.00	R13TSS		36.73		MODRES	CL		57.93	27M0F8W		70	P	
AUS	AUS00500	152.00	20	133.90	–18.40	2.82	1.74	105.00	R13TSS		37.53		MODRES	CL		59.43	27M0F8W			P	
AUT	AUT01600	–19.00	20	12.20	47.50	1.14	0.63	166.00	R13TSS		45.88		MODRES	CL		59.28	27M0F8W			P	
AZE	AZE06400	23.00	20	47.47	40.14	0.93	0.60	158.14	R13TSS		46.98		MODRES	CR		58.88	27M0F8W			P	5
BGD	BGD22000	74.00	20	90.30	23.60	1.46	0.84	135.00	R13TSS		43.56		MODRES	CR		58.66	27M0F8W			P	
BUL	BUL02000	–1.00	20	25.00	43.00	1.04	0.60	165.00	R13TSS		46.50		MODRES	CR		58.90	27M0F8W			P	
CBG	CBG29900	68.00	20	105.00	12.70	1.01	0.90	110.00	R13TSS		44.86		MODRES	CR		59.26	27M0F8W			P	
CHN	CHN15900	79.80	20	109.40	27.30	2.14	1.72	107.00	R13TSS		38.79		MODRES	CL		59.59	27M0F8W			P	
CHN	CHN18400	62.00	20	101.00	37.90	2.78	0.82	144.00	R13TSS		40.87		MODRES	CR		58.67	27M0F8W			P	
COD	ZAI32200	–19.00	20	22.40	0.00	2.16	1.88	48.00	R13TSS		38.36		MODRES	CR		59.86	27M0F8W			P	
DNK	DNK08901	5.00	20	12.30	57.10	1.20	0.60	177.00	R13TSS		45.87		MODRES	CL		59.37	27M0F8W		29	P	
EGY	EGY02600	–7.00	20	29.70	26.80	2.33	1.72	136.00	R13TSS		38.42		MODRES	CL		58.32	27M0F8W			P	
F	F2_A2744	–7.00	20	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2784	–7.00	20	3.40	45.60	2.00	0.95	155.00	R13TSS		42.70		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2784	–7.00	20	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3384	–7.00	20	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2784	–7.00	20	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	55.20	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3384	–7.00	20	3.40	45.60	2.00	0.95	155.00	RAD_TSS		42.70		MODRES	LE	158.00	54.70	33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA2	29.00	20	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	20	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	20	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	20	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	20	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	20	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	20	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
G	G 02700	–33.50	20	–3.50	53.80	1.84	0.72	142.00	R13TSS		43.23		MODRES	CR		60.23	27M0F8W			P	7
IND	IND04101	56.00	20	78.40	16.00	2.08	1.38	35.00	R13TSS		39.87		MODRES	CL		58.77	27M0F8W			P	
IND	IND04200	68.00	20	79.30	27.70	2.14	1.16	147.00	R13TSS		40.50		MODRES	CL		58.80	27M0F8W			P	
INS	INS03000	80.20	20	112.30	–8.10	3.14	1.46	169.00	R13TSS		37.83		MODRES	CR		59.23	27M0F8W			P	
KRE	KRE28600	110.00	20	127.00	39.10	1.30	1.10	31.00	R13TSS		42.89		MODRES	CL		58.99	27M0F8W			P	
MDA	MDA06300	38.00	20	28.41	46.99	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5
MLA	MLA22700	86.00	20	102.10	4.10	1.62	0.82	135.00	R13TSS		43.21		MODRES	CR		58.31	27M0F8W			P	
MLI	MLI32800	–37.00	20	–7.60	13.20	1.74	1.24	171.00	R13TSS		41.11		MODRES	CR		58.91	27M0F8W			P	
MLT	MLT1470A	–13.00	20	14.30	35.90	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		56.18	27M0F8W			P	5, 7
MOZ	MOZ30700	–1.00	20	34.00	–18.00	3.57	1.38	55.00	R13TSS		37.52		MODRES	CL		59.42	27M0F8W			P	
NZL	TKL05800	158.00	20	–171.80	–8.90	0.70	0.60	35.00	R13TSS		48.21		MODRES	CR		58.81	27M0F8W		1	P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
NZL	TKL05801	158.00	20	–171.80	–8.90	0.70	0.60	35.00	R13TSS		48.21		MODRES	CR		58.81	27M0F8W		1	P	
PAK	PAK28200	38.00	20	68.50	25.80	1.32	0.62	133.00	R13TSS		45.32		MODRES	CR		58.32	27M0F8W			P	
PHL	PHL28500	98.00	20	121.30	11.10	3.46	1.76	99.00	R13TSS		36.60		MODRES	CL		58.70	27M0F8W			P	
PLW	PLW00000	146.00	20	132.99	5.52	1.29	0.60	55.84	R13TSS		45.55		MODRES	CR		58.85	27M0F8W			P	7
RRW	RRW31000	11.00	20	30.00	–2.10	0.66	0.60	42.00	R13TSS		48.47		MODRES	CL		59.97	27M0F8W			P	
S	SIRIUS03	5.20	20	14.00	63.00	1.30	0.70	142.00	R13TSS		42.50		R13RES	CR		58.00	27M0F8W	SIRIUS	29	AE	
STP	STP24100	–13.00	20	7.00	0.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		56.68	27M0F8W			P	
SVN	SVN14800	34.00	20	15.01	46.18	0.60	0.60	90.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W			P	5
AFS	AFS02100	5.00	21	24.50	–28.00	3.13	1.68	27.00	R13TSS		37.24		MODRES	CL		59.14	27M0F8W			P	
AUS	AUS00900	164.00	21	147.50	–32.10	2.31	1.43	187.00	R13TSS		39.25		MODRES	CR		59.25	27M0F8W		78	P	
AUS	AUS0090A	164.00	21	159.06	–31.52	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
AUS	AUS0090B	164.00	21	167.93	–29.02	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		78	P	7
BEL	BEL01800	–19.00	21	4.60	50.60	0.82	0.60	167.00	R13TSS		47.53		MODRES	CR		59.23	27M0F8W			P	
BFA	BFA10700	–30.00	21	–1.50	12.20	1.45	1.14	29.00	R13TSS		42.26		MODRES	CR		58.96	27M0F8W			P	7
BRM	BRM29800	74.00	21	97.10	19.10	3.58	1.48	104.00	R13TSS		37.21		MODRES	CL		58.91	27M0F8W			P	
CHN	CHN17500	92.00	21	121.40	23.80	1.14	0.82	64.00	R13TSS		44.74		MODRES	CL		59.34	27M0F8W			P	
CHN	CHN17600	79.80	21	113.70	33.90	1.20	0.80	141.00	R13TSS		44.62		MODRES	CR		59.32	27M0F8W			P	
CYP	CYP08600	5.00	21	33.30	35.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.58	27M0F8W			P	
D	D2-21600	–1.00	21	12.60	52.10	0.83	0.63	172.00	R13TSS		47.26		MODRES	CL		59.16	27M0F8W			P	
DJI	DJI09900	23.00	21	42.50	11.60	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.48	27M0F8W			P	
F /EUT	E2WA7DA1	29.00	21	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	21	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	21	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	21	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	21	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	21	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	21	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
IND	IND03800	56.00	21	75.90	33.40	1.52	1.08	33.00	R13TSS		42.29		MODRES	CR		59.39	27M0F8W			P	
IND	IND04601	68.00	21	84.70	20.50	1.60	0.86	30.00	R13TSS		43.06		MODRES	CR		58.66	27M0F8W			P	
INS	INS03200	80.20	21	112.30	–0.30	2.66	2.32	109.00	R13TSS		36.54		MODRES	CL		59.14	27M0F8W			P	
ISL	ISL04900	–33.50	21	–19.00	64.90	1.00	0.60	177.00	R13TSS		46.67		MODRES	CL		60.77	27M0F8W			P	7
ISR	ISR1100A	–13.00	21	34.90	31.40	0.94	0.60	117.00	R13TSS		46.93		MODRES	CL		58.83	27M0F8W			P	5, 7
KEN	KEN24900	11.00	21	37.90	1.10	2.29	1.56	94.00	R13TSS		38.92		MODRES	CR		58.72	27M0F8W			P	
LVA	LVA06100	23.00	21	24.53	56.20	0.83	0.60	0.05	R13TSS		47.50		MODRES	CL		58.90	27M0F8W			P	5
MCO	MCO11600	–37.00	21	7.40	43.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.38	27M0F8W			P	
MRC	MRC20900	–25.00	21	–9.00	29.20	2.72	1.47	43.00	R13TSS		38.43		MODRES	CL		58.33	27M0F8W			P	
NMB	NMB0250A	–19.00	21	17.50	–21.60	2.66	1.90	48.00	R13TSS		37.41		MODRES	CL		59.71	27M0F8W			P	5
NPL	NPL12200	50.00	21	83.70	28.30	1.72	0.60	163.00	R13TSS		44.31		MODRES	CL		59.61	27M0F8W			P	
NZL	NZL28700	128.00	21	173.00	–41.00	3.30	1.28	48.00	R13TSS		38.19		MODRES	CR		59.89	27M0F8W			P	
POR	AZR13400	–30.00	21	–23.40	36.10	2.56	0.70	158.00	R13TSS		41.91		MODRES	CL		58.01	27M0F8W		21	P	7

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
POR	POR13300	–30.00	21	–8.00	39.60	0.92	0.60	112.00	R13TSS		47.03		MODRES	CL		58.43	27M0F8W		21	P	5, 7
SEN	SEN22201	–37.00	21	–14.40	13.80	1.46	1.04	139.00	R13TSS		42.63		MODRES	CL		58.63	27M0F8W			P	
UAE	UAE27400	17.00	21	53.60	24.20	0.98	0.80	162.00	R13TSS		45.50		MODRES	CR		58.20	27M0F8W			P	1
ALB	ALB29600	–7.00	22	19.80	41.30	0.68	0.60	146.00	R13TSS		48.34		MODRES	CL		58.84	27M0F8W			P	
AUS	AUS00600	152.00	22	136.60	–30.90	2.41	1.52	161.00	R13TSS		38.80		MODRES	CL		58.40	27M0F8W			P	
AUS	AUS00800	164.00	22	145.90	–21.70	3.62	1.63	136.00	R13TSS		36.73		MODRES	CL		58.83	27M0F8W			P	
BDI	BDI27000	11.00	22	29.90	–3.10	0.71	0.60	80.00	R13TSS		48.15		MODRES	CL		58.35	27M0F8W			P	
BGD	BGD22000	74.00	22	90.30	23.60	1.46	0.84	135.00	R13TSS		43.56		MODRES	CR		58.76	27M0F8W			P	
CBG	CBG29900	68.00	22	105.00	12.70	1.01	0.90	110.00	R13TSS		44.86		MODRES	CR		59.26	27M0F8W			P	
CHN	CHN15900	79.80	22	109.40	27.30	2.14	1.72	107.00	R13TSS		38.79		MODRES	CL		59.59	27M0F8W			P	
CHN	CHN16800	92.00	22	124.80	48.10	2.68	0.92	157.00	R13TSS		40.53		MODRES	CL		60.43	27M0F8W			P	
CHN	CHN18300	62.00	22	104.80	39.00	1.48	0.60	142.00	R13TSS		44.96		MODRES	CR		58.76	27M0F8W			P	
COG	COG23500	–13.00	22	14.60	–0.70	2.02	1.18	59.00	R13TSS		40.67		MODRES	CL		58.77	27M0F8W			P	
CTI	CTI23700	–30.00	22	–5.60	7.50	1.60	1.22	108.00	R13TSS		41.54		MODRES	CL		58.74	27M0F8W			P	7
ETH	ETH09200	23.00	22	39.55	8.58	2.48	1.92	128.32	R13TSS		37.67		MODRES	CL		58.87	27M0F8W			P	
F	REU09700	29.00	22	55.60	–19.20	1.56	0.78	96.00	R13TSS		43.59		MODRES	CR		58.89	27M0F8W		5	P	
F	REU09701	29.00	22	55.60	–19.20	1.56	0.78	96.00	R13TSS		43.59		MODRES	CR		58.89	27M0F8W		5	P	
F /EUT	E2WA7DA2	29.00	22	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	22	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	22	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	22	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	22	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	22	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	22	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FIN	FIN10400	5.00	22	17.00	61.50	2.00	1.00	10.00	R13TSS		41.44		MODRES	CL		62.74	27M0F8W			P	
G	G UKDBS	–33.50	22	–3.50	53.80	1.84	0.72	142.00	R13TSS		43.20		MODRES	CR		60.10	27M0F8W	UKDBS-3		A	5, 7
GEO	GEO06400	23.00	22	43.35	42.27	1.11	0.60	161.21	R13TSS		46.23		MODRES	CR		58.93	27M0F8W			P	5
HNG	HNG10600	–1.00	22	19.50	47.20	0.92	0.60	176.00	R13TSS		47.03		MODRES	CR		59.03	27M0F8W			P	
IND	IND04101	56.00	22	78.40	16.00	2.08	1.38	35.00	R13TSS		39.87		MODRES	CL		58.77	27M0F8W			P	
IND	IND04200	68.00	22	79.30	27.70	2.14	1.16	147.00	R13TSS		40.50		MODRES	CL		58.80	27M0F8W			P	
INS	INS03000	80.20	22	112.30	–8.10	3.14	1.46	169.00	R13TSS		37.83		MODRES	CR		59.23	27M0F8W			P	
KGZ	KGZ07000	44.00	22	73.88	41.32	1.34	0.64	3.53	R13TSS		45.12		MODRES	CL		58.92	27M0F8W			P	
KRE	KRE28600	110.00	22	127.00	39.10	1.30	1.10	31.00	R13TSS		42.89		MODRES	CL		59.09	27M0F8W			P	
KWT	KWT11300	17.00	22	47.60	29.20	0.68	0.60	145.00	R13TSS		48.34		MODRES	CL		58.14	27M0F8W			P	
MLA	MLA22700	86.00	22	102.10	4.10	1.62	0.82	135.00	R13TSS		43.21		MODRES	CR		58.31	27M0F8W			P	
MTN	MTN22300	–37.00	22	–12.20	18.50	2.62	1.87	150.00	R13TSS		37.55		MODRES	CR		57.85	27M0F8W			P	
NIG	NIG11900	–19.00	22	7.80	9.40	2.16	2.02	45.00	R13TSS		38.05		MODRES	CR		58.95	27M0F8W			P	
PAK	PAK28100	38.00	22	65.20	27.90	1.52	1.42	28.00	R13TSS		41.11		MODRES	CR		58.11	27M0F8W			P	
PHL	PHL28500	98.00	22	121.30	11.10	3.46	1.76	99.00	R13TSS		36.60		MODRES	CL		58.70	27M0F8W			P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
SDN	SDN23100	–7.00	22	28.90	12.70	2.26	1.96	159.00	R13TSS		37.98		MODRES	CR		58.48	27M0F8W			P	
SUI	SUI14000	–19.00	22	8.20	46.60	0.98	0.70	171.00	R13TSS		46.08		MODRES	CL		59.08	27M0F8W			P	
SYR	SYR22900	11.00	22	38.30	34.90	1.04	0.90	7.00	R13TSS		44.73		MODRES	CR		58.23	27M0F8W			P	
TUN	TUN15000	–25.00	22	9.50	33.50	1.88	0.72	135.00	R13TSS		43.13		MODRES	CR		58.83	27M0F8W			P	
ZWE	ZWE13500	–1.00	22	29.60	–18.80	1.46	1.36	37.00	R13TSS		41.47		MODRES	CL		59.17	27M0F8W			P	
AGL	AGL29500	–13.00	23	16.50	–12.00	3.09	2.26	84.00	R13TSS		36.01		MODRES	CR		59.11	27M0F8W			P	
ARS	ARS34000	17.00	23	52.30	24.80	2.68	0.70	143.00	R13TSS		41.71		MODRES	CR		58.21	27M0F8W		71	P	
ARS	ARS34001	17.00	23	52.30	24.80	2.68	0.70	143.00	R13TSS		41.71		MODRES	CR		58.21	27M0F8W		71	P	
AUS	AUS00400	152.00	23	123.00	–24.20	3.06	2.17	102.00	R13TSS		36.22		MODRES	CR		58.22	27M0F8W		76	P	
AUS	AUS0040A	152.00	23	96.83	–12.19	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	
AUS	AUS0040B	152.00	23	105.69	–10.45	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	
AUS	AUS0040C	152.00	23	110.52	–66.28	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		76	P	
AUS	AUS00700	164.00	23	145.20	–38.10	2.12	1.02	147.00	R13TSS		41.09		MODRES	CR		58.49	27M0F8W		77	P	
AUS	AUS0070A	164.00	23	158.94	–54.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.88	27M0F8W		77	P	7
BHR	BHR2550A	17.00	23	50.50	26.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		55.78	27M0F8W		71	P	5
BRM	BRM29800	74.00	23	97.10	19.10	3.58	1.48	104.00	R13TSS		37.21		MODRES	CL		59.01	27M0F8W			P	
CHN	CHN15800	79.80	23	111.80	38.00	2.60	1.74	124.00	R13TSS		37.89		MODRES	CR		59.99	27M0F8W			P	
CVA	CVA08500	–37.00	23	10.80	41.50	2.00	0.60	138.00	R13TSS		43.66		MODRES	CR		58.56	27M0F8W			P	
CZE	CZE14400	17.00	23	15.50	49.79	0.92	0.60	174.55	R13TSS		47.02		MODRES	CL		58.92	27M0F8W			P	5
E	CNR13000	–30.00	23	–15.70	28.40	1.54	0.60	5.00	R13TSS		44.79		MODRES	CL		57.79	27M0F8W		17	P	
E	E 12900	–30.00	23	–3.10	39.90	2.10	1.14	154.00	R13TSS		40.66		MODRES	CL		58.86	27M0F8W		17	P	
E	HISPASA4	–30.00	23	–4.00	39.00					COP	39.80	5.50	R13RES	CL		57.60	27M0F8W	HISPASAT-1	17	AE	
E	HISPASA6	–30.00	23	–4.00	39.00					COP	39.80	5.50	R13RES	CL		57.60	27M0F8W	HISPASAT-1	17	AE	
ERI	ERI09200	23.00	23	39.41	14.98	1.67	0.95	145.48	R13TSS		42.44		MODRES	CR		58.94	27M0F8W			P	5
F /EUT	E2WA7DA1	29.00	23	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	23	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	23	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	23	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	23	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	23	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	23	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
GHA	GHA10800	–25.00	23	–1.20	7.90	1.48	1.06	102.00	R13TSS		42.49		MODRES	CR		58.59	27M0F8W			P	
GNE	GNE30300	–19.00	23	10.30	1.50	0.68	0.60	10.00	R13TSS		48.34		MODRES	CL		58.84	27M0F8W			P	
HOL	HOL21300	–19.00	23	5.40	52.00	0.76	0.60	171.00	R13TSS		47.86		MODRES	CR		59.36	27M0F8W			P	
IND	IND03801	56.00	23	75.90	33.40	1.52	1.08	33.00	R13TSS		42.29		MODRES	CR		59.39	27M0F8W			P	
IND	IND04600	68.00	23	84.70	20.50	1.60	0.86	30.00	R13TSS		43.06		MODRES	CR		58.66	27M0F8W			P	
INS	INS03200	80.20	23	112.30	–0.30	2.66	2.32	109.00	R13TSS		36.54		MODRES	CL		59.14	27M0F8W			P	
ISL	ISL05000	5.00	23	–19.50	61.00	2.20	0.80	4.00	R13TSS		41.99		MODRES	CR		61.29	27M0F8W			P	2
JOR	JOR22400	11.00	23	35.80	31.40	0.84	0.78	114.00	R13TSS		46.28		MODRES	CL		58.08	27M0F8W			P	
KIR	KIR00002	176.00	23	–157.78	–0.33	2.40	0.64	110.62	R13TSS		42.60		MODRES	CL		58.90	27M0F8W			P	5

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
NOR	BIFROS21	–0.80	23	17.00	61.50					NO9	32.00	6.00	MODRES	CL		54.50	27M0FXF	BIFROST-2		A	
NPL	NPL1220A	50.00	23	83.70	28.30	1.72	0.60	163.00	R13TSS		44.31		MODRES	CL		59.61	27M0F8W			P	5
NZL	NIU05400	158.00	23	–169.80	–19.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		59.08	27M0F8W		2	P	
NZL	NIU05401	158.00	23	–169.80	–19.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	CL		59.08	27M0F8W		2	P	
SDN	SDN23000	–7.00	23	29.20	7.50	2.34	1.12	148.00	R13TSS		40.26		MODRES	CL		59.36	27M0F8W			P	
SRL	SRL25900	–33.50	23	–11.80	8.60	0.78	0.68	114.00	R13TSS		47.20		MODRES	CR		58.40	27M0F8W			P	7
TKM	TKM06800	44.00	23	59.18	38.84	2.25	0.99	164.51	R13TSS		40.94		MODRES	CR		58.94	27M0F8W			P	5
TZA	TZA22500	11.00	23	34.60	–6.20	2.41	1.72	129.00	R13TSS		38.27		MODRES	CR		58.67	27M0F8W			P	
YUG	YUG14800	–7.00	23	20.50	43.98	0.91	0.60	145.16	R13TSS		47.07		MODRES	CR		58.87	27M0F8W			P	
ARM	ARM06400	23.00	24	44.99	39.95	0.73	0.60	148.17	R13TSS		48.02		MODRES	CR		58.92	27M0F8W			P	5
AUS	AUS00500	152.00	24	133.90	–18.40	2.82	1.74	105.00	R13TSS		37.53		MODRES	CL		59.43	27M0F8W			P	
BGD	BGD22000	74.00	24	90.30	23.60	1.46	0.84	135.00	R13TSS		43.56		MODRES	CR		58.76	27M0F8W			P	
CAF	CAF25800	–13.00	24	21.00	6.30	2.25	1.68	31.00	R13TSS		38.67		MODRES	CL		59.27	27M0F8W			P	
CBG	CBG29900	68.00	24	105.00	12.70	1.01	0.90	110.00	R13TSS		44.86		MODRES	CR		59.26	27M0F8W			P	
CHN	CHN16600	92.00	24	121.10	41.70	1.52	0.78	154.00	R13TSS		43.71		MODRES	CL		59.51	27M0F8W			P	
CHN	CHN17700	79.80	24	111.80	30.80	1.42	0.82	160.00	R13TSS		43.79		MODRES	CL		59.69	27M0F8W			P	
CHN	CHN18800	62.00	24	101.50	25.10	1.86	1.08	132.00	R13TSS		41.42		MODRES	CL		60.02	27M0F8W			P	
CPV	CPV30100	–30.00	24	–24.00	16.00	0.86	0.70	144.00	R13TSS		46.65		MODRES	CL		57.15	27M0F8W			P	5, 7
DNK	DNK09000	5.00	24	17.00	61.50	2.00	1.00	10.00	R13TSS		41.44		MODRES	CL		62.54	27M0F8W			P	
F	F2_A2788	–7.00	24	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2728	–7.00	24	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2788	–7.00	24	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2728	–7.00	24	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A2788	–7.00	24	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3328	–7.00	24	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_A3388	–7.00	24	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2728	–7.00	24	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	55.50	27M0G9W	RADIOSAT-3	19	A	
F	F3_D2788	–7.00	24	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	55.50	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3328	–7.00	24	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	55.00	33M0G9W	RADIOSAT-3	19	A	
F	F3_D3388	–7.00	24	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	55.00	33M0G9W	RADIOSAT-3	19	A	
F	MYT09800	29.00	24	45.10	–12.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.38	27M0F8W		7	P	
F	MYT09801	29.00	24	45.10	–12.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.38	27M0F8W		7	P	
F /EUT	E2WA7DA2	29.00	24	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	24	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	24	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	24	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	24	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	24	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	24	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
I	I 08200	–19.00	24	12.30	41.30	2.38	0.98	137.00	R13TSS		40.77		MODRES	CL		59.07	27M0F8W			P	
IND	IND04100	56.00	24	78.40	16.00	2.08	1.38	35.00	R13TSS		39.87		MODRES	CL		58.87	27M0F8W			P	
IND	IND04201	68.00	24	79.30	27.70	2.14	1.16	147.00	R13TSS		40.50		MODRES	CL		58.90	27M0F8W			P	
INS	INS03000	80.20	24	112.30	–8.10	3.14	1.46	169.00	R13TSS		37.83		MODRES	CR		59.33	27M0F8W			P	
IRQ	IRQ25600	11.00	24	43.60	32.80	1.88	0.96	143.00	R13TSS		41.88		MODRES	CR		58.28	27M0F8W			P	1
KAZ	KAZ06600	44.00	24	64.72	46.40	4.31	1.70	172.22	R13TSS		35.79		MODRES	CL		58.89	27M0F8W			P	
LSO	LSO30500	5.00	24	27.80	–29.80	0.66	0.60	36.00	R13TSS		48.47		MODRES	CR		59.17	27M0F8W			P	
MLA	MLA22700	86.00	24	102.10	4.10	1.62	0.82	135.00	R13TSS		43.21		MODRES	CR		58.41	27M0F8W			P	
MTN	MTN28800	–37.00	24	–7.80	23.40	1.63	1.10	141.00	R13TSS		41.91		MODRES	CR		58.01	27M0F8W			P	
MWI	MWI30800	–1.00	24	34.10	–13.00	1.54	0.60	87.00	R13TSS		44.79		MODRES	CL		59.19	27M0F8W			P	
NGR	NGR11500	–25.00	24	8.30	16.80	2.54	2.08	44.00	R13TSS		37.22		MODRES	CL		59.52	27M0F8W			P	
NOR	BIFROS22	–0.80	24	17.00	61.50					NO9	32.00	6.00	MODRES	CR		54.50	27M0FXF	BIFROST-2		A	
NZL	TKL05800	158.00	24	–171.80	–8.90	0.70	0.60	35.00	R13TSS		48.21		MODRES	CR		58.91	27M0F8W		1	P	
NZL	TKL05801	158.00	24	–171.80	–8.90	0.70	0.60	35.00	R13TSS		48.21		MODRES	CR		58.91	27M0F8W		1	P	
OMA	OMA12300	17.00	24	55.60	21.00	1.88	1.02	100.00	R13TSS		41.62		MODRES	CL		58.32	27M0F8W			P	
PAK	PAK28200	38.00	24	68.50	25.80	1.32	0.62	133.00	R13TSS		45.32		MODRES	CR		58.42	27M0F8W			P	
PHL	PHL28500	98.00	24	121.30	11.10	3.46	1.76	99.00	R13TSS		36.60		MODRES	CL		58.80	27M0F8W			P	
SDN	SDN23200	–7.00	24	30.40	19.00	2.44	1.52	176.00	R13TSS		38.75		MODRES	CR		58.25	27M0F8W			P	
AFS	AFS02100	5.00	25	24.50	–28.00	3.13	1.68	27.00	R13TSS		37.24		MODRES	CL		59.14	27M0F8W			P	
BEL	BEL01800	–19.00	25	4.60	50.60	0.82	0.60	167.00	R13TSS		47.53		MODRES	CR		59.13	27M0F8W			P	
BFA	BFA10700	–30.00	25	–1.50	12.20	1.45	1.14	29.00	R13TSS		42.26		MODRES	CR		58.96	27M0F8W			P	7
CYP	CYP08600	5.00	25	33.30	35.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.58	27M0F8W			P	
D	D2-21600	–1.00	25	12.60	52.10	0.83	0.63	172.00	R13TSS		47.26		MODRES	CL		59.26	27M0F8W			P	
DJI	DJI09900	23.00	25	42.50	11.60	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W			P	
F /EUT	E2WA7DA1	29.00	25	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	25	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	25	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	25	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	25	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	25	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	25	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
ISL	ISL04900	–33.50	25	–19.00	64.90	1.00	0.60	177.00	R13TSS		46.67		MODRES	CL		60.87	27M0F8W			P	7
ISR	ISR11000	–13.00	25	34.90	31.40	0.94	0.60	117.00	R13TSS		46.93		MODRES	CL		58.83	27M0F8W			P	
KEN	KEN24900	11.00	25	37.90	1.10	2.29	1.56	94.00	R13TSS		38.92		MODRES	CR		58.82	27M0F8W			P	
LVA	LVA06100	23.00	25	24.53	56.20	0.83	0.60	0.05	R13TSS		47.50		MODRES	CL		58.90	27M0F8W			P	5
MCO	MCO11600	–37.00	25	7.40	43.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.48	27M0F8W			P	
MNG	MNG24800	74.00	25	102.20	46.60	3.60	1.13	169.00	R13TSS		38.35		MODRES	CR		59.05	27M0F8W			P	
MRC	MRC20900	–25.00	25	–9.00	29.20	2.72	1.47	43.00	R13TSS		38.43		MODRES	CL		58.33	27M0F8W			P	
NMB	NMB02500	–19.00	25	17.50	–21.60	2.66	1.90	48.00	R13TSS		37.41		MODRES	CL		59.71	27M0F8W			P	
POR	AZR13400	–30.00	25	–23.40	36.10	2.56	0.70	158.00	R13TSS		41.91		MODRES	CL		58.11	27M0F8W		21	P	7

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
POR	POR13300	–30.00	25	–8.00	39.60	0.92	0.60	112.00	R13TSS		47.03		MODRES	CL		58.43	27M0F8W		21	P	5, 7
RUS	RSTRSA11	36.00	25	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	25	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	25	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	25	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	25	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	25	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	25	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	25	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-5	42	P	
RUS	RUS00400	110.00	25	127.76	57.81	3.59	1.65	165.75	R13TSS		36.73		MODRES	CL		58.93	27M0F8W			P	5, 7
SEN	SEN22201	–37.00	25	–14.40	13.80	1.46	1.04	139.00	R13TSS		42.63		MODRES	CL		58.73	27M0F8W			P	
UAE	UAE27400	17.00	25	53.60	24.20	0.98	0.80	162.00	R13TSS		45.50		MODRES	CR		58.20	27M0F8W			P	
ALB	ALB29600	–7.00	26	19.80	41.30	0.68	0.60	146.00	R13TSS		48.34		MODRES	CL		58.84	27M0F8W			P	
BDI	BDI27000	11.00	26	29.90	–3.10	0.71	0.60	80.00	R13TSS		48.15		MODRES	CL		58.35	27M0F8W			P	
COG	COG23500	–13.00	26	14.60	–0.70	2.02	1.18	59.00	R13TSS		40.67		MODRES	CL		58.77	27M0F8W			P	
CTI	CTI23700	–30.00	26	–5.60	7.50	1.60	1.22	108.00	R13TSS		41.54		MODRES	CL		58.74	27M0F8W			P	
ETH	ETH09200	23.00	26	39.55	8.58	2.48	1.92	128.32	R13TSS		37.67		MODRES	CL		58.87	27M0F8W			P	
F	REU09700	29.00	26	55.60	–19.20	1.56	0.78	96.00	R13TSS		43.59		MODRES	CR		58.99	27M0F8W		5	P	
F	REU09701	29.00	26	55.60	–19.20	1.56	0.78	96.00	R13TSS		43.59		MODRES	CR		58.99	27M0F8W		5	P	
F /EUT	E2WA7DA2	29.00	26	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	26	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	26	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	26	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	26	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	26	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	26	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
FIN	FIN10400	5.00	26	17.00	61.50	2.00	1.00	10.00	R13TSS		41.44		MODRES	CL		62.54	27M0F8W			P	
G	G UKDBS	–33.50	26	–3.50	53.80	1.84	0.72	142.00	R13TSS		43.20		MODRES	CR		60.10	27M0F8W	UKDBS-3		A	5, 7
GEO	GEO06400	23.00	26	43.35	42.27	1.11	0.60	161.21	R13TSS		46.23		MODRES	CR		58.93	27M0F8W			P	5, 7
HNG	HNG10600	–1.00	26	19.50	47.20	0.92	0.60	176.00	R13TSS		47.03		MODRES	CR		59.03	27M0F8W			P	
KGZ	KGZ07000	44.00	26	73.88	41.32	1.34	0.64	3.53	R13TSS		45.12		MODRES	CL		58.92	27M0F8W			P	5, 7
KWT	KWT11300	17.00	26	47.60	29.20	0.68	0.60	145.00	R13TSS		48.34		MODRES	CL		58.14	27M0F8W			P	
MTN	MTN22300	–37.00	26	–12.20	18.50	2.62	1.87	150.00	R13TSS		37.55		MODRES	CR		57.95	27M0F8W			P	
NIG	NIG11900	–19.00	26	7.80	9.40	2.16	2.02	45.00	R13TSS		38.05		MODRES	CR		58.95	27M0F8W			P	
RUS	RSTRSA12	36.00	26	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	26	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	26	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	26	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	26	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0G7W	RST-1	38	P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
RUS	RSTRSD22	56.00	26	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	26	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	26	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-5	42	P	
SDN	SDN23100	–7.00	26	28.90	12.70	2.26	1.96	159.00	R13TSS		37.98		MODRES	CR		58.48	27M0F8W			P	
SUI	SUI14000	–19.00	26	8.20	46.60	0.98	0.70	171.00	R13TSS		46.08		MODRES	CL		59.08	27M0F8W			P	
SYR	SYR22900	11.00	26	38.30	34.90	1.04	0.90	7.00	R13TSS		44.73		MODRES	CR		58.33	27M0F8W			P	
TUN	TUN15000	–25.00	26	9.50	33.50	1.88	0.72	135.00	R13TSS		43.13		MODRES	CR		58.93	27M0F8W			P	
ZWE	ZWE13500	–1.00	26	29.60	–18.80	1.46	1.36	37.00	R13TSS		41.47		MODRES	CL		59.17	27M0F8W			P	
AGL	AGL29500	–13.00	27	16.50	–12.00	3.09	2.26	84.00	R13TSS		36.01		MODRES	CR		59.21	27M0F8W			P	
BHR	BHR25500	17.00	27	50.50	26.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		55.78	27M0F8W			P	
CVA	CVA08300	–37.00	27	12.40	41.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		60.18	27M0F8W			P	
CZE	CZE14400	17.00	27	15.50	49.79	0.92	0.60	174.55	R13TSS		47.02		MODRES	CL		58.92	27M0F8W			P	5
DNK	DNK09100	5.00	27	–19.50	61.00	2.20	0.80	4.00	R13TSS		41.99		MODRES	CR		61.19	27M0F8W			P	2
E	CNR13000	–30.00	27	–15.70	28.40	1.54	0.60	5.00	R13TSS		44.79		MODRES	CL		57.79	27M0F8W		17	P	
E	E 12900	–30.00	27	–3.10	39.90	2.10	1.14	154.00	R13TSS		40.66		MODRES	CL		58.96	27M0F8W		17	P	
E	HISPASA4	–30.00	27	–4.00	39.00					COP	39.80	5.50	R13RES	CL		57.60	27M0F8W	HISPASAT-1	17	AE	
E	HISPASA6	–30.00	27	–4.00	39.00					COP	39.80	5.50	R13RES	CL		57.60	27M0F8W	HISPASAT-1	17	AE	
ERI	ERI09200	23.00	27	39.41	14.98	1.67	0.95	145.48	R13TSS		42.44		MODRES	CR		58.94	27M0F8W			P	5
F /EUT	E2WA7DA1	29.00	27	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	27	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	27	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	27	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	27	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	27	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	27	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
GHA	GHA10800	–25.00	27	–1.20	7.90	1.48	1.06	102.00	R13TSS		42.49		MODRES	CR		58.69	27M0F8W			P	
GNE	GNE30300	–19.00	27	10.30	1.50	0.68	0.60	10.00	R13TSS		48.34		MODRES	CL		58.84	27M0F8W			P	
HOL	HOL21300	–19.00	27	5.40	52.00	0.76	0.60	171.00	R13TSS		47.86		MODRES	CR		59.46	27M0F8W			P	
JOR	JOR22400	11.00	27	35.80	31.40	0.84	0.78	114.00	R13TSS		46.28		MODRES	CL		58.08	27M0F8W			P	
NOR	BIFROS21	–0.80	27	17.00	61.50					NO9	32.00	6.00	MODRES	CL		54.50	27M0FXF	BIFROST-2		A	
RUS	RSTRSA11	36.00	27	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	27	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	27	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	27	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	27	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	27	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	27	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	27	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-5	42	P	
RUS	RUS00400	110.00	27	127.76	57.81	3.59	1.65	165.75	R13TSS		36.73		MODRES	CL		58.93	27M0F8W			P	5, 7
SDN	SDN23000	–7.00	27	29.20	7.50	2.34	1.12	148.00	R13TSS		40.26		MODRES	CL		59.46	27M0F8W			P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
SRL	SRL25900	–33.50	27	–11.80	8.60	0.78	0.68	114.00	R13TSS		47.20		MODRES	CR		58.50	27M0F8W			P	6
TKM	TKM06800	44.00	27	59.18	38.84	2.25	0.99	164.51	R13TSS		40.94		MODRES	CR		58.94	27M0F8W			P	5
TZA	TZA22500	11.00	27	34.60	–6.20	2.41	1.72	129.00	R13TSS		38.27		MODRES	CR		58.77	27M0F8W			P	
YUG	YUG14800	–7.00	27	20.50	43.98	0.91	0.60	145.16	R13TSS		47.07		MODRES	CR		58.87	27M0F8W			P	
ARM	ARM06400	23.00	28	44.99	39.95	0.73	0.60	148.17	R13TSS		48.02		MODRES	CR		58.92	27M0F8W			P	5, 7
CAF	CAF25800	–13.00	28	21.00	6.30	2.25	1.68	31.00	R13TSS		38.67		MODRES	CL		59.27	27M0F8W			P	
CPV	CPV30100	–30.00	28	–24.00	16.00	0.86	0.70	144.00	R13TSS		46.65		MODRES	CL		57.15	27M0F8W			P	
F	F2_A2788	–7.00	28	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2728	–7.00	28	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2788	–7.00	28	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2728	–7.00	28	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A2788	–7.00	28	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3328	–7.00	28	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_A3388	–7.00	28	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2728	–7.00	28	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	55.40	27M0G9W	RADIOSAT-3	19	A	
F	F3_D2788	–7.00	28	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	55.40	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3328	–7.00	28	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	54.80	33M0G9W	RADIOSAT-3	19	A	
F	F3_D3388	–7.00	28	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	54.80	33M0G9W	RADIOSAT-3	19	A	
F	MYT09800	29.00	28	45.10	–12.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.48	27M0F8W		7	P	
F	MYT09801	29.00	28	45.10	–12.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.48	27M0F8W		7	P	
F /EUT	E2WA7DA2	29.00	28	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	28	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	28	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	28	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	28	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	28	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	28	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
I	I 08200	–19.00	28	12.30	41.30	2.38	0.98	137.00	R13TSS		40.77		MODRES	CL		59.17	27M0F8W			P	
IRQ	IRQ25600	11.00	28	43.60	32.80	1.88	0.96	143.00	R13TSS		41.88		MODRES	CR		58.38	27M0F8W			P	
KAZ	KAZ06600	44.00	28	64.72	46.40	4.31	1.70	172.22	R13TSS		35.79		MODRES	CL		58.89	27M0F8W			P	7
LSO	LSO30500	5.00	28	27.80	–29.80	0.66	0.60	36.00	R13TSS		48.47		MODRES	CR		59.17	27M0F8W			P	
MTN	MTN28800	–37.00	28	–7.80	23.40	1.63	1.10	141.00	R13TSS		41.91		MODRES	CR		58.01	27M0F8W			P	
MWI	MWI30800	–1.00	28	34.10	–13.00	1.54	0.60	87.00	R13TSS		44.79		MODRES	CL		59.29	27M0F8W			P	
NGR	NGR11500	–25.00	28	8.30	16.80	2.54	2.08	44.00	R13TSS		37.22		MODRES	CL		59.52	27M0F8W			P	
NOR	BIFROS22	–0.80	28	17.00	61.50					NO9	32.00	6.00	MODRES	CR		54.50	27M0FXF	BIFROST-2		A	
NOR	NOR12101	5.00	28	17.00	61.50	2.00	1.00	10.00	R13TSS		41.44		MODRES	CL		61.84	27M0F8W			P	
OMA	OMA12300	17.00	28	55.60	21.00	1.88	1.02	100.00	R13TSS		41.62		MODRES	CL		58.32	27M0F8W			P	
RUS	RSTRSA12	36.00	28	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	28	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0F8W	RST-2	39	P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
RUS	RSTRSA32	86.00	28	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	28	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	28	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	28	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	28	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	28	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-5	42	P	
SDN	SDN23200	–7.00	28	30.40	19.00	2.44	1.52	176.00	R13TSS		38.75		MODRES	CR		58.25	27M0F8W			P	
AFS	AFS02100	5.00	29	24.50	–28.00	3.13	1.68	27.00	R13TSS		37.24		MODRES	CL		59.24	27M0F8W			P	
BEL	BEL01800	–19.00	29	4.60	50.60	0.82	0.60	167.00	R13TSS		47.53		MODRES	CR		58.53	27M0F8W			P	
BFA	BFA10700	–30.00	29	–1.50	12.20	1.45	1.14	29.00	R13TSS		42.26		MODRES	CR		59.06	27M0F8W			P	
CYP	CYP08600	5.00	29	33.30	35.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.68	27M0F8W			P	
D	D2-21600	–1.00	29	12.60	52.10	0.83	0.63	172.00	R13TSS		47.26		MODRES	CL		59.26	27M0F8W			P	
DJI	DJI09900	23.00	29	42.50	11.60	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W			P	
F /EUT	E2WA7DA1	29.00	29	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	29	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	29	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	29	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	29	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	29	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	29	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
ISL	ISL04900	–33.50	29	–19.00	64.90	1.00	0.60	177.00	R13TSS		46.67		MODRES	CL		60.87	27M0F8W			P	5, 6
ISR	ISR11000	–13.00	29	34.90	31.40	0.94	0.60	117.00	R13TSS		46.93		MODRES	CL		58.93	27M0F8W			P	
KEN	KEN24900	11.00	29	37.90	1.10	2.29	1.56	94.00	R13TSS		38.92		MODRES	CR		58.82	27M0F8W			P	
LVA	LVA06100	23.00	29	24.53	56.20	0.83	0.60	0.05	R13TSS		47.50		MODRES	CL		58.90	27M0F8W			P	5
MCO	MCO11600	–37.00	29	7.40	43.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.48	27M0F8W			P	
MNG	MNG24800	74.00	29	102.20	46.60	3.60	1.13	169.00	R13TSS		38.35		MODRES	CR		59.15	27M0F8W			P	
MRC	MRC20900	–25.00	29	–9.00	29.20	2.72	1.47	43.00	R13TSS		38.43		MODRES	CL		58.43	27M0F8W			P	
NMB	NMB02500	–19.00	29	17.50	–21.60	2.66	1.90	48.00	R13TSS		37.41		MODRES	CL		59.81	27M0F8W			P	
POR	AZR13400	–30.00	29	–23.40	36.10	2.56	0.70	158.00	R13TSS		41.91		MODRES	CL		58.11	27M0F8W		21	P	
POR	POR13300	–30.00	29	–8.00	39.60	0.92	0.60	112.00	R13TSS		47.03		MODRES	CL		58.53	27M0F8W		21	P	5
RUS	RSTRSA11	36.00	29	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	29	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	29	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	29	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	29	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	29	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	29	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	29	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-5	42	P	
SEN	SEN22200	–37.00	29	–14.40	13.80	1.46	1.04	139.00	R13TSS		42.63		MODRES	CL		58.73	27M0F8W			P	
UAE	UAE27400	17.00	29	53.60	24.20	0.98	0.80	162.00	R13TSS		45.50		MODRES	CR		58.30	27M0F8W			P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
ALB	ALB29600	–7.00	30	19.80	41.30	0.68	0.60	146.00	R13TSS		48.34		MODRES	CL		58.94	27M0F8W			P	
BDI	BDI27000	11.00	30	29.90	–3.10	0.71	0.60	80.00	R13TSS		48.15		MODRES	CL		58.45	27M0F8W			P	
COG	COG23500	–13.00	30	14.60	–0.70	2.02	1.18	59.00	R13TSS		40.67		MODRES	CL		58.87	27M0F8W			P	
CTI	CTI23700	–30.00	30	–5.60	7.50	1.60	1.22	108.00	R13TSS		41.54		MODRES	CL		58.84	27M0F8W			P	
ETH	ETH09200	23.00	30	39.55	8.58	2.48	1.92	128.32	R13TSS		37.67		MODRES	CL		58.87	27M0F8W			P	
F	REU09700	29.00	30	55.60	–19.20	1.56	0.78	96.00	R13TSS		43.59		MODRES	CR		59.09	27M0F8W		5	P	
F	REU09701	29.00	30	55.60	–19.20	1.56	0.78	96.00	R13TSS		43.59		MODRES	CR		59.09	27M0F8W		5	P	
F /EUT	E2WA7DA2	29.00	30	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	30	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	30	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	30	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	30	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	30	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	30	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
G	G UKDBS	–33.50	30	–3.50	53.80	1.84	0.72	142.00	R13TSS		43.20		MODRES	CR		60.10	27M0F8W	UKDBS-3		A	5, 6
GEO	GEO06400	23.00	30	43.35	42.27	1.11	0.60	161.21	R13TSS		46.23		MODRES	CR		58.93	27M0F8W			P	5, 7
HNG	HNG10600	–1.00	30	19.50	47.20	0.92	0.60	176.00	R13TSS		47.03		MODRES	CR		59.13	27M0F8W			P	
KGZ	KGZ07000	44.00	30	73.88	41.32	1.34	0.64	3.53	R13TSS		45.12		MODRES	CL		58.92	27M0F8W			P	5, 7
KWT	KWT11300	17.00	30	47.60	29.20	0.68	0.60	145.00	R13TSS		48.34		MODRES	CL		58.24	27M0F8W			P	
MTN	MTN22300	–37.00	30	–12.20	18.50	2.62	1.87	150.00	R13TSS		37.55		MODRES	CR		57.95	27M0F8W			P	
NIG	NIG11900	–19.00	30	7.80	9.40	2.16	2.02	45.00	R13TSS		38.05		MODRES	CR		59.05	27M0F8W			P	
RUS	RSTRSA12	36.00	30	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	30	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	30	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	30	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	30	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	30	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	30	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	30	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-5	42	P	
S	S 13900	5.00	30	17.00	61.50	2.00	1.00	10.00	R13TSS		41.44		MODRES	CL		62.14	27M0F8W			P	
SDN	SDN23100	–7.00	30	28.90	12.70	2.26	1.96	159.00	R13TSS		37.98		MODRES	CR		58.58	27M0F8W			P	
SUI	SUI14000	–19.00	30	8.20	46.60	0.98	0.70	171.00	R13TSS		46.08		MODRES	CL		59.18	27M0F8W			P	
SYR	SYR22900	11.00	30	38.30	34.90	1.04	0.90	7.00	R13TSS		44.73		MODRES	CR		58.33	27M0F8W			P	
TUN	TUN15000	–25.00	30	9.50	33.50	1.88	0.72	135.00	R13TSS		43.13		MODRES	CR		58.93	27M0F8W			P	
ZWE	ZWE13500	–1.00	30	29.60	–18.80	1.46	1.36	37.00	R13TSS		41.47		MODRES	CL		59.27	27M0F8W			P	
AGL	AGL29500	–13.00	31	16.50	–12.00	3.09	2.26	84.00	R13TSS		36.01		MODRES	CR		59.21	27M0F8W			P	
BHR	BHR25500	17.00	31	50.50	26.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		55.88	27M0F8W			P	
CVA	CVA08300	–37.00	31	12.40	41.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		60.28	27M0F8W			P	
CZE	CZE14400	17.00	31	15.50	49.79	0.92	0.60	174.55	R13TSS		47.02		MODRES	CL		58.92	27M0F8W			P	5

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
E	CNR13000	–30.00	31	–15.70	28.40	1.54	0.60	5.00	R13TSS		44.79		MODRES	CL		57.89	27M0F8W			P	
E	E 12900	–30.00	31	–3.10	39.90	2.10	1.14	154.00	R13TSS		40.66		MODRES	CL		58.96	27M0F8W		17	P	
E	HISPASA4	–30.00	31	–4.00	39.00					COP	39.80	5.50	R13RES	CL		57.60	27M0F8W	HISPASAT-1	17	AE	
E	HISPASA6	–30.00	31	–4.00	39.00					COP	39.80	5.50	R13RES	CL		57.60	27M0F8W	HISPASAT-1	17	AE	
ERI	ERI09200	23.00	31	39.41	14.98	1.67	0.95	145.48	R13TSS		42.44		MODRES	CR		58.94	27M0F8W			P	5
F /EUT	E2WA7DA1	29.00	31	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	31	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	31	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	31	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	31	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	31	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	31	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
GHA	GHA10800	–25.00	31	–1.20	7.90	1.48	1.06	102.00	R13TSS		42.49		MODRES	CR		58.69	27M0F8W			P	
GNE	GNE30300	–19.00	31	10.30	1.50	0.68	0.60	10.00	R13TSS		48.34		MODRES	CL		58.94	27M0F8W			P	
HOL	HOL21300	–19.00	31	5.40	52.00	0.76	0.60	171.00	R13TSS		47.86		MODRES	CR		59.56	27M0F8W			P	
ISL	ISL05000	5.00	31	–19.50	61.00	2.20	0.80	4.00	R13TSS		41.99		MODRES	CR		61.39	27M0F8W			P	2
JOR	JOR22400	11.00	31	35.80	31.40	0.84	0.78	114.00	R13TSS		46.28		MODRES	CL		58.18	27M0F8W			P	
NOR	BIFROS21	–0.80	31	17.00	61.50					NO9	32.00	6.00	MODRES	CL		54.50	27M0FXF	BIFROST-2		A	
RUS	RSTRSA11	36.00	31	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	31	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	31	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	31	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	31	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	31	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	31	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	31	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-5	42	P	
RUS	RUS00400	110.00	31	127.76	57.81	3.59	1.65	165.75	R13TSS		36.73		MODRES	CL		58.93	27M0F8W			P	5, 7
SDN	SDN23000	–7.00	31	29.20	7.50	2.34	1.12	148.00	R13TSS		40.26		MODRES	CL		59.46	27M0F8W			P	
SRL	SRL25900	–33.50	31	–11.80	8.60	0.78	0.68	114.00	R13TSS		47.20		MODRES	CR		58.60	27M0F8W			P	6
TKM	TKM06800	44.00	31	59.18	38.84	2.25	0.99	164.51	R13TSS		40.94		MODRES	CR		58.94	27M0F8W			P	5
TZA	TZA22500	11.00	31	34.60	–6.20	2.41	1.72	129.00	R13TSS		38.27		MODRES	CR		58.77	27M0F8W			P	
YUG	YUG14800	–7.00	31	20.50	43.98	0.91	0.60	145.16	R13TSS		47.07		MODRES	CR		58.87	27M0F8W			P	
ARM	ARM06400	23.00	32	44.99	39.95	0.73	0.60	148.17	R13TSS		48.02		MODRES	CR		58.92	27M0F8W			P	5, 7
CAF	CAF25800	–13.00	32	21.00	6.30	2.25	1.68	31.00	R13TSS		38.67		MODRES	CL		59.37	27M0F8W			P	
CPV	CPV30100	–30.00	32	–24.00	16.00	0.86	0.70	144.00	R13TSS		46.65		MODRES	CL		57.25	27M0F8W			P	
F	F2_A2788	–7.00	32	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2728	–7.00	32	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2788	–7.00	32	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2728	–7.00	32	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A2788	–7.00	32	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F	F3_A3328	–7.00	32	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_A3388	–7.00	32	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2728	–7.00	32	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	55.30	27M0G9W	RADIOSAT-3	19	A	
F	F3_D2788	–7.00	32	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	55.30	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3328	–7.00	32	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	54.80	33M0G9W	RADIOSAT-3	19	A	
F	F3_D3388	–7.00	32	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	54.80	33M0G9W	RADIOSAT-3	19	A	
F	MYT09800	29.00	32	45.10	–12.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.48	27M0F8W		7	P	
F	MYT09801	29.00	32	45.10	–12.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.48	27M0F8W		7	P	
F /EUT	E2WA7DA2	29.00	32	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	32	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	32	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	32	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	32	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	32	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	32	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
I	I 08200	–19.00	32	12.30	41.30	2.38	0.98	137.00	R13TSS		40.77		MODRES	CL		59.17	27M0F8W			P	
IRQ	IRQ25600	11.00	32	43.60	32.80	1.88	0.96	143.00	R13TSS		41.88		MODRES	CR		58.38	27M0F8W			P	
KAZ	KAZ06600	44.00	32	64.72	46.40	4.31	1.70	172.22	R13TSS		35.79		MODRES	CL		58.89	27M0F8W			P	7
LSO	LSO30500	5.00	32	27.80	–29.80	0.66	0.60	36.00	R13TSS		48.47		MODRES	CR		59.27	27M0F8W			P	
MTN	MTN28800	–37.00	32	–7.80	23.40	1.63	1.10	141.00	R13TSS		41.91		MODRES	CR		58.11	27M0F8W			P	
MWI	MWI30800	–1.00	32	34.10	–13.00	1.54	0.60	87.00	R13TSS		44.79		MODRES	CL		59.39	27M0F8W			P	
NGR	NGR11500	–25.00	32	8.30	16.80	2.54	2.08	44.00	R13TSS		37.22		MODRES	CL		59.62	27M0F8W			P	
NOR	BIFROS22	–0.80	32	17.00	61.50					NO9	32.00	6.00	MODRES	CR		54.50	27M0FXF	BIFROST-2		A	
NOR	NOR12102	5.00	32	17.00	61.50	2.00	1.00	10.00	R13TSS		41.44		R13RES	CL		66.94	27M0F8W			PE	
OMA	OMA12300	17.00	32	55.60	21.00	1.88	1.02	100.00	R13TSS		41.62		MODRES	CL		58.42	27M0F8W			P	
RUS	RSTRSA12	36.00	32	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	32	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	32	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	32	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	32	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	32	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	32	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	32	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-5	42	P	
SDN	SDN23200	–7.00	32	30.40	19.00	2.44	1.52	176.00	R13TSS		38.75		MODRES	CR		58.35	27M0F8W			P	
AFS	AFS02100	5.00	33	24.50	–28.00	3.13	1.68	27.00	R13TSS		37.24		MODRES	CL		59.24	27M0F8W			P	
BEL	BEL01800	–19.00	33	4.60	50.60	0.82	0.60	167.00	R13TSS		47.53		MODRES	CR		58.93	27M0F8W			P	
BFA	BFA10700	–30.00	33	–1.50	12.20	1.45	1.14	29.00	R13TSS		42.26		MODRES	CR		59.06	27M0F8W			P	
CYP	CYP08600	5.00	33	33.30	35.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.68	27M0F8W			P	
D	D2-21600	–1.00	33	12.60	52.10	0.83	0.63	172.00	R13TSS		47.26		MODRES	CL		59.36	27M0F8W			P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
DJI	DJI09900	23.00	33	42.50	11.60	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.68	27M0F8W			P	
F /EUT	E2WA7DA1	29.00	33	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	33	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	33	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	33	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	33	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	33	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	33	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
ISL	ISL04900	–33.50	33	–19.00	64.90	1.00	0.60	177.00	R13TSS		46.67		MODRES	CL		60.97	27M0F8W			P	5, 6
ISR	ISR11000	–13.00	33	34.90	31.40	0.94	0.60	117.00	R13TSS		46.93		MODRES	CL		58.93	27M0F8W			P	
KEN	KEN24900	11.00	33	37.90	1.10	2.29	1.56	94.00	R13TSS		38.92		MODRES	CR		58.92	27M0F8W			P	
LVA	LVA06100	23.00	33	24.53	56.20	0.83	0.60	0.05	R13TSS		47.50		MODRES	CL		58.90	27M0F8W			P	5
MCO	MCO11600	–37.00	33	7.40	43.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W			P	
MNG	MNG24800	74.00	33	102.20	46.60	3.60	1.13	169.00	R13TSS		38.35		MODRES	CR		59.15	27M0F8W			P	
MRC	MRC20900	–25.00	33	–9.00	29.20	2.72	1.47	43.00	R13TSS		38.43		MODRES	CL		58.43	27M0F8W			P	
NMB	NMB02500	–19.00	33	17.50	–21.60	2.66	1.90	48.00	R13TSS		37.41		MODRES	CL		59.81	27M0F8W			P	
POR	AZR13400	–30.00	33	–23.40	36.10	2.56	0.70	158.00	R13TSS		41.91		MODRES	CL		58.21	27M0F8W		21	P	5
POR	POR13300	–30.00	33	–8.00	39.60	0.92	0.60	112.00	R13TSS		47.03		MODRES	CL		58.63	27M0F8W		21	P	5
RUS	RSTRSA11	36.00	33	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	33	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	33	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	33	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	33	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	33	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	33	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	33	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-5	42	P	
SEN	SEN22200	–37.00	33	–14.40	13.80	1.46	1.04	139.00	R13TSS		42.63		MODRES	CL		58.83	27M0F8W			P	
UAE	UAE27400	17.00	33	53.60	24.20	0.98	0.80	162.00	R13TSS		45.50		MODRES	CR		58.30	27M0F8W			P	
ALB	ALB29600	–7.00	34	19.80	41.30	0.68	0.60	146.00	R13TSS		48.34		MODRES	CL		58.94	27M0F8W			P	
BDI	BDI27000	11.00	34	29.90	–3.10	0.71	0.60	80.00	R13TSS		48.15		MODRES	CL		58.45	27M0F8W			P	
COG	COG23500	–13.00	34	14.60	–0.70	2.02	1.18	59.00	R13TSS		40.67		MODRES	CL		58.87	27M0F8W			P	
CTI	CTI23700	–30.00	34	–5.60	7.50	1.60	1.22	108.00	R13TSS		41.54		MODRES	CL		58.94	27M0F8W			P	
ETH	ETH09200	23.00	34	39.55	8.58	2.48	1.92	128.32	R13TSS		37.67		MODRES	CL		58.87	27M0F8W			P	
F	REU09700	29.00	34	55.60	–19.20	1.56	0.78	96.00	R13TSS		43.59		MODRES	CR		59.09	27M0F8W		5	P	
F	REU09701	29.00	34	55.60	–19.20	1.56	0.78	96.00	R13TSS		43.59		MODRES	CR		59.09	27M0F8W		5	P	
F /EUT	E2WA7DA2	29.00	34	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	34	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	34	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	34	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	34	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F /EUT	E2WA7DF2	29.00	34	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	34	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
G	G UKDBS	–33.50	34	–3.50	53.80	1.84	0.72	142.00	R13TSS		43.20		MODRES	CR		60.10	27M0F8W	UKDBS-3		A	5, 6
GEO	GEO06400	23.00	34	43.35	42.27	1.11	0.60	161.21	R13TSS		46.23		MODRES	CR		58.93	27M0F8W			P	5, 7
HNG	HNG10600	–1.00	34	19.50	47.20	0.92	0.60	176.00	R13TSS		47.03		MODRES	CR		59.13	27M0F8W			P	
KGZ	KGZ07000	44.00	34	73.88	41.32	1.34	0.64	3.53	R13TSS		45.12		MODRES	CL		58.92	27M0F8W			P	5, 7
KWT	KWT11300	17.00	34	47.60	29.20	0.68	0.60	145.00	R13TSS		48.34		MODRES	CL		58.24	27M0F8W			P	
MTN	MTN22300	–37.00	34	–12.20	18.50	2.62	1.87	150.00	R13TSS		37.55		MODRES	CR		58.05	27M0F8W			P	
NIG	NIG11900	–19.00	34	7.80	9.40	2.16	2.02	45.00	R13TSS		38.05		MODRES	CR		59.15	27M0F8W			P	
RUS	RSTRSA12	36.00	34	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	34	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	34	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	34	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	34	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	34	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	34	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	34	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-5	42	P	
S	S 13800	5.00	34	16.20	61.00	1.04	0.98	14.00	R13TSS		44.36		MODRES	CL		62.36	27M0F8W		27	P	
SDN	SDN23100	–7.00	34	28.90	12.70	2.26	1.96	159.00	R13TSS		37.98		MODRES	CR		58.58	27M0F8W			P	
SUI	SUI14000	–19.00	34	8.20	46.60	0.98	0.70	171.00	R13TSS		46.08		MODRES	CL		59.28	27M0F8W			P	
SYR	SYR22900	11.00	34	38.30	34.90	1.04	0.90	7.00	R13TSS		44.73		MODRES	CR		58.43	27M0F8W			P	
TUN	TUN15000	–25.00	34	9.50	33.50	1.88	0.72	135.00	R13TSS		43.13		MODRES	CR		59.03	27M0F8W			P	
ZWE	ZWE13500	–1.00	34	29.60	–18.80	1.46	1.36	37.00	R13TSS		41.47		MODRES	CL		59.27	27M0F8W			P	
AGL	AGL29500	–13.00	35	16.50	–12.00	3.09	2.26	84.00	R13TSS		36.01		MODRES	CR		59.31	27M0F8W			P	
BHR	BHR25500	17.00	35	50.50	26.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		55.98	27M0F8W			P	
CVA	CVA08300	–37.00	35	12.40	41.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		60.28	27M0F8W			P	
CZE	CZE14400	17.00	35	15.50	49.79	0.92	0.60	174.55	R13TSS		47.02		MODRES	CL		58.92	27M0F8W			P	5
DNK	DNK09100	5.00	35	–19.50	61.00	2.20	0.80	4.00	R13TSS		41.99		MODRES	CR		61.29	27M0F8W			P	2
E	CNR13000	–30.00	35	–15.70	28.40	1.54	0.60	5.00	R13TSS		44.79		MODRES	CL		57.99	27M0F8W		17	P	
E	E 12900	–30.00	35	–3.10	39.90	2.10	1.14	154.00	R13TSS		40.66		MODRES	CL		59.06	27M0F8W		17	P	
E	HISPASA4	–30.00	35	–4.00	39.00					COP	39.80	5.50	R13RES	CL		57.60	27M0F8W	HISPASAT-1	17	AE	
E	HISPASA6	–30.00	35	–4.00	39.00					COP	39.80	5.50	R13RES	CL		57.60	27M0F8W	HISPASAT-1	17	AE	
ERI	ERI09200	23.00	35	39.41	14.98	1.67	0.95	145.48	R13TSS		42.44		MODRES	CR		58.94	27M0F8W			P	5
F /EUT	E2WA7DA1	29.00	35	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	35	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	35	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	35	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	35	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	35	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F /EUT	E2WA7DG1	29.00	35	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
GHA	GHA10800	–25.00	35	–1.20	7.90	1.48	1.06	102.00	R13TSS		42.49		MODRES	CR		58.79	27M0F8W			P	
GNE	GNE30300	–19.00	35	10.30	1.50	0.68	0.60	10.00	R13TSS		48.34		MODRES	CL		58.94	27M0F8W			P	
HOL	HOL21300	–19.00	35	5.40	52.00	0.76	0.60	171.00	R13TSS		47.86		MODRES	CR		59.56	27M0F8W			P	
JOR	JOR22400	11.00	35	35.80	31.40	0.84	0.78	114.00	R13TSS		46.28		MODRES	CL		58.18	27M0F8W			P	
NOR	BIFROS21	–0.80	35	17.00	61.50					NO9	32.00	6.00	MODRES	CL		54.50	27M0FXF	BIFROST-2		A	
RUS	RSTRSA11	36.00	35	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	35	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	35	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	35	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	35	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	35	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	35	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	35	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-5	42	P	
RUS	RUS00400	110.00	35	127.76	57.81	3.59	1.65	165.75	R13TSS		36.73		MODRES	CL		58.93	27M0F8W			P	5, 7
SDN	SDN23000	–7.00	35	29.20	7.50	2.34	1.12	148.00	R13TSS		40.26		MODRES	CL		59.56	27M0F8W			P	
SRL	SRL25900	–33.50	35	–11.80	8.60	0.78	0.68	114.00	R13TSS		47.20		MODRES	CR		58.60	27M0F8W			P	6
TKM	TKM06800	44.00	35	59.18	38.84	2.25	0.99	164.51	R13TSS		40.94		MODRES	CR		58.94	27M0F8W			P	5
TZA	TZA22500	11.00	35	34.60	–6.20	2.41	1.72	129.00	R13TSS		38.27		MODRES	CR		58.87	27M0F8W			P	
YUG	YUG14800	–7.00	35	20.50	43.98	0.91	0.60	145.16	R13TSS		47.07		MODRES	CR		58.87	27M0F8W			P	
ARM	ARM06400	23.00	36	44.99	39.95	0.73	0.60	148.17	R13TSS		48.02		MODRES	CR		58.92	27M0F8W			P	5, 7
CAF	CAF25800	–13.00	36	21.00	6.30	2.25	1.68	31.00	R13TSS		38.67		MODRES	CL		59.37	27M0F8W			P	
CPV	CPV30100	–30.00	36	–24.00	16.00	0.86	0.70	144.00	R13TSS		46.65		MODRES	CL		57.35	27M0F8W			P	
DNK	DNK09000	5.00	36	17.00	61.50	2.00	1.00	10.00	R13TSS		41.44		MODRES	CL		63.24	27M0F8W			P	
F	F2_A2788	–7.00	36	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2728	–7.00	36	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2788	–7.00	36	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2728	–7.00	36	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A2788	–7.00	36	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3328	–7.00	36	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_A3388	–7.00	36	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2728	–7.00	36	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	55.40	27M0G9W	RADIOSAT-3	19	A	
F	F3_D2788	–7.00	36	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	55.40	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3328	–7.00	36	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	54.90	33M0G9W	RADIOSAT-3	19	A	
F	F3_D3388	–7.00	36	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	54.90	33M0G9W	RADIOSAT-3	19	A	
F	MYT09800	29.00	36	45.10	–12.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.58	27M0F8W		7	P	
F	MYT09801	29.00	36	45.10	–12.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.58	27M0F8W		7	P	
F /EUT	E2WA7DA2	29.00	36	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	36	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	36	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
F /EUT	E2WA7DD2	29.00	36	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	36	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	36	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	36	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
I	I 08200	–19.00	36	12.30	41.30	2.38	0.98	137.00	R13TSS		40.77		MODRES	CL		59.27	27M0F8W			P	
IRQ	IRQ25600	11.00	36	43.60	32.80	1.88	0.96	143.00	R13TSS		41.88		MODRES	CR		58.48	27M0F8W			P	
KAZ	KAZ06600	44.00	36	64.72	46.40	4.31	1.70	172.22	R13TSS		35.79		MODRES	CL		58.89	27M0F8W			P	7
LSO	LSO30500	5.00	36	27.80	–29.80	0.66	0.60	36.00	R13TSS		48.47		MODRES	CR		59.27	27M0F8W			P	
MTN	MTN28800	–37.00	36	–7.80	23.40	1.63	1.10	141.00	R13TSS		41.91		MODRES	CR		58.11	27M0F8W			P	
MWI	MWI30800	–1.00	36	34.10	–13.00	1.54	0.60	87.00	R13TSS		44.79		MODRES	CL		59.39	27M0F8W			P	
NGR	NGR11500	–25.00	36	8.30	16.80	2.54	2.08	44.00	R13TSS		37.22		MODRES	CL		59.72	27M0F8W			P	
NOR	BIFROS22	–0.80	36	17.00	61.50					NO9	32.00	6.00	MODRES	CR		54.50	27M0FXF	BIFROST-2		A	
OMA	OMA12300	17.00	36	55.60	21.00	1.88	1.02	100.00	R13TSS		41.62		MODRES	CL		58.42	27M0F8W			P	
RUS	RSTRSA12	36.00	36	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	36	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	36	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	36	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	36	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	36	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	36	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	36	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-5	42	P	
SDN	SDN23200	–7.00	36	30.40	19.00	2.44	1.52	176.00	R13TSS		38.75		MODRES	CR		58.35	27M0F8W			P	
AFS	AFS02100	5.00	37	24.50	–28.00	3.13	1.68	27.00	R13TSS		37.24		MODRES	CL		59.34	27M0F8W			P	
BEL	BEL01800	–19.00	37	4.60	50.60	0.82	0.60	167.00	R13TSS		47.53		MODRES	CR		59.43	27M0F8W			P	
BFA	BFA10700	–30.00	37	–1.50	12.20	1.45	1.14	29.00	R13TSS		42.26		MODRES	CR		59.16	27M0F8W			P	
CYP	CYP08600	5.00	37	33.30	35.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.78	27M0F8W			P	
D	D2-21600	–1.00	37	12.60	52.10	0.83	0.63	172.00	R13TSS		47.26		MODRES	CL		59.36	27M0F8W			P	
DJI	DJI09900	23.00	37	42.50	11.60	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.68	27M0F8W			P	
F /EUT	E2WA7DA1	29.00	37	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	37	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	37	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	37	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	37	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	37	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	37	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
ISL	ISL04900	–33.50	37	–19.00	64.90	1.00	0.60	177.00	R13TSS		46.67		MODRES	CL		60.97	27M0F8W			P	5, 6
ISR	ISR11000	–13.00	37	34.90	31.40	0.94	0.60	117.00	R13TSS		46.93		MODRES	CL		59.03	27M0F8W			P	
KEN	KEN24900	11.00	37	37.90	1.10	2.29	1.56	94.00	R13TSS		38.92		MODRES	CR		58.92	27M0F8W			P	
LVA	LVA06100	23.00	37	24.53	56.20	0.83	0.60	0.05	R13TSS		47.50		MODRES	CL		58.90	27M0F8W			P	5

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
MCO	MCO11600	–37.00	37	7.40	43.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		57.58	27M0F8W			P	
MNG	MNG24800	74.00	37	102.20	46.60	3.60	1.13	169.00	R13TSS		38.35		MODRES	CR		59.25	27M0F8W			P	
MRC	MRC20900	–25.00	37	–9.00	29.20	2.72	1.47	43.00	R13TSS		38.43		MODRES	CL		58.53	27M0F8W			P	
NMB	NMB02500	–19.00	37	17.50	–21.60	2.66	1.90	48.00	R13TSS		37.41		MODRES	CL		59.91	27M0F8W			P	
POR	AZR13400	–30.00	37	–23.40	36.10	2.56	0.70	158.00	R13TSS		41.91		MODRES	CL		58.21	27M0F8W		21	P	5
POR	POR13300	–30.00	37	–8.00	39.60	0.92	0.60	112.00	R13TSS		47.03		MODRES	CL		58.63	27M0F8W		21	P	5
RUS	RSTRSA11	36.00	37	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	37	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	37	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	37	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	37	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	37	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	37	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	37	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-5	42	P	
SEN	SEN22200	–37.00	37	–14.40	13.80	1.46	1.04	139.00	R13TSS		42.63		MODRES	CL		58.93	27M0F8W			P	
UAE	UAE27400	17.00	37	53.60	24.20	0.98	0.80	162.00	R13TSS		45.50		MODRES	CR		58.40	27M0F8W			P	
ALB	ALB29600	–7.00	38	19.80	41.30	0.68	0.60	146.00	R13TSS		48.34		MODRES	CL		59.04	27M0F8W			P	
BDI	BDI27000	11.00	38	29.90	–3.10	0.71	0.60	80.00	R13TSS		48.15		MODRES	CL		58.55	27M0F8W			P	
COG	COG23500	–13.00	38	14.60	–0.70	2.02	1.18	59.00	R13TSS		40.67		MODRES	CL		58.97	27M0F8W			P	
CTI	CTI23700	–30.00	38	–5.60	7.50	1.60	1.22	108.00	R13TSS		41.54		MODRES	CL		58.94	27M0F8W			P	
ETH	ETH09200	23.00	38	39.55	8.58	2.48	1.92	128.32	R13TSS		37.67		MODRES	CL		58.87	27M0F8W			P	
F	REU09700	29.00	38	55.60	–19.20	1.56	0.78	96.00	R13TSS		43.59		MODRES	CR		59.19	27M0F8W		5	P	
F	REU09701	29.00	38	55.60	–19.20	1.56	0.78	96.00	R13TSS		43.59		MODRES	CR		59.19	27M0F8W		5	P	
F /EUT	E2WA7DA2	29.00	38	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	38	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	38	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	38	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	38	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	38	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	38	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
G	G UKDBS	–33.50	38	–3.50	53.80	1.84	0.72	142.00	R13TSS		43.20		MODRES	CR		60.10	27M0F8W	UKDBS-3		A	5, 6
GEO	GEO06400	23.00	38	43.35	42.27	1.11	0.60	161.21	R13TSS		46.23		MODRES	CR		58.93	27M0F8W			P	5, 7
HNG	HNG10600	–1.00	38	19.50	47.20	0.92	0.60	176.00	R13TSS		47.03		MODRES	CR		59.23	27M0F8W			P	
KGZ	KGZ07000	44.00	38	73.88	41.32	1.34	0.64	3.53	R13TSS		45.12		MODRES	CL		58.92	27M0F8W			P	5, 7
KWT	KWT11300	17.00	38	47.60	29.20	0.68	0.60	145.00	R13TSS		48.34		MODRES	CL		58.34	27M0F8W			P	
MTN	MTN22300	–37.00	38	–12.20	18.50	2.62	1.87	150.00	R13TSS		37.55		MODRES	CR		58.05	27M0F8W			P	
NIG	NIG11900	–19.00	38	7.80	9.40	2.16	2.02	45.00	R13TSS		38.05		MODRES	CR		59.15	27M0F8W			P	
NOR	NOR12000	5.00	38	13.10	64.10	1.84	0.88	10.00	R13TSS		42.35		MODRES	CL		61.95	27M0F8W			P	
RUS	RSTRSA12	36.00	38	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	38	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0F8W	RST-2	39	P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
RUS	RSTRSA32	86.00	38	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	38	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	38	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	38	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	38	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	38	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-5	42	P	
SDN	SDN23100	–7.00	38	28.90	12.70	2.26	1.96	159.00	R13TSS		37.98		MODRES	CR		58.68	27M0F8W			P	
SUI	SUI14000	–19.00	38	8.20	46.60	0.98	0.70	171.00	R13TSS		46.08		MODRES	CL		59.28	27M0F8W			P	
SYR	SYR33900	11.00	38	37.60	34.20	1.32	0.88	74.00	R13TSS		43.80		MODRES	CR		58.40	27M0F8W			P	1
TUN	TUN27200	–25.00	38	2.50	32.00	3.59	1.75	175.00	R13TSS		36.47		MODRES	CR		56.87	27M0F8W			P	4
ZWE	ZWE13500	–1.00	38	29.60	–18.80	1.46	1.36	37.00	R13TSS		41.47		MODRES	CL		59.37	27M0F8W			P	
AGL	AGL29500	–13.00	39	16.50	–12.00	3.09	2.26	84.00	R13TSS		36.01		MODRES	CR		59.41	27M0F8W			P	
BHR	BHR25500	17.00	39	50.50	26.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		55.98	27M0F8W			P	
CVA	CVA08300	–37.00	39	12.40	41.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		60.38	27M0F8W			P	
CZE	CZE14400	17.00	39	15.50	49.79	0.92	0.60	174.55	R13TSS		47.02		MODRES	CL		58.92	27M0F8W			P	5
E	CNR13000	–30.00	39	–15.70	28.40	1.54	0.60	5.00	R13TSS		44.79		MODRES	CL		57.99	27M0F8W		17	P	
E	E 12900	–30.00	39	–3.10	39.90	2.10	1.14	154.00	R13TSS		40.66		MODRES	CL		59.16	27M0F8W		17	P	
E	HISPASA4	–30.00	39	–4.00	39.00					COP	39.80	5.50	R13RES	CL		57.60	27M0F8W	HISPASAT-1	17	AE	
E	HISPASA6	–30.00	39	–4.00	39.00					COP	39.80	5.50	R13RES	CL		57.60	27M0F8W	HISPASAT-1	17	AE	
ERI	ERI09200	23.00	39	39.41	14.98	1.67	0.95	145.48	R13TSS		42.44		MODRES	CR		58.94	27M0F8W			P	5
F /EUT	E2WA7DA1	29.00	39	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB1	29.00	39	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CR		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC1	29.00	39	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CR		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD1	29.00	39	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CR		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE1	29.00	39	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CR		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF1	29.00	39	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CR		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG1	29.00	39	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CR		51.30	27M0F9W	EUROPESAT-1	16	AE	8
GHA	GHA10800	–25.00	39	–1.20	7.90	1.48	1.06	102.00	R13TSS		42.49		MODRES	CR		58.79	27M0F8W			P	
GNE	GNE30300	–19.00	39	10.30	1.50	0.68	0.60	10.00	R13TSS		48.34		MODRES	CL		59.04	27M0F8W			P	
HOL	HOL21300	–19.00	39	5.40	52.00	0.76	0.60	171.00	R13TSS		47.86		MODRES	CR		59.66	27M0F8W			P	
ISL	ISL05000	5.00	39	–19.50	61.00	2.20	0.80	4.00	R13TSS		41.99		MODRES	CR		61.49	27M0F8W			P	2
JOR	JOR22400	11.00	39	35.80	31.40	0.84	0.78	114.00	R13TSS		46.28		MODRES	CL		58.28	27M0F8W			P	
MNG	MNG24800	74.00	39	102.20	46.60	3.60	1.13	169.00	R13TSS		38.35		MODRES	CR		59.25	27M0F8W			P	
NOR	BIFROS21	–0.80	39	17.00	61.50					NO9	32.00	6.00	MODRES	CL		54.50	27M0FXF	BIFROST-2		A	
RUS	RSTRSA11	36.00	39	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	39	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	39	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	39	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	39	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		53.00	27M0G7W	RST-1	38	P	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
RUS	RSTRSD21	56.00	39	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CL		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	39	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	39	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CL		55.00	27M0G7W	RST-5	42	P	
RUS	RUS00400	110.00	39	127.76	57.81	3.59	1.65	165.75	R13TSS		36.73		MODRES	CL		58.93	27M0F8W			P	5, 7
SDN	SDN23000	–7.00	39	29.20	7.50	2.34	1.12	148.00	R13TSS		40.26		MODRES	CL		59.56	27M0F8W			P	
SRL	SRL25900	–33.50	39	–11.80	8.60	0.78	0.68	114.00	R13TSS		47.20		MODRES	CR		58.70	27M0F8W			P	6
TKM	TKM06800	44.00	39	59.18	38.84	2.25	0.99	164.51	R13TSS		40.94		MODRES	CR		58.94	27M0F8W			P	5
TZA	TZA22500	11.00	39	34.60	–6.20	2.41	1.72	129.00	R13TSS		38.27		MODRES	CR		58.87	27M0F8W			P	
YUG	YUG14800	–7.00	39	20.50	43.98	0.91	0.60	145.16	R13TSS		47.07		MODRES	CR		58.87	27M0F8W			P	
ARM	ARM06400	23.00	40	44.99	39.95	0.73	0.60	148.17	R13TSS		48.02		MODRES	CR		58.92	27M0F8W			P	5, 7
CAF	CAF25800	–13.00	40	21.00	6.30	2.25	1.68	31.00	R13TSS		38.67		MODRES	CL		59.47	27M0F8W			P	
CPV	CPV30100	–30.00	40	–24.00	16.00	0.86	0.70	144.00	R13TSS		46.65		MODRES	CL		57.35	27M0F8W			P	
F	F2_A2788	–7.00	40	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2728	–7.00	40	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F2aA2788	–7.00	40	2.60	45.90	2.50	0.98	160.00	R13TSS		41.60		MODRES	CL		58.00	27M0F9W	RADIOSAT-2	19	A	
F	F3_A2728	–7.00	40	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A2788	–7.00	40	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0F9W	RADIOSAT-3	19	A	
F	F3_A3328	–7.00	40	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_A3388	–7.00	40	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0F9W	RADIOSAT-3	19	A	
F	F3_D2728	–7.00	40	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D2788	–7.00	40	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	27M0G9W	RADIOSAT-3	19	A	
F	F3_D3328	–7.00	40	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	F3_D3388	–7.00	40	2.60	45.90	2.50	0.98	160.00	RAD_TSS		41.60		MODRES	LE	158.00	56.00	33M0G9W	RADIOSAT-3	19	A	
F	MYT09800	29.00	40	45.10	–12.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.58	27M0F8W		7	P	
F	MYT09801	29.00	40	45.10	–12.80	0.60	0.60	0.00	R13TSS		48.88		MODRES	CR		58.58	27M0F8W		7	P	
F /EUT	E2WA7DA2	29.00	40	1.90	49.00	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		51.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DB2	29.00	40	12.70	44.50	1.82	1.82	0.00	R13TSS		40.40		R13RES	CL		52.00	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DC2	29.00	40	8.90	61.30	3.06	0.71	9.00	R13TSS		41.50		R13RES	CL		60.50	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DD2	29.00	40	17.50	40.40	2.54	1.07	168.00	R13TSS		40.70		R13RES	CL		53.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DE2	29.00	40	–12.50	35.50	3.75	1.27	25.00	R13TSS		38.30		R13RES	CL		57.30	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DF2	29.00	40	35.40	38.70	2.25	0.93	174.00	R13TSS		41.70		R13RES	CL		54.70	27M0F9W	EUROPESAT-1	16	AE	8
F /EUT	E2WA7DG2	29.00	40	8.00	49.70	2.84	1.45	26.00	R13TSS		39.30		R13RES	CL		51.30	27M0F9W	EUROPESAT-1	16	AE	8
I	I 08200	–19.00	40	12.30	41.30	2.38	0.98	137.00	R13TSS		40.77		MODRES	CL		59.27	27M0F8W			P	
IRQ	IRQ25600	11.00	40	43.60	32.80	1.88	0.96	143.00	R13TSS		41.88		MODRES	CR		58.48	27M0F8W			P	
KAZ	KAZ06600	44.00	40	64.72	46.40	4.31	1.70	172.22	R13TSS		35.79		MODRES	CL		58.89	27M0F8W			P	7
LSO	LSO30500	5.00	40	27.80	–29.80	0.66	0.60	36.00	R13TSS		48.47		MODRES	CR		59.37	27M0F8W			P	
MTN	MTN28800	–37.00	40	–7.80	23.40	1.63	1.10	141.00	R13TSS		41.91		MODRES	CR		58.21	27M0F8W			P	
MWI	MWI30800	–1.00	40	34.10	–13.00	1.54	0.60	87.00	R13TSS		44.79		MODRES	CL		59.49	27M0F8W			P	
NGR	NGR11500	–25.00	40	8.30	16.80	2.54	2.08	44.00	R13TSS		37.22		MODRES	CL		59.72	27M0F8W			P	
NOR	BIFROS22	–0.80	40	17.00	61.50					NO9	32.00	6.00	MODRES	CR		54.50	27M0FXF	BIFROST-2		A	

1	2	3	4	5		6			7	8	9		10	11		12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position(°)	Chan-nel	Boresight		Space antenna characteristic			Space antenna	Shaped beam	Space antenna gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Designation of emission	Satellite identification	Group code	Status	Re-marks
				Long.(°)	Lat.(°)	Major(°)	Minor(°)	Orient.(°)			Co-polar.	X-polar.		Type	Angle(°)						
OMA	OMA12300	17.00	40	55.60	21.00	1.88	1.02	100.00	R13TSS		41.62		MODRES	CL		58.52	27M0F8W			P	
RUS	RSTRSA12	36.00	40	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	40	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	40	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	40	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	40	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		53.00	27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	40	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	CR		55.00	27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	40	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	40	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	CR		55.00	27M0G7W	RST-5	42	P	
S	S 13902	5.00	40	17.00	61.50	2.00	1.00	10.00	R13TSS		41.44		R13RES	CL		68.24	27M0F8W			PE	
SDN	SDN23200	–7.00	40	30.40	19.00	2.44	1.52	176.00	R13TSS		38.75		MODRES	CR		58.45	27M0F8W			P	

ARTICLE 12

Relationship to Resolution 507

12.1 The provisions and associated Plans for the broadcasting-satellite service in Regions 1 and 3 and in Region 2, of this Appendix, shall be regarded as including a world agreement and associated Plans for Regions 1, 2 and 3 in accordance with *resolves* 1 of Resolution **507**, which requires the stations in the broadcasting-satellite service to be established and operated in accordance with such agreements and associated plans.

ARTICLE 13

Interference

13.1 The Member States of the Union shall endeavour to agree on the action required to reduce harmful interference which might be caused by the application of these provisions and the associated Plans.

ARTICLE 14

Period of validity of the provisions and associated Plans

14.1 For Regions 1 and 3, the provisions and associated Plan have been prepared in order to meet the requirements of the broadcasting-satellite service in the bands concerned for a period of at least fifteen years from 1 January 1979.

14.2 For Region 2, the provisions and associated Plan have been prepared in order to meet the requirements of the broadcasting-satellite service in the bands concerned for a period extending until at least 1 January 1994.

14.3 In any event, the provisions and associated Plans shall remain in force until their revision by a competent radiocommunication conference convened in accordance with the relevant provisions of the Constitution and Convention in force.

ANNEX 1

Limits for determining whether a service of an administration is affected by a proposed modification to the Plans or when it is necessary under this Appendix to seek the agreement of any other administration[13]

(See Article 4)

1 Limits to the change in the wanted-to-interfering signal ratio with respect to frequency assignments in conformity with the Regions 1 and 3 Plan

With respect to § 4.3.1.1 of Article 4, an administration in Region 1 or 3 shall be considered as being affected if the effect of the proposed modification to the Regions 1 and 3 Plan would result in the wanted-to-interfering signal ratio at any point within the service area associated with any of its frequency assignments in that Plan falling below either 30 dB or the value resulting from the frequency assignments in the Plan at the date of entry into force of the Final Acts[14], whichever is the lower.

NOTE – In performing the calculation, the effect at the receiver input of all the co-channel and adjacent-channel signals is expressed in terms of one equivalent co-channel interfering signal. This value is usually expressed in decibels.

2 Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Region 2 Plan

With respect to § 4.3.3.1 of Article 4, an administration in Region 2 shall be considered as being affected if the overall equivalent protection margin[15] corresponding to a test point of its entry in the Region 2 Plan, including the cumulative effect of any previous modification to that Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:

– the Region 2 Plan as established by the 1983 Conference; *or*

– a modification of the assignment in accordance with this Appendix; *or*

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[13] With respect to this Annex, except for section 2 and § 8 *b)*, the limits relate to the power flux-density which would be obtained assuming free-space propagation conditions.

With respect to § 8 *b)* of this Annex, the limits relate to the power flux-density which would be obtained assuming clear-sky propagation conditions using the method contained in Annex 5.

With respect to section 2 of this Annex, the limit specified relates to the overall equivalent protection margin calculated in accordance with § 2.2.4 of Annex 5.

[14] Final Acts of the 1977 Conference, which entered into force on 1 January 1979.

[15] For the definition of the overall equivalent protection margin, see § 1.11 of Annex 5.

– a new entry in the Region 2 Plan under Article 4; *or*

– any agreement reached in accordance with this Appendix.

3 Limits to the change in the power flux-density to protect the broadcasting-satellite service in Regions 1 and 2 in the band 12.2-12.5 GHz and in Region 3 in the band 12.5-12.7 GHz

With respect to § 4.3.1.2 of Article 4, an administration in Region 2 shall be considered as being affected if the proposed modification to the Regions 1 and 3 Plan would result in exceeding the power flux-densities given below, at any point in the service area affected.

With respect to § 4.3.3.2 or 4.3.3.6 of Article 4, as appropriate, an administration in Region 1 or 3 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in exceeding the power flux-densities given below, at any point in the service area affected.

-147 dB(W/m^2/27 MHz) for $0° \leq \theta < 0.44°$;

$-138 + 25 \log \theta$ dB(W/m^2/27 MHz) for $0.44° \leq \theta < 19.1°$;

-106 dB(W/m^2/27 MHz) for $\theta \geq 19.1°$;

where θ is:

– the difference in degrees between the longitudes of the broadcasting-satellite space station in Region 1 or 3 and the broadcasting-satellite space station affected in Region 2, *or*

– the difference in degrees between the longitudes of the broadcasting-satellite space station in Region 2 and the broadcasting-satellite space station affected in Region 1 or 3.

4 Limits to the change in the power flux-density to protect the terrestrial services of administrations in Region 2

With respect to § 4.3.1.4 of Article 4, an administration in Region 2 shall be considered as being affected if the proposed modification to the Regions 1 and 3 Plan would result in exceeding a power flux-density, for any angle of arrival, at any point on its territories, of:

-125 dB(W/m^2/4 kHz) when the broadcasting-satellite station uses circular polarization, *and*,

-128 dB(W/m^2/4 kHz) when the broadcasting-satellite station uses linear polarization.

5 Limits to the change in the power flux-density to protect the terrestrial services of administrations in Regions 1 and 3[16]

With respect to § 4.3.3.4 of Article 4, an administration in Region 1 or 3 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in the following power flux-density limits being exceeded:

a) in the frequency band 12.2-12.7 GHz for all the territories of administrations in Regions 1[17] and 3 and for any arrival angle γ:

-125 dB(W/m^2/4 kHz)	for broadcasting-satellite space stations using circular polarization;
-128 dB(W/m^2/4 kHz)	for broadcasting-satellite space stations using linear polarization;

b) in the frequency band 12.2-12.5 GHz for territories of administrations in Region 3 and those in the western part of Region 1, west of longitude 30° E[18]:

-132 dB(W/m^2/5 MHz)	for $0° \le \gamma < 10°$;
$-132 + 4.2\,(\gamma - 10)$ dB(W/m^2/5 MHz)	for $10° \le \gamma < 15°$;
-111 dB(W/m^2/5 MHz)	for $15° \le \gamma < 90°$;

c) in the frequency band 12.2-12.7 GHz for territories of administrations in Region 1[17], east of longitude 30° E:

-134 dB(W/m^2/5 MHz)	for $\gamma = 0°$;
$-134 + 4.6975\,\gamma^2$ dB(W/m^2/5 MHz)	for $0° < \gamma \le 0.8°$;
$-128.5 + 25 \log \gamma$ dB(W/m^2/5 MHz)	for $\gamma > 0.8°$;

d) in the frequency band 12.5-12.7 GHz for all the territories of administrations of Regions 1[17] and 3:

-148 dB(W/m^2/4 kHz)	for $\gamma = 0°$;
$-148 + 4.6975\,\gamma^2$ dB(W/m^2/4 kHz)	for $0° < \gamma \le 0.8°$;
$-142.5 + 25 \log \gamma$ dB(W/m^2/4 kHz)	for $\gamma > 0.8°$;

where γ is the angle of arrival of the incident wave above the horizontal plane, in degrees.

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16 See § 3.18 of Annex 5.

17 In the band 12.5-12.7 GHz in Region 1, these limits are applicable only to the territory of administrations mentioned in Nos. **S5.494** and **S5.496**.

18 See Resolution **34**.

6 Limits to the change in the power flux-density of assignments in the Regions 1 and 3 Plan to protect the fixed-satellite service (space-to-Earth) in the band 11.7-12.2 GHz in Region 2, and of assignments in the Region 2 Plan to protect the fixed-satellite service (space-to-Earth) in the band 12.5-12.7 GHz in Region 1 and in the band 12.2-12.7 GHz in Region 3

With respect to § 4.3.1.5 of Article 4, an administration in Region 2 shall be considered as being affected if the proposed modification to the Regions 1 and 3 Plan would result in an increase in the power flux-density on its territory of 0.25 dB or more above that resulting from the frequency assignments in the Regions 1 and 3 Plan at the time of entry into force of the Final Acts (1977 Conference, in force on 1 January 1979).

With respect to § 4.3.3.5 of Article 4, an administration in Region 1 or 3 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in an increase in the power flux-density on its territory of 0.25 dB or more above that resulting from the frequency assignments in the Region 2 Plan at the time of entry into force of the Final Acts (1985 Conference).

However, where an assignment in the Regions 1 and 3 Plan or its subsequent modification gives a power flux-density of less than -138 dB(W/m^2/27 MHz) anywhere in the territory of an administration of Region 2, that administration shall be considered as not being affected; where an assignment in the Region 2 Plan or its subsequent modification gives a power flux-density of less than -160 dB(W/m^2/4 kHz) anywhere in the territory of an administration of Region 1 or 3, that administration shall be considered as not being affected.

7 Limits to the change in equivalent noise temperature to protect the fixed-satellite service (Earth-to-space) in Region 1 from modifications to the Region 2 Plan in the band 12.5-12.7 GHz

With respect to § 4.3.3.5 of Article 4, an administration of Region 1 shall be considered as being affected if the proposed modification to the Region 2 Plan would result in:

– the $\Delta T/T$ resulting from the proposed modification is greater than the $\Delta T/T$ resulting from the assignment in the Region 2 Plan as of the date of entry into force of the Final Acts (1985 Conference); *and*

– the $\Delta T/T$ resulting from the proposed modification exceeds 4%,

using the method of Appendix **S8** (Case II).

8 Limits to the change in the power flux-density to protect the terrestrial services of other administrations

a) *In Region 1 or 3:*

With respect to § 4.3.1.4 of Article 4, an administration in Region 1 or 3 shall be considered as being affected if the consequence of the proposed modification of an existing assignment in the Regions 1 and 3 Plan is to increase the power flux-density arriving on any part of the territory of that administration by more than 0.25 dB over that resulting from that frequency assignment in the Regions 1 and 3 Plan at the time of entry into force of the Final Acts (1977 Conference, in force on 1 January 1979). The same administration shall be considered as not being affected if the value of the power flux-density anywhere in its territory does not exceed the limits expressed in § 5 *a)* and 5 *b)* of this Annex applied to the frequency range 11.7-12.5 GHz.

With respect to § 4.3.1.4 of Article 4, in the case of an addition of a new assignment to the Regions 1 and 3 Plan, an administration in Region 1 or 3 is considered as being affected if the power flux-density on any part of its territory exceeds the limit expressed in § 5 *a)* and 5 *b)* of this Annex applied to the frequency range 11.7-12.5 GHz.

b) *In Region 2:*

With respect to § 4.3.3.4 of Article 4, an administration in Region 2 shall be considered as being affected if the consequence of the proposed modification to an existing assignment in the Region 2 Plan is to increase the power flux-density arriving on any part of the territory of that administration by more than 0.25 dB over that resulting from that frequency assignment in the Region 2 Plan at the time of entry into force of the Final Acts (1985 Conference). The same administration shall be considered as not being affected if the value of the power flux-density anywhere in its territory does not exceed the following limit: -115 dB(W/m^2).

With respect to § 4.3.3.4 of Article 4, in the case of an addition of a new assignment to the Region 2 Plan, an administration in Region 2 is considered as being affected if the power flux-density on any part of its territory exceeds -115 dB(W/m^2).

ANNEX 2

Basic characteristics to be furnished in notices[19] relating to space stations in the broadcasting-satellite service[20]

1 Country and BR number in the case of Regions 1 and 3; country and beam identification in the case of Region 2.

2 Nominal orbital position (in degrees from the Greenwich meridian) in the case of Regions 1 and 3; orbital position (xxx.xx degrees from the Greenwich meridian) in the case of Region 2.

3 Assigned frequency.

4 Assigned frequency band.

5 Date of bringing into use.

6 Identity of the space station.

7 Service area identified by:

a) a set of a maximum of twenty test points, and

b) a service-area contour on the surface of the Earth or a service area defined by a minimum elevation angle in degrees, and

c) the name of other administration(s) (country/territory symbols) included in the service area.

8 Geographical coordinates of the intersection of the antenna beam axis with the Earth.

9 Class of station.

10 Class of emission and necessary bandwidth.

11 Power supplied to the antenna (dBW) and maximum power density per Hz supplied to the antenna (dB(W/Hz)), averaged over the worst 5 MHz, 4 kHz and 27 MHz, as well as averaged over the worst 40 kHz in the case of Region 2.

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[19] The Bureau shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Annex.

[20] In Region 2, only those notices relating to frequency assignments for space stations used for telemetry and tracking purposes associated with the Region 2 Plan shall be furnished in accordance with Appendix **S4** Annexes 2A and 2B.

12 Space station transmitting antenna characteristics:

a) co-polar gain of the antenna in the direction of maximum radiation referred to an isotropic radiator (dBi), as well as the cross-polar gain of the antenna in the case of a beam of other than elliptical shape;

b) pointing accuracy;

c) type of polarization;

d) sense of polarization, and, in the case of a linear polarization, the angle (degrees) measured counter-clockwise in a plane normal to the beam axis from the equatorial plane to the electric vector of the wave as seen from the satellite in the direction of the nominal boresight or aim point as defined under § 8 above;

e) for elliptical beams[21] indicate the following:

– co-polar and cross-polar radiation patterns;

– rotation accuracy;

– orientation;

– major axis (degrees) at the half-power beamwidth;

– minor axis (degrees) at the half-power beamwidth;

f) for beams of other than elliptical shape, indicate the following:

– co-polar and cross-polar gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite on to a plane perpendicular to the line from the centre of the Earth to the satellite. The isotropic or absolute gain shall be indicated at each contour which corresponds to a decrease in gain of 2, 4, 6, 10 and 20 dB and thereafter at 10 dB intervals down to a value of 0 dB relative to an isotropic radiator;

– wherever practicable, a numerical equation or table providing the necessary information to allow the gain contours to be plotted.

13 Station-keeping accuracy.

14 Modulation characteristics:

a) type of modulation;

b) pre-emphasis characteristics;

c) TV standard;

d) sound broadcasting characteristics;

e) frequency deviation;

f) composition of the baseband;

g) type of multiplexing of the video and sound signals;

---

[21] A circular beam is considered as a particular elliptical beam where the major and minor axes are equal and where the major axis orientation and rotational accuracy are equal to 0°.

h) energy dispersal characteristics;

i) in the case of a digital modulation, the effective and transmitted bit/symbol rates.

15 Minimum angle of elevation in the service area in the case of Regions 1 and 3.

16 Receiving antenna characteristics of the earth station:

a) isotropic gain (dBi) of the antenna in the direction of maximum radiation;

b) beamwidth in degrees between the half-power points (describe in detail if not symmetrical);

c) either the measured co-polar and cross-polar radiation patterns of the antenna (taking as a reference the direction of maximum radiation) or the reference co-polar and cross-polar radiation patterns;

d) equivalent diameter of the antenna (m);

e) type of reception (individual or community) in the case of Regions 1 and 3.

17 Regular hours of operation (UTC).

18 Coordination.

19 Agreements.

20 Other information.

21 Operating administration or agency.

22 Connection between Earth-to-space and space-to-Earth frequencies in the network in the case of Region 2.

23 Description of the group(s) required in the case of non-simultaneous emissions.

ANNEX 3

Method for determining the limiting interfering power flux-density at the edge of a broadcasting-satellite service area in the frequency bands 11.7-12.2 GHz (in Region 3), 11.7-12.5 GHz (in Region 1) and 12.2-12.7 GHz (in Region 2) and for calculating the power flux-density produced there by a terrestrial station

1 General

1.1 This Annex describes a method of calculating the interference potential from terrestrial transmitters to broadcasting-satellite receivers.

1.2 The method is in two parts:

a) the calculation of the maximum permissible interfering power flux-density at the edge of the broadcasting-satellite service area concerned;

b) the calculation of the likely power flux-density produced at any point on the edge of the service area by the terrestrial transmitter of another administration.

1.3 The interference potential of the terrestrial transmitters must be considered case by case; the power flux-density produced by each terrestrial transmitter is compared to the limiting power flux-density at any point on the edge of the service area of a broadcasting-satellite station of another administration. If, for a given transmitter, the value of the power flux-density produced is lower than the value of the limiting power flux-density at any point on the edge of the service area, the interference caused to the broadcasting-satellite service by this transmitter is considered to be lower than the permissible value and no coordination is required between administrations before the terrestrial service is brought into use. Where this is not the case, coordination and more precise calculations derived from a mutually agreed basis are necessary.

1.4 It is emphasized that, should the calculation described in this Annex indicate that the maximum permissible power flux-density is exceeded, it does not necessarily preclude the introduction of the terrestrial service since the calculations are necessarily based on worst-case assumptions for:

a) the nature of the terrain of the interference path;

b) the off-beam discrimination on the broadcasting-satellite receiving installations;

c) the necessary protection ratios for the broadcasting-satellite service;

d) the type of reception in the broadcasting-satellite service, i.e., assuming individual reception, this being more critical than community reception for the angles of elevation concerned;

e) the value of power flux-density to be protected in the broadcasting-satellite service;

f) the propagation conditions between the terrestrial station and the broadcasting-satellite service area.

2 Limit of power flux-density

2.1 General

The limiting power flux-density not to be exceeded at the edge of the service area in order to protect the broadcasting-satellite service of an administration is given by the formula:

$$F = F_0 - R + D + P \quad (1)$$

where:

F: the maximum permissible interfering power flux-density (dB(W/m^2)) within the necessary bandwidth of the broadcasting-satellite;

F_0: the wanted power flux-density (dB(W/m^2)) at the edge of the service area;

R: the protection ratio (dB) between the wanted and interfering signals;

D: angular discrimination (dB) provided by the radiation pattern of the broadcasting-satellite receiver antenna;

P: polarization discrimination (dB) between the wanted and interfering signals.

2.2 Wanted power flux-density (F_0)

The value of F_0 is equal to:

a) -103 dB(W/m^2) for service areas in Regions 1 and 3, *and*

b) -107 dB(W/m^2) for 24 MHz, as well as for 27 MHz with respect to the cases mentioned in the footnote to section 3.8 of Annex 5 for service areas in Region 2.

2.3 Protection ratio (R)

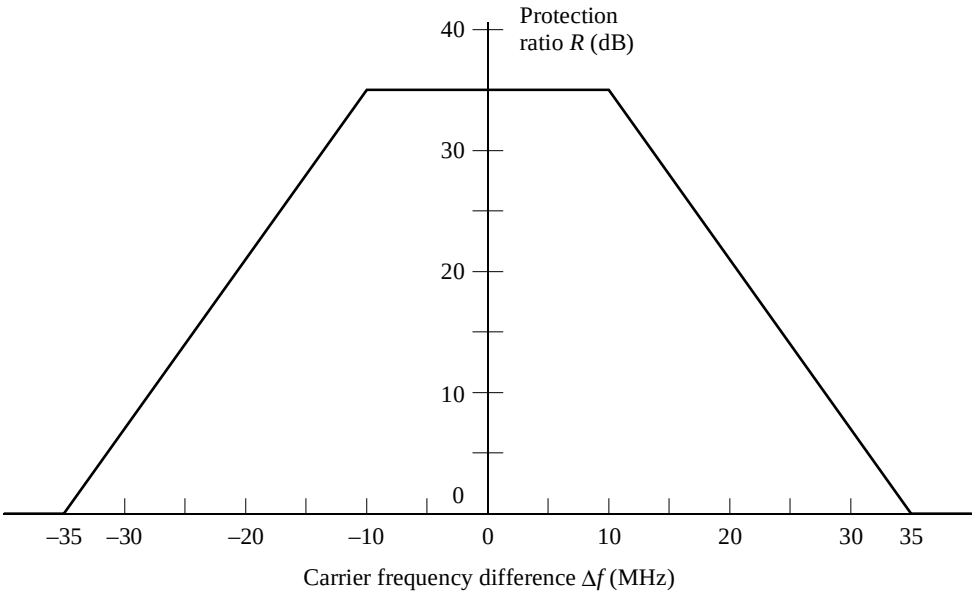
2.3.1 The single entry protection ratio against all types of terrestrial transmissions, with the exception of amplitude-modulation multichannel television systems, is 35 dB for carrier frequency differences between the wanted and interfering signals of up to ± 10 MHz, decreasing linearly from 35 dB to 0 dB for carrier frequency differences between 10 MHz and 35 MHz, and is 0 dB for frequency differences in excess of 35 MHz (see Fig. 1).

2.3.2 The carrier frequency difference should be determined by reference to the frequency assignments in the broadcasting-satellite Plan or, in the case of assignments not contained within a plan, by reference to the characteristics of the proposed or operational system. For amplitude-modulation multichannel television systems which produce high peaks of power flux-density spread over a wide range of their necessary bandwidth, the protection ratio R is 35 dB and is independent of the carrier frequency difference.

2.3.3 A signal from a terrestrial station should be considered only if its necessary bandwidth overlaps the necessary bandwidth of the broadcasting-satellite assignment.

FIGURE 1

Protection ratio *R* (dB) for a broadcasting-satellite signal against a single entry of interference from a terrestrial service (except for AM multichannel TV system)



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2.4 Angular discrimination (*D*)

Regions 1 and 3:

2.4.1 Where the angle of elevation φ selected for the proposed or operational broadcasting-satellite system for the broadcasting-satellite service area concerned is equal to or greater than 19°, the value of *D* to be assumed in equation (1) is 33 dB. When φ is less than 19°, *D* should be derived from the equation (2) below.

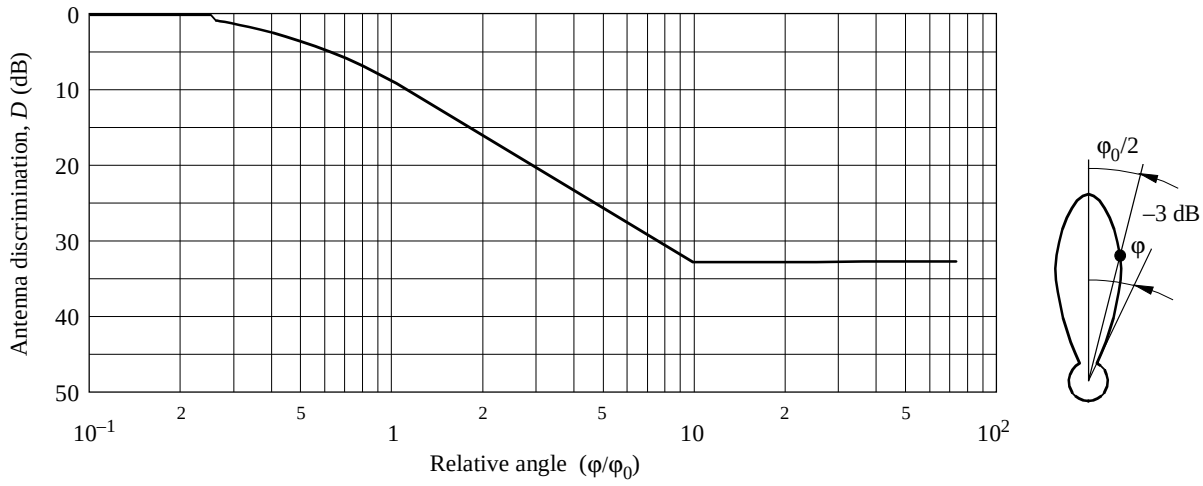
NOTE 1 – If more than one value of φ is specified for a particular service area, the appropriate value of φ should be used for each section of the edge of the service area under consideration.

$$
\begin{aligned}
&D = 0 && \text{for } 0° \leq \varphi \leq 0.5° \\
&D = 3\,\varphi^2 && \text{for } 0.5° < \varphi \leq 1.41° \\
&D = 3 + 20 \log \varphi && \text{for } 1.41° < \varphi \leq 2.52° \\
&D = 1 + 25 \log \varphi && \text{for } 2.52° < \varphi \leq 19°
\end{aligned}
\qquad (2)
$$

NOTE 2 – For the graphical determination of *D* see Fig. 2.

FIGURE 2

Discrimination *D* (dB) of broadcasting-satellite receiver antenna as a function of satellite elevation angle



For service areas in Regions 1 and 3, $\varphi_0 = 2°$.

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Region 2:

2.4.2 *D* should be derived from the expression (3) below where φ is the elevation angle for the proposed or operational broadcasting-satellite system for the broadcasting-satellite service area concerned.

NOTE 1 – If more than one value of φ is specified for a particular service area, the appropriate value of φ should be used for each section of the edge of the service area under consideration.

$$\begin{aligned} D &= 0 && \text{for } 0° \le \varphi \le 0.43° \\ D &= 4.15\,\varphi^2 && \text{for } 0.43° < \varphi \le 1.92° \\ D &= 8.24 + 25 \log \varphi && \text{for } 1.92° < \varphi \le 25° \\ D &= 43.2 && \text{for } \varphi > 25° \end{aligned} \qquad (3)$$

NOTE 2 – For the graphical determination of *D* see Fig. 3.

2.5 Polarization discrimination (*P*)

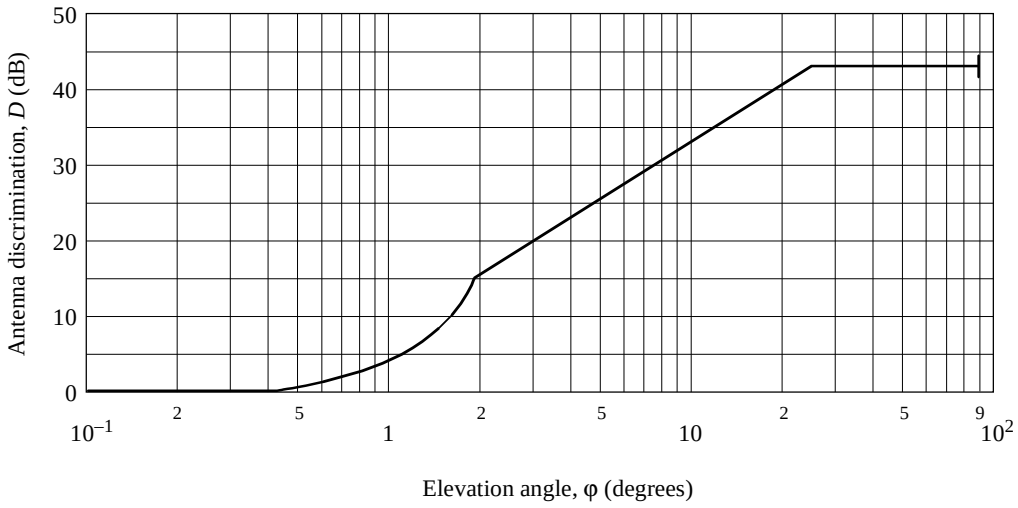
The value of *P* is equal to:

a) 3 dB when the interfering terrestrial service uses linear polarization and the broadcasting-satellite service uses circular polarization or vice versa;

b) 0 dB when the interfering terrestrial service and the broadcasting-satellite service both use circular or both use linear polarization.

FIGURE 3

Discrimination *D* (dB) of broadcasting-satellite receiver antenna as a function of satellite elevation angle



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3 Power flux-density produced by a terrestrial station (F_p)

The power flux-density F_p (dB(W/m^2)) produced at any point on the edge of the service area by the terrestrial station is determined from the following formula:

$$F_p = E - A + 43 \quad (4)$$

where:

E: the equivalent isotropically radiated power (dBW) of the terrestrial station in the direction of the point concerned on the edge of the service area;

A: the total path loss in dB.

3.1 Evaluation of path loss *A* for a terrestrial station at a distance greater than 100 km from the edge of the service area of the broadcasting satellite

For path lengths greater than 100 km, A is given by:

In the case of Regions 1 and 3:

$$A = 137.6 + 0.2324\, d_t + 0.0814\, d_m \quad (5)$$

In the case of Region 2:

$$A = 141.9 + 0.2867\, d_t + 0.1522\, d_m \quad (6)$$

where:

d_t and d_m are the overland and oversea path lengths respectively (km).

3.2 Evaluation of path loss *A* for a terrestrial station at a distance equal to or less than 100 km from the edge of the service area of the broadcasting satellite

In the case of Regions 1 and 3:

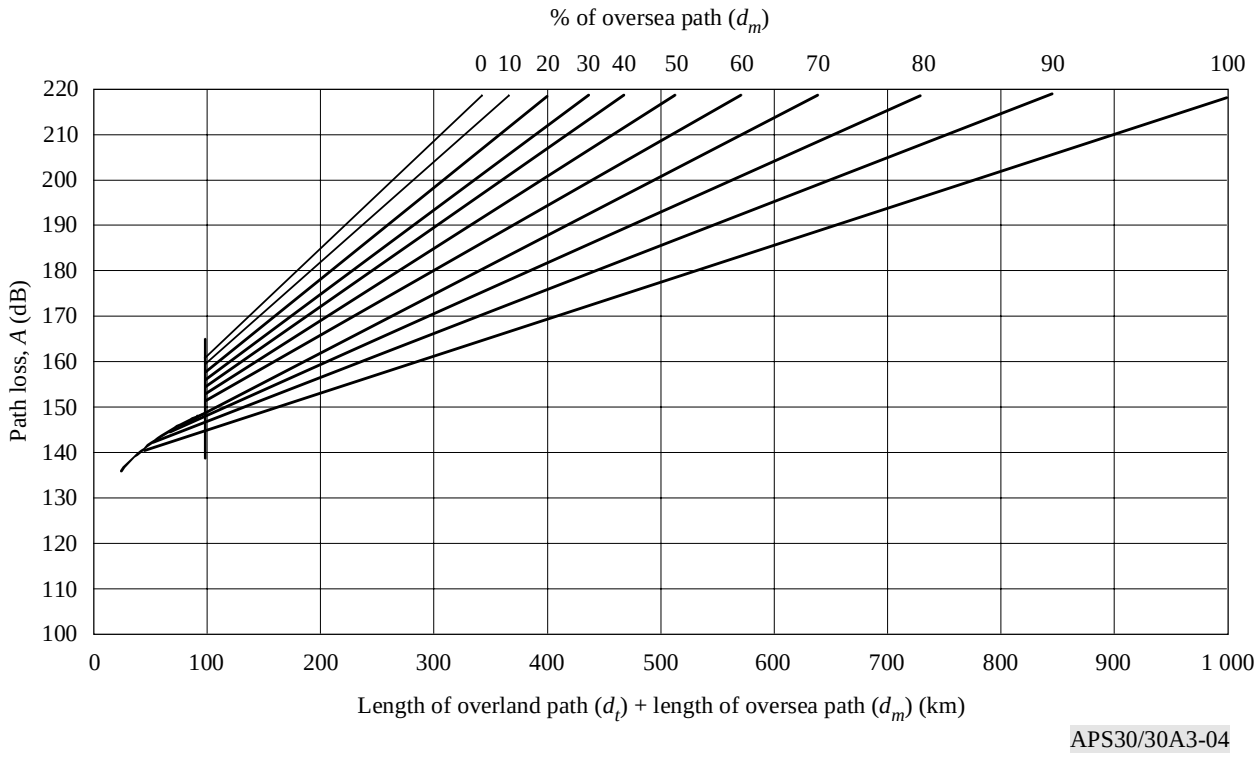
For path lengths equal to or less than 100 km, *A* is calculated using equations (5) and (7) and the lower value obtained is substituted in formula (4) to calculate the power flux-density produced at the point concerned on the edge of the service area:

$$A = 109.5 + 20 \log (d_t + d_m) \quad (7)$$

The variation in *A* for different path lengths and percentage of oversea path is shown in Fig. 4.

FIGURE 4

Total path loss *A* (dB) versus total path length ($d_t + d_m$) (km) and percentage of oversea path (Regions 1 and 3)



In the case of Region 2:

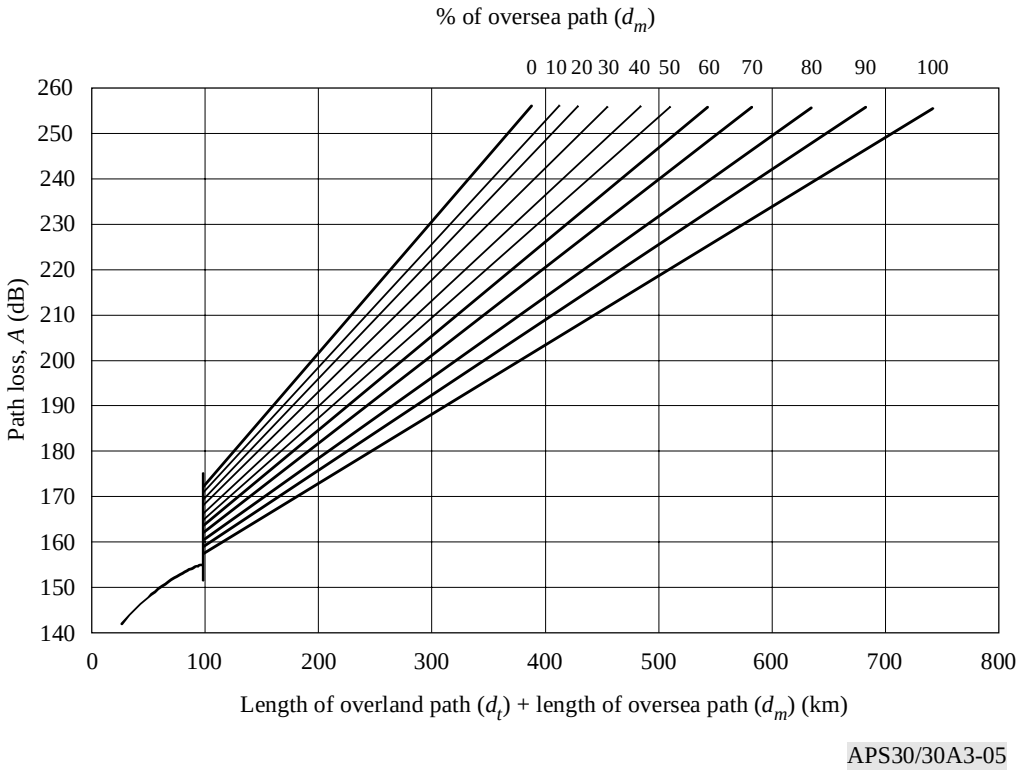
For path lengths equal to or less than 100 km, *A* is calculated using equations (6) and (8) and the lower value obtained is substituted in formula (4) to calculate the power flux-density produced at the point concerned on the edge of the service area:

$$A = 114.4 + 20 \log (d_t + d_m) + 0.01 (d_t + d_m) \quad (8)$$

The variation in *A* for different path lengths and percentage of oversea path is shown in Fig. 5.

FIGURE 5

Total path *A* (dB) versus total path length ($d_t + d_m$) (km) and percentage of oversea path (Region 2)



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3.3 Distance beyond which the method need not be applied

The method need not be applied and coordination is unnecessary when the distance between the terrestrial station and the service area of the broadcasting satellite is greater than:

a) 400 km in the case of all overland paths; *or*

b) 1 200 km in the case of all oversea or mixed paths.

ANNEX 4

Need for coordination of a space station in the fixed-satellite service: in Region 2 (11.7-12.2 GHz) with respect to the Regions 1 and 3 Plan, in Region 1 (12.5-12.7 GHz) and in Region 3 (12.2-12.7 GHz) with respect to the Region 2 Plan

(See Article 7)

With respect to § 7.2.1 of Article 7, coordination of a space station in the fixed-satellite service of Region 2 is required when, under assumed free-space propagation conditions, the power

flux-density on the territory of an administration in Region 1 or Region 3 exceeds the value derived from the expressions given below.

With respect to § 7.2.1 of Article 7, coordination of a space station in the fixed-satellite service in Region 1 or 3 is required when, under assumed free-space propagation conditions, the power flux-density on the territory of an administration in Region 2 exceeds the value derived from the same expressions:

-147 dB(W/m^2/27 MHz) for $0° \leq \theta < 0.44°$;

$-138 + 25 \log \theta$ dB(W/m^2/27 MHz) for $0.44° \leq \theta < 19.1°$;

-106 dB(W/m^2/27 MHz) for $\theta \geq 19.1°$;

where θ is:

– the difference in degrees between the longitude of the interfering fixed-satellite space station in Region 2 and the longitude of the affected broadcasting-satellite space station in Regions 1 and 3, *or*

– the difference in degrees between the longitude of the interfering fixed-satellite space station in Region 1 or 3 and the longitude of the affected broadcasting-satellite space station in Region 2.

ANNEX 5

Technical data used in establishing the provisions and associated Plans and which should be used for their application[22]

1 Definitions

1.1 Downlink service area

The area on the surface of the Earth in which the administration responsible for the service has the right to demand that the agreed protection conditions be provided.

NOTE – In the definition of service area, it is made clear that within the service area the agreed protection conditions can be demanded. This is the area where there should be at least the wanted power flux-density and protection against interference based on the agreed protection ratio for the agreed percentage of time.

[22] In revising this Annex at WRC-97, no changes have been made to the technical data applicable to the Region 2 Plan. However, for all three Regions, it should be noted that some of the parameters of networks proposed as modifications to the Plans may differ from the technical data presented herein.

1.2 Downlink coverage area

The area on the surface of the Earth delineated by a contour of a constant given value of power flux-density which would permit the wanted quality of reception in the absence of interference.

NOTE 1 – In accordance with the provisions of No. **S23.13**, the coverage area must be the smallest area which encompasses the service area.

NOTE 2 – The coverage area, which will normally encompass the entire service area, will result from the intersection of the antenna beam (elliptical, circular, or shaped) with the surface of the Earth, and will be defined by a given value of power flux-density. For example, it would be the area delineated by the contour corresponding to the level specified in section 3.16 of this Annex. There will usually be an area outside the service area but within the coverage area in which the power flux-density will be at least equivalent to the minimum specified value; however, protection against interference will not be provided in this area.

NOTE 3 – If coverage is provided by a steerable beam, the contour delineating the coverage area will depend on the pointing capability of the beam and will not necessarily cover the entire service area.

1.3 Downlink beam area

The area delineated by the intersection of the half-power beam of the satellite transmitting antenna with the surface of the Earth. The downlink beam area concept was generally used for planning purposes in conjunction with elliptical beams.

NOTE – The beam area is simply that area on the Earth's surface corresponding to the –3 dB points on the satellite antenna radiation pattern. In many cases the beam area would almost coincide with the coverage area, the discrepancy being accounted for by the permanent difference in path lengths from the satellite throughout the beam area, and also by the permanent variations, if any, in propagation factors across the area. However, for a service area where the maximum dimension as seen from the satellite position is less than 0.6° in Regions 1 and 3, and less than 0.8° in Region 2 (the agreed minimum practicable satellite antenna half-power beamwidths), there could be a significant difference between the beam area and the coverage area.

1.4 Nominal orbital position

The longitude of a position in the geostationary-satellite orbit associated with a frequency assignment to a space station in a space radiocommunication service. The position is given in degrees from the Greenwich meridian.

NOTE – Definitions in § 1.5 to 1.11 are applicable to Region 2.

1.5 Adjacent channel

The RF channel in the broadcasting-satellite service frequency Plan, or in the associated feeder-link frequency Plan, which is situated immediately higher or lower in frequency with respect to the reference channel.

1.6 Second adjacent channel

The RF channel in the broadcasting-satellite service frequency Plan, or in the associated feeder-link frequency Plan, which is situated immediately beyond either of the adjacent channels, with respect to the reference channel.

1.7 Overall carrier-to-interference ratio

The overall carrier-to-interference ratio is the ratio of the wanted carrier power to the sum of all interfering RF powers in a given channel including both feeder links and downlinks. The overall carrier-to-interference ratio due to interference from the given channel is calculated as the reciprocal of the sum of the reciprocals of the feeder-link carrier-to-interference ratio and the down-link carrier-to-interference ratio referred to the satellite receiver input and earth station receiver input, respectively[23].

1.8 Overall co-channel protection margin

The overall co-channel protection margin in a given channel is the difference in decibels between the overall co-channel carrier-to-interference ratio and the co-channel protection ratio.

1.9 Overall adjacent channel protection margin

The overall adjacent channel protection margin is the difference in decibels between the overall adjacent channel carrier-to-interference ratio and the adjacent channel protection ratio.

1.10 Overall second adjacent channel protection margin

The overall second adjacent channel protection margin is the difference in decibels between the overall second adjacent channel carrier-to-interference ratio and the second adjacent channel protection ratio

1.11 Overall equivalent protection margin[24]

The overall equivalent protection margin M is given in decibels by the expression:

$$M = -10 \log \left(\sum_{i=1}^{5} 10^{\left(-M_i/10\right)} \right)$$

where:

M_1: overall co-channel protection margin (dB) (as defined in § 1.8 of this Annex);

---

[23] There are a total of five overall carrier-to-interference ratios used in the analysis of the Plan for the broadcasting-satellite service in Region 2, namely, co-channel, upper and lower adjacent channels, and upper and lower second adjacent channels. In Regions 1 and 3, three ratios are normally used, namely, co-channel and upper and lower adjacent channels. However, see the footnote to the definition of M_4 and M_5 in § 1.11 of this Annex.

[24] For calculation of overall equivalent protection margin for Regions 1 and 3, as defined at WARC Orb-88, see alternative formula in § 1.12 to Annex 3 of Appendix **S30A/30A**.

M_2, M_3: overall adjacent channel protection margins for the upper and lower adjacent channels, respectively (dB) (as defined in § 1.9 of this Annex);

M_4, M_5: overall second adjacent channel protection margins for the upper and lower second adjacent channels, respectively (dB) (as defined in § 1.10 of this Annex)[25].

The adjective “equivalent” indicates that the protection margins for all interference sources from the adjacent and second adjacent channels as well as co-channel interference sources have been included.

2 Radio propagation factors

In Regions 1 and 3:

2.1 The propagation loss on the space-to-Earth path (used for computing downlink e.i.r.p. and as a guide in choosing orbital locations during the development of the Plan) is equal to the free-space path loss plus the atmospheric absorption and the rain attenuation exceeded for 1% of the worst month. Values of this attenuation can be calculated as a function of angle of elevation for the rain-climatic zones shown in Fig. 1 and 2 from Recommendation ITU-R P.837-1 by applying the method described in Recommendation ITU-R P.618-5.

[25] M_4 and M_5 are normally applicable only for Region 2. However, in certain cases (e.g. when the channel spacing and/or bandwidth of an assignment are different from the values given in sections 3.5 and 3.8 of this Annex), these margins may also be used for Regions 1 and 3, provided that appropriate protection masks are included in ITU-R Recommendations. Until a relevant ITU-R Recommendation is incorporated in this Annex by reference, the Bureau will use the worst-case approach as adopted by the Radio Regulations Board.

FIGURE 1

Rain-climatic zones for Regions 1 and 3 between longitudes 45° W and 105° E

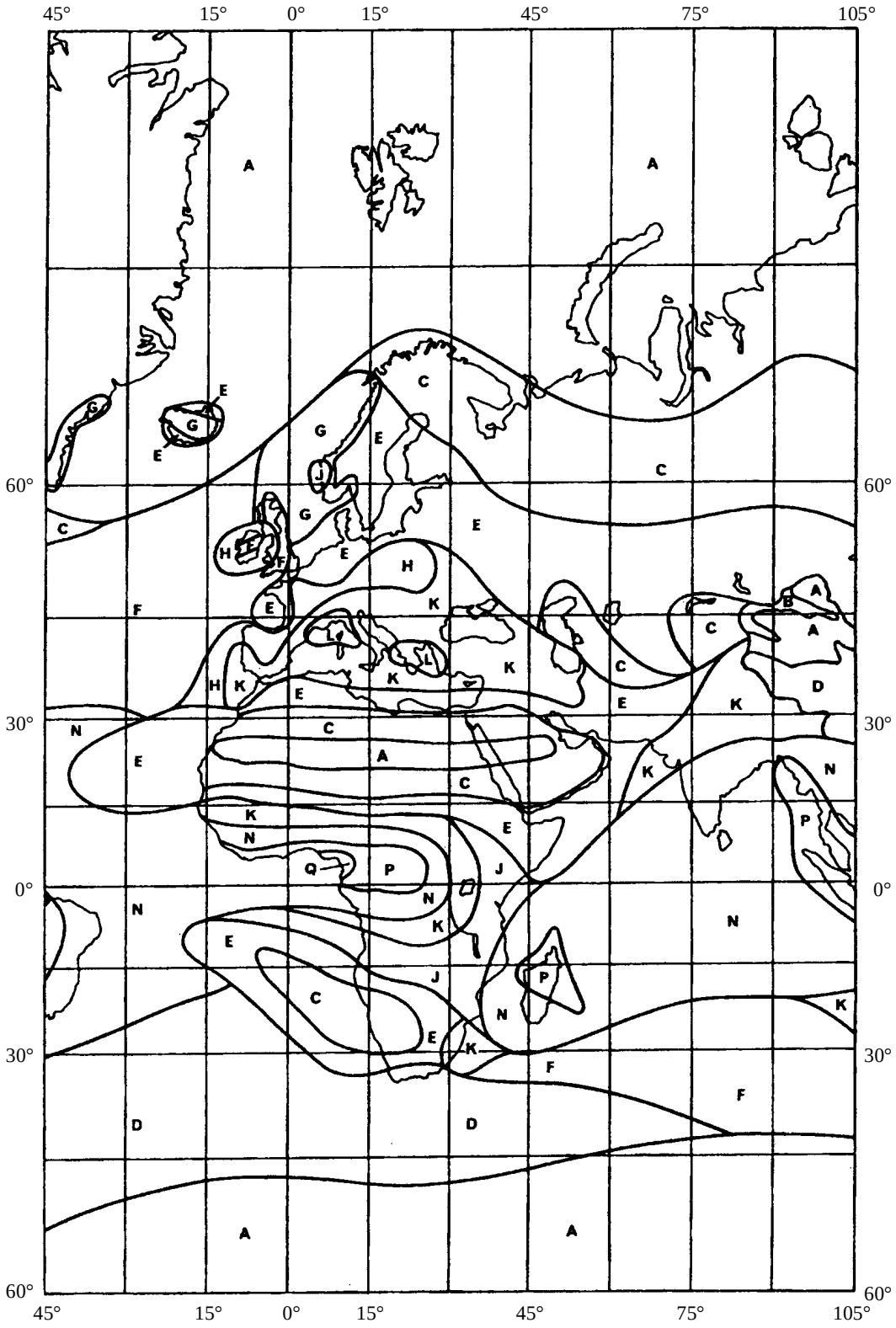
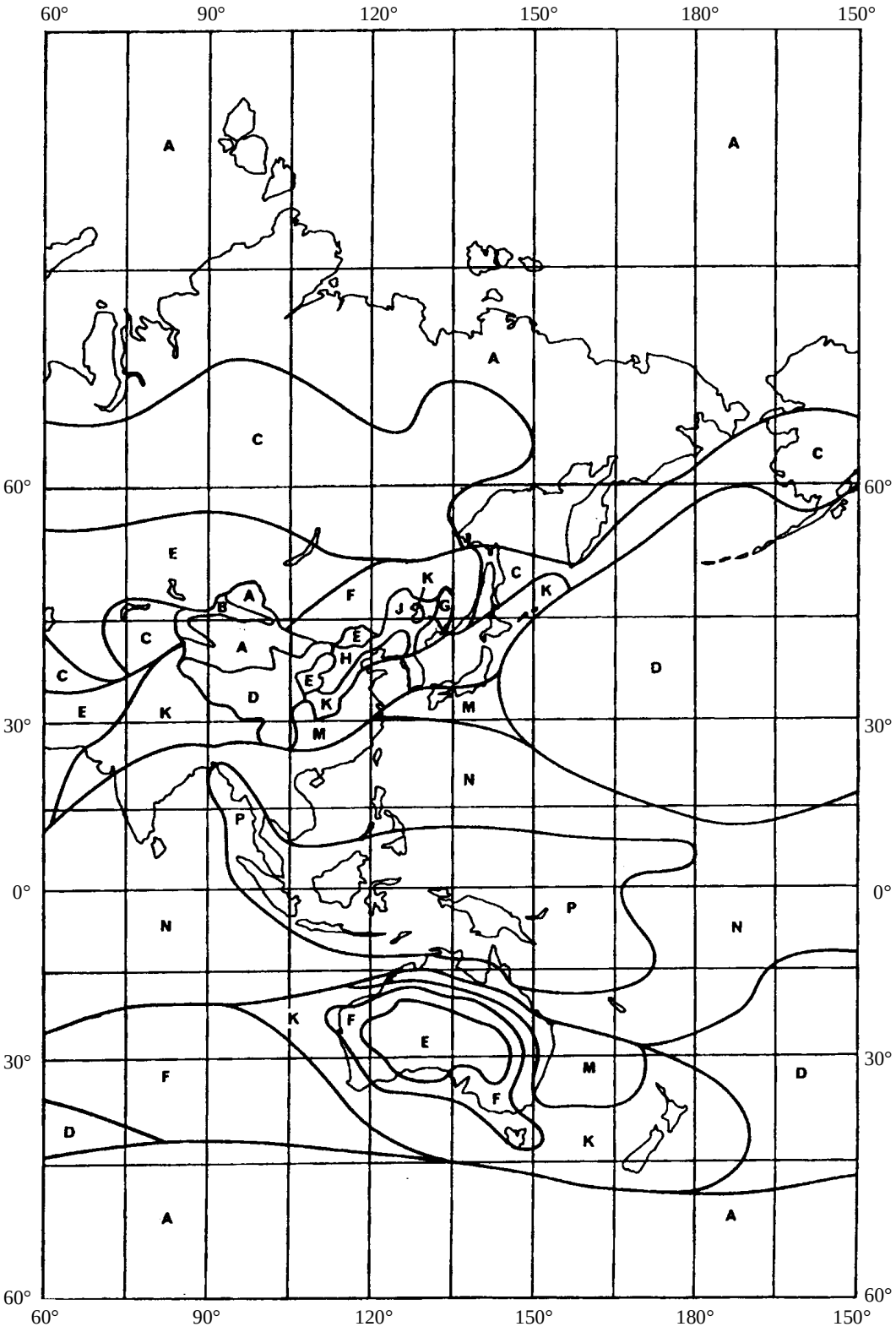


FIGURE 2

Rain-climatic zones for Regions 1 and 3 between longitudes 60° E and 150° W



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In Region 2:

2.2 The propagation loss on a space-Earth path is equal to the free-space path loss plus the atmospheric absorption loss plus the rain attenuation exceeded for 1% of the worst month.

2.2.1 Atmospheric absorption

The loss due to atmospheric absorption (i.e. clear-sky attenuation) is given by:

$$A_a = \frac{92.20}{\cos\theta}\left[0.017F_o + 0.002\,\rho F_w\right] \quad \text{dB} \quad \text{for } \theta < 5°$$

where:

$$F_o = \left[24.88\tan\theta + 0.339\sqrt{1\,416.77\tan^2\theta + 5.51}\right]^{-1}$$

$$F_w = \left[40.81\tan\theta + 0.339\sqrt{3\,811.66\tan^2\theta + 5.51}\right]^{-1}$$

and:

$$A_a = \frac{0.042 + 0.003\,\rho}{\sin\theta} \quad \text{dB} \quad \text{for } \theta \geq 5°$$

where:

θ: elevation angle (degrees),

ρ: surface water vapour concentration (g/m^3), being

$\rho = 10$ g/m^3 for rain climatic zones A to K and

$\rho = 20$ g/m^3 for rain climatic zones M to P (see Fig. 3).

2.2.2 Rain attenuation

The rain attenuation A_p of circularly polarized signals exceeded for 1% of the worst month at 12.5 GHz is given by:

$$A_p = 0.21\,\gamma\,L\,r \quad \text{dB} \tag{9}$$

where:

L: slant path length through rain

$$= \frac{2(h_R - h_0)}{\left\{\sin^2\theta + 2\dfrac{h_R - h_0}{8\,500}\right\}^{1/2} + \sin\theta} \quad \text{km}$$

r: rain path length reduction factor

$$= \frac{90}{90 + 4L \cos \theta}$$

h_R: rain height (km)

$$= c \left\{ 5.1 - 2.15 \log \left(1 + 10^{(\zeta - 27)/25} \right) \right\} \quad \text{km}$$

where:

$c = 0.6$ for $|\zeta| \leq 20°$

$c = 0.6 + 0.02 (|\zeta| - 20)$ for $20° < |\zeta| \leq 40°$

$c = 1.0$ for $|\zeta| > 40°$

h_0: height (km) above mean sea level of the earth station;

ζ: earth station latitude (degrees);

θ: elevation angle (degrees);

γ: specific rain attenuation = $0.0202 R^{1.198}$ dB/km;

R: rain intensity (mm/h) obtained from the table below for the rain climatic zones identified in Fig. 3.

(NOTE – The method is based on R exceeded for 0.01% of an average year.)

Rainfall intensity (R) for the rain climatic zones (exceeded for 0.01% of an average year) (see Fig. 3)

Rain climatic zone	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**K**	**M**	**N**	**P**
Rainfall intensity (mm/h)	8	12	15	19	22	28	30	42	63	95	145

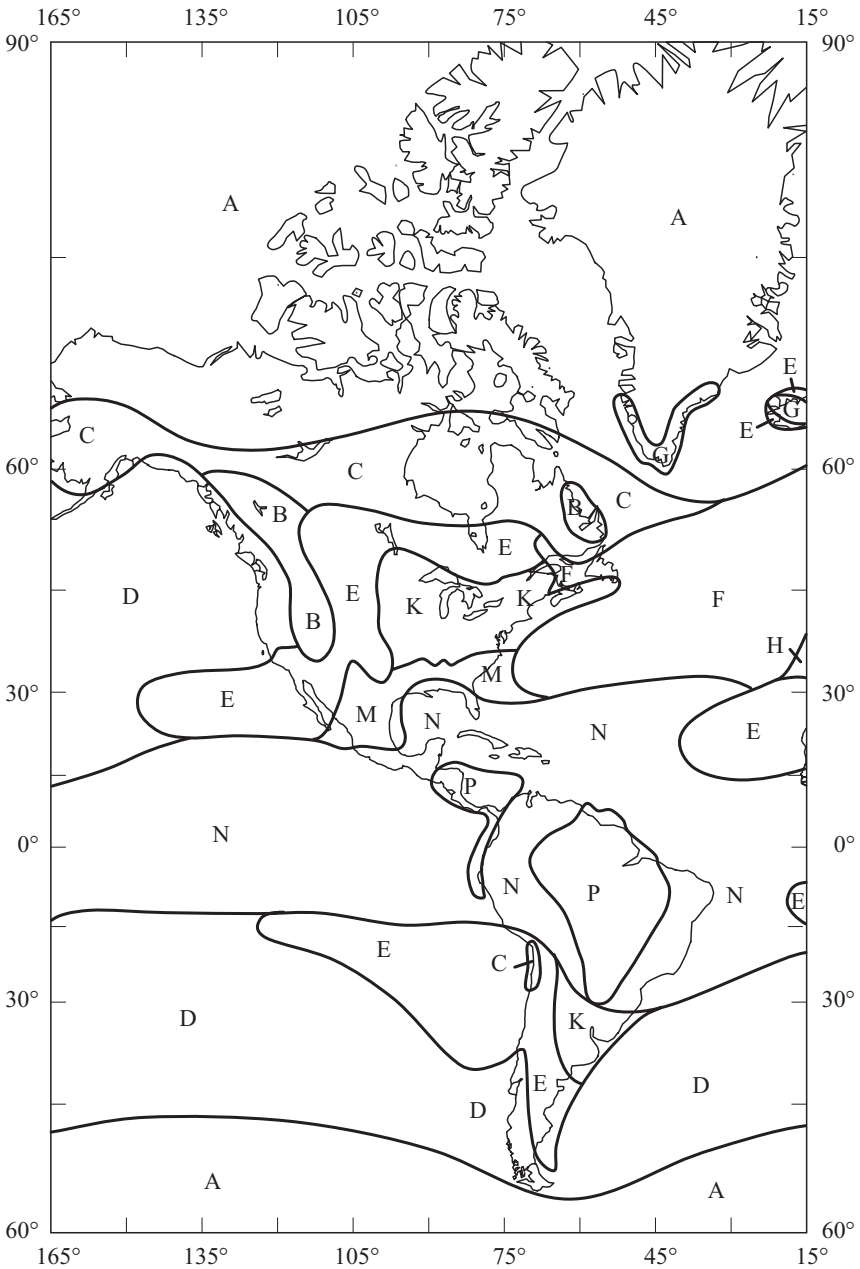
Figure 4 presents plots of rain attenuation, as calculated using equation (9), of circularly polarized signals exceeded for 1% of the worst month at 12.5 GHz, as a function of earth station latitude and elevation angle for each of the rain climatic zones shown in Fig. 3.

2.2.3 Rain attenuation limit

In the analysis of the Plan for the broadcasting-satellite service in Region 2, a maximum downlink attenuation of 9 dB was agreed in order to limit the inhomogeneity of broadcasting-satellite power flux-density and to facilitate sharing during clear-sky conditions.

FIGURE 3

Rain-climatic zones (Region 2)



2.2.4 Procedure for calculating the carrier-to-interference ratio at a test point

The calculation of the down-link carrier-to-interference ratio (exceeded for 99% of the worst month) used to obtain the overall equivalent protection margin at a test point is the minimum value of the carrier-to-interference ratio obtained assuming:

i) clear-sky conditions (i.e. including atmospheric absorption); *or*

ii) rain-faded conditions corresponding to an attenuation value exceeded for 1% of the worst month.

2.3 Depolarization

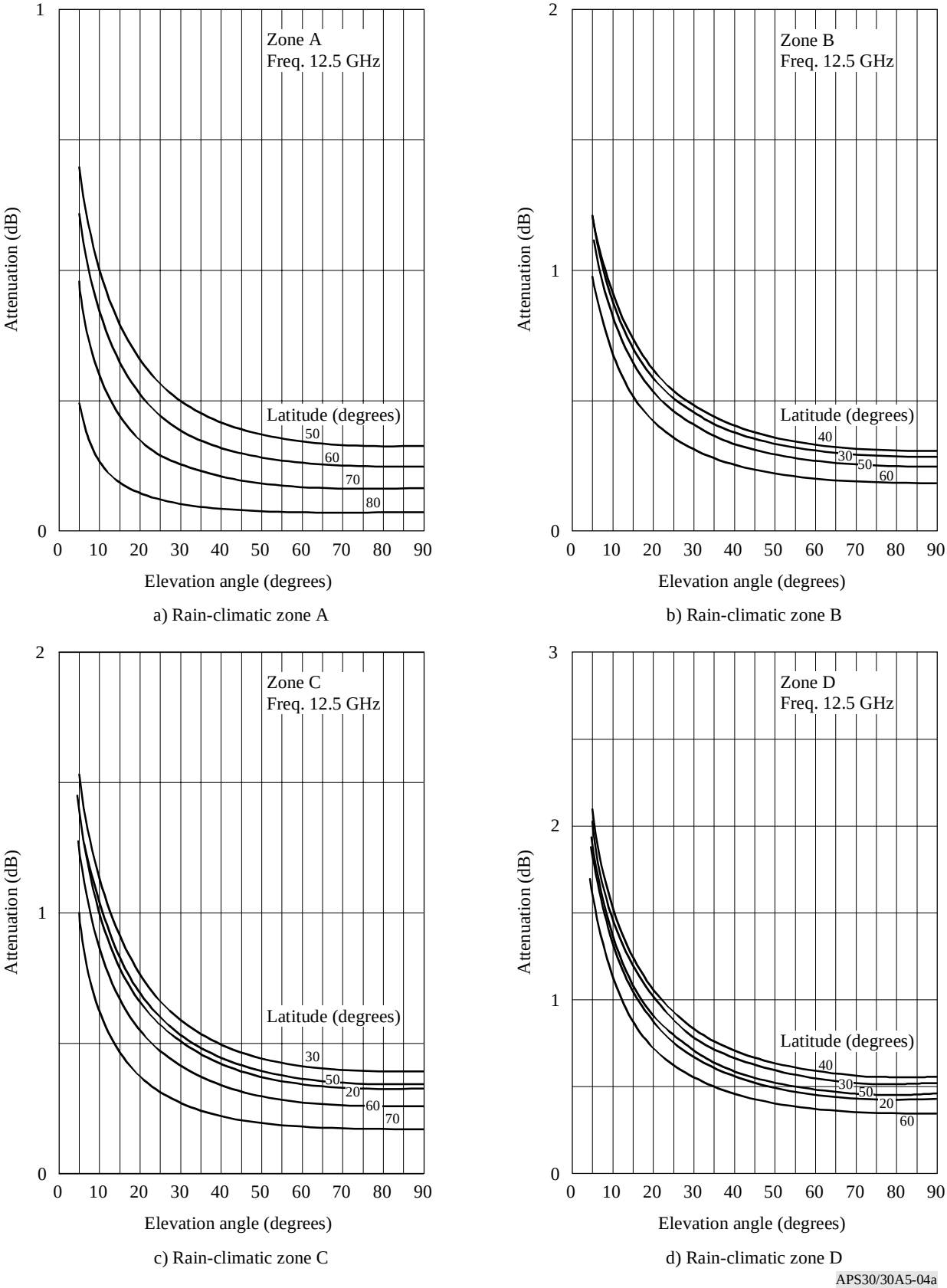
Rain and ice can cause depolarization of radio frequency signals. The level of the co-polar component relative to the depolarized component is given by the cross-polarization discrimination (XPD) ratio. For circularly polarized emissions, the XPD ratio, in dB, exceeded for 99% of the worst month is obtained from:

$$XPD = 30 \log f - 40 \log (\cos \theta) - 20 \log A_p \quad \text{for } 5° \leq \theta \leq 60° \tag{10}$$

where A_p (dB) is the co-polar rain attenuation exceeded for 1% of the worst month (calculated in § 2.2), f is the frequency in GHz and θ is the elevation angle. For angles of θ greater than 60°, use $\theta = 60°$ in equation (10).

FIGURE 4

Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain-climatic zones



a) Rain-climatic zone A

b) Rain-climatic zone B

c) Rain-climatic zone C

d) Rain-climatic zone D

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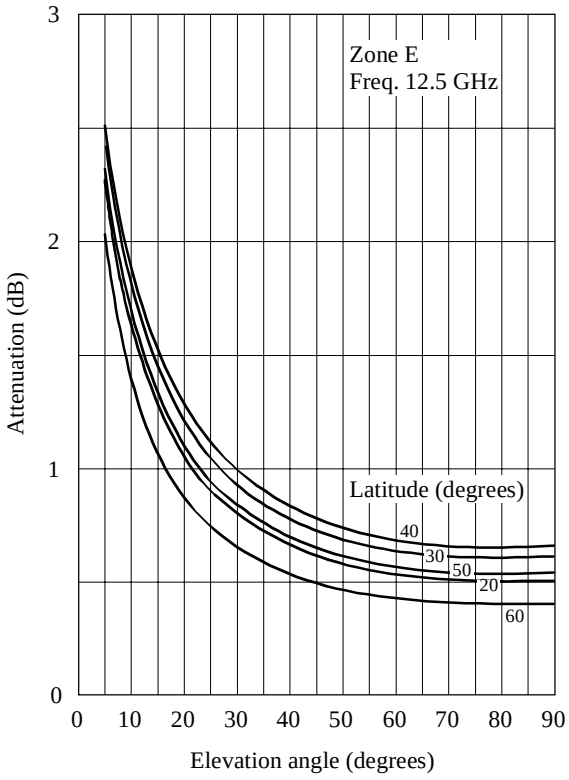
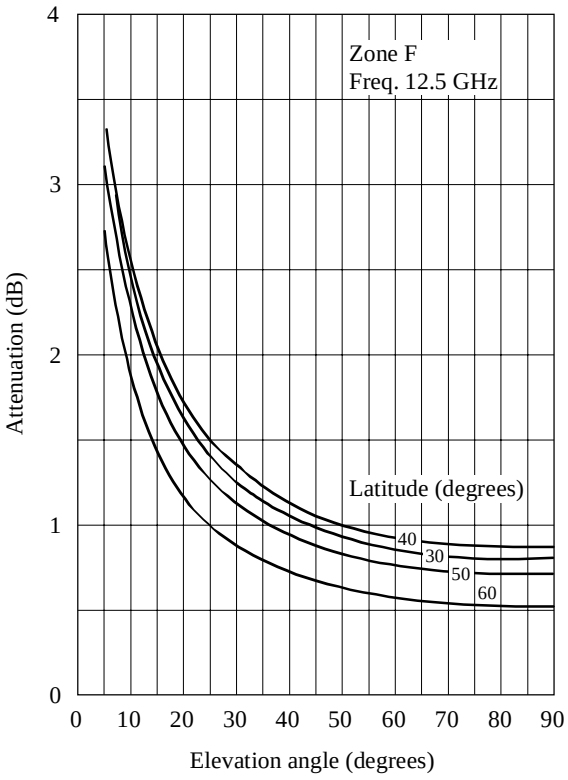
FIGURE 4 (*continued*)

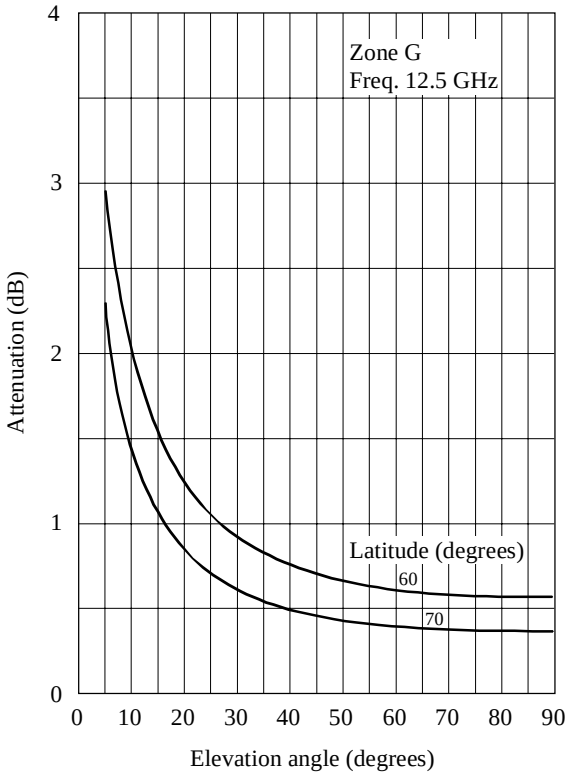
Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain-climatic zones



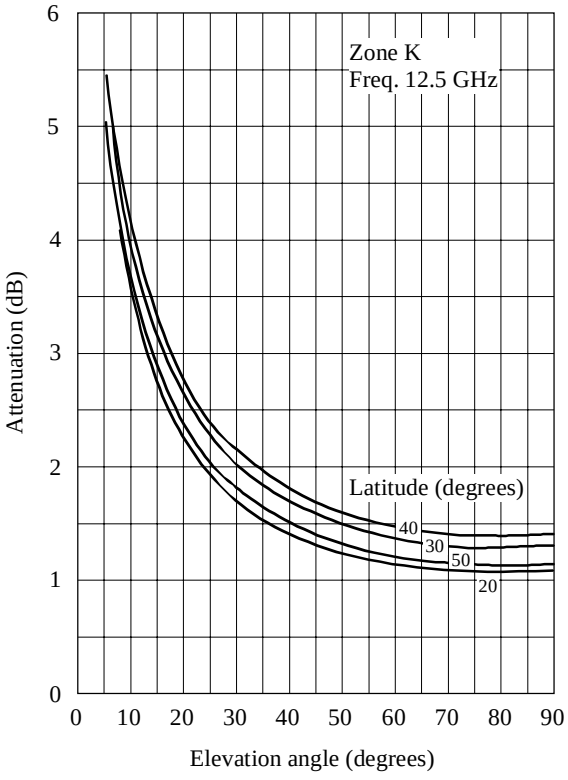
e) Rain-climatic zone E



f) Rain-climatic zone F



g) Rain-climatic zone G



h) Rain-climatic zone K

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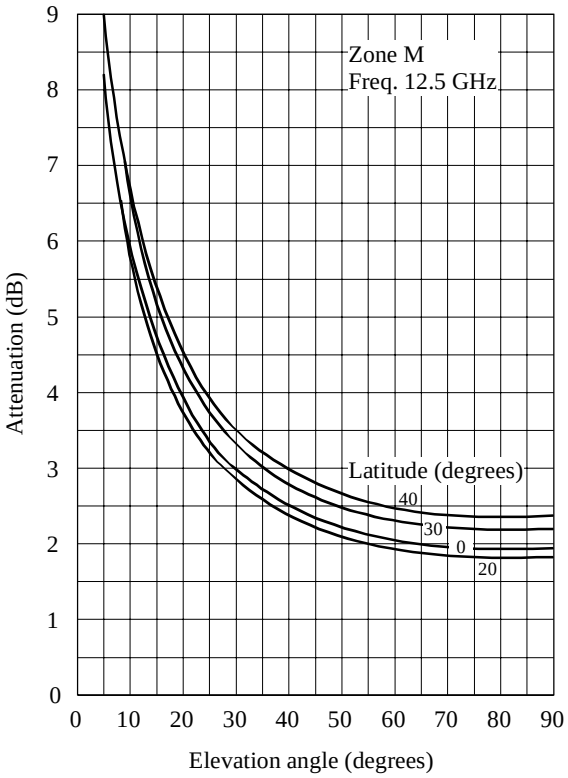
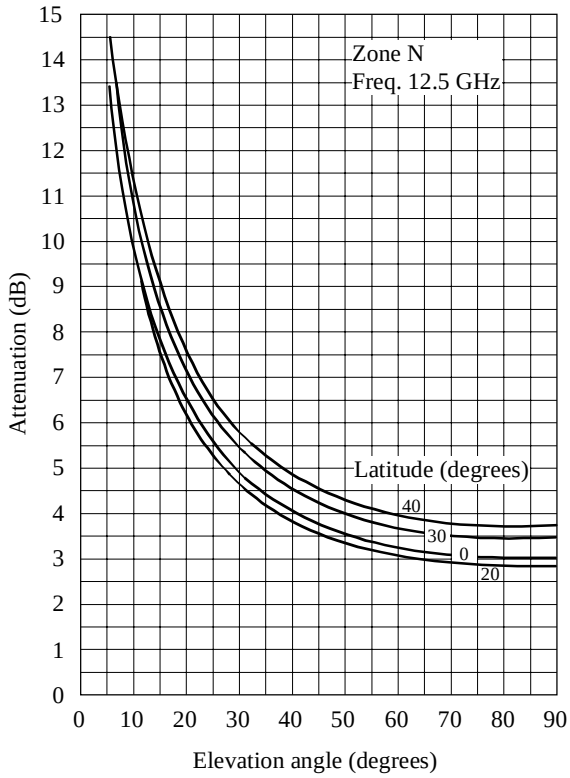
FIGURE 4 (*continued*)

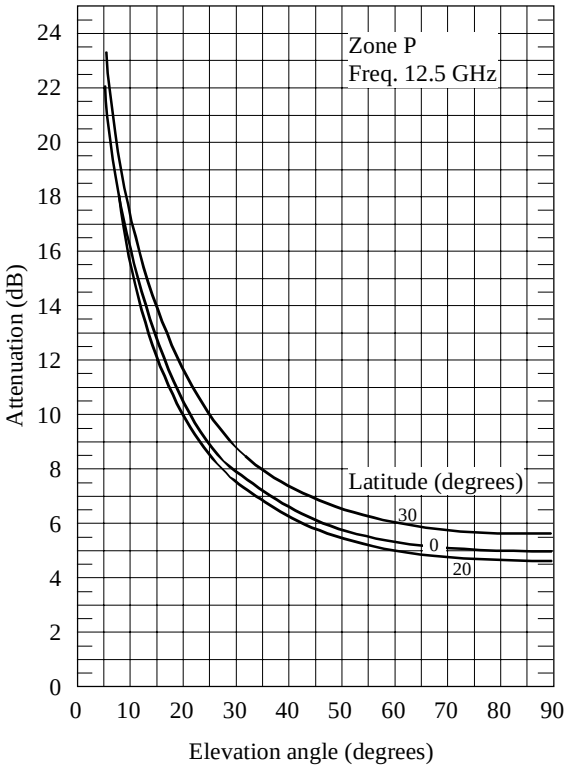
Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain-climatic zones



j) Rain-climatic zone M



k) Rain-climatic zone N



l) Rain-climatic zone P

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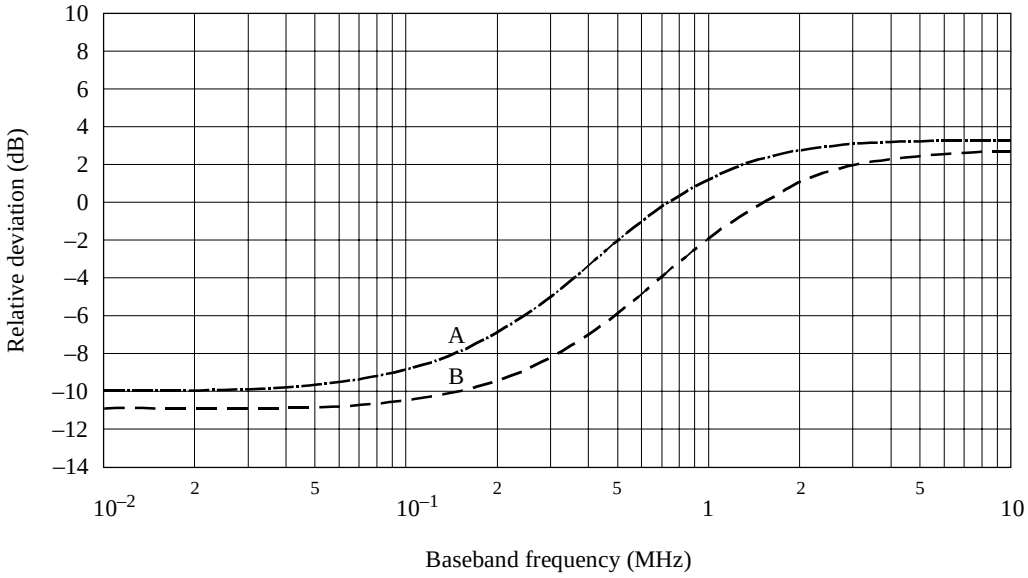
3 Basic technical characteristics

3.1 Type of modulation

3.1.1 In Regions 1 and 3, planning of the broadcasting-satellite service is normally based on the use of a signal consisting of a video signal with an associated carrier, frequency-modulated by a sound signal, both frequency-modulating a carrier in the 12 GHz band, with a pre-emphasis characteristic in accordance with Fig. 5 (from Recommendation ITU-R F.405-1).

FIGURE 5

Pre-emphasis characteristic for television on 525- and 625-line systems



Curves A: 525-line system
B: 625-line system

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3.1.2 In Region 2, planning is based on the use of a frequency-modulated composite-coded colour television signal with two sound sub-carriers. However, in recognition of the need to provide for the use of new, enhanced television coding and modulation formats (e.g. time-compressed, multiplexed analogue video component signals and digitally-coded sound and data signals), values of the important technical characteristics have been chosen to take into consideration the implementation of these new formats within the provisions of the Plan.

3.1.3 Nevertheless, other modulating signals having different characteristics (e.g. modulation with sound channels frequency-multiplexed within the bandwidth of a television channel, digital modulation of sound and television signals, or other pre-emphasis characteristics) are not

precluded, provided that appropriate protection masks and calculation methods[26] are applied or if the use of such characteristics complies with the provisions of § 3.2 of Article 3.

3.2 Polarization

3.2.1 For the planning of the broadcasting-satellite service, circular polarization is generally used. However, for implementation of assignments in the Plan, linear polarization may also be used, subject to the successful application of the modification procedure of Article 4.

3.2.2 In Regions 1 and 3, the polarization of different beams intended to serve the same area should, if possible, be the same.

3.2.3 The terms “direct” and “indirect” used in the Plans to indicate the direction of rotation of circularly-polarized waves correspond to right-hand (clockwise) and left-hand (anti-clockwise) polarization respectively according to the following definitions:

Direct polarization (right-hand or clockwise polarization):

An elliptically or circularly-polarized electromagnetic wave, in which the electric field-intensity vector, observed in any *fixed plane*, normal to the direction of propagation, whilst looking in (i.e., not against) the direction of propagation, rotates *with time* in a *right-hand* or clockwise direction.

NOTE – For right-hand circularly-polarized plane waves, the ends of the electric vectors drawn from any points along a straight line normal to the plane of the wave front form, *at any instant*, a *left-hand* helix.

Indirect polarization (left-hand or anti-clockwise polarization):

An elliptically or circularly-polarized electromagnetic wave, in which the electric field-intensity vector, observed in any *fixed plane*, normal to the direction of propagation, whilst looking in (i.e., not against) the direction of propagation, rotates *with time* in a *left-hand* or anti-clockwise direction.

NOTE – For left-hand circularly-polarized plane waves, the ends of the electric vectors drawn from any points along a straight line normal to the plane of the wave front form, *at any instant*, a *right-hand* helix.

---

[26] Protection masks for verifying that this provision is met are not yet fully defined in existing ITU-R Recommendations. Recommendations for interference between analogue and digital signals are still under development. In absence of criteria to evaluate interference, the Bureau will use the worst-case approach as adopted by the Radio Regulations Board.

3.2.4 Linear polarization is defined in Recommendation ITU-R BO.1212. This Recommendation should be used when analysing linearly polarized signals.

3.3 Carrier-to-noise ratio

For the purpose of planning the broadcasting-satellite service, the carrier-to-noise ratio is equal to or exceeds 14 dB for 99% of the worst month.

In Regions 1 and 3, the reduction in quality in the down-link due to thermal noise in the feeder-link is taken as equivalent to a degradation in the down-link carrier-to-noise ratio not exceeding 0.5 dB for 99% of the worst month. In Region 2, as a guide for planning, the reduction in quality in the down-link due to thermal noise in the feeder link is taken as equivalent to a degradation in the down-link carrier-to-noise ratio of approximately 0.5 dB not exceeded for 99% of the worst month, but the feeder-link and down-link Plans are evaluated on the basis of the overall carrier-to-noise ratio of 14 dB for the combined down-link and feeder-link contributions.

3.4 Protection ratio between television signals

For developing the original 1977 broadcasting-satellite service Plan for Regions 1 and 3, the following protection ratios were used[27, 28]:

– 31 dB for co-channel signals;

– 15 dB for adjacent channel signals.

For revising this Plan at WRC-97, the following aggregate downlink protection ratios were specified in Recommendation ITU-R BO.1297 for the purpose of calculating downlink equivalent protection margins[28]:

– 24 dB for co-channel signals;

– 16 dB for adjacent channel signals;

---

[27] These protection ratio values may be used for the assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997.

[28] The equivalent protection margin M is given in dB by the formula

$$M = -10 \log (10^{-M_1/10} + 10^{-M_2/10} + 10^{-M_3/10})$$

where M_1 is the value in dB of the protection margin for the same channel. This is defined in the following expression where the powers are evaluated at the receiver input:

$$\frac{\text{wanted power}}{\text{sum of the co-channel interfering powers}} \text{ (dB)} - \text{co-channel protection ratio (dB)}$$

M_2 and M_3 are the values in dB of the upper and lower adjacent-channel protection margins respectively.

The definition of the adjacent-channel protection margin is similar to that for the co-channel case except that the adjacent-channel protection ratio and the sum of the interfering powers due to emissions in the adjacent channel are considered.

In revising the Regions 1 and 3 Plan at WRC-97, the following aggregate overall protection ratio values were used (as specified in Recommendation **521 (WRC-95)**) for calculating the overall co-channel and adjacent-channel protection margins as defined in § 1.8 and 1.9 of this Annex:

– 23 dB for co-channel signals;

– 15 dB for adjacent channel signals.

Recommendation **521 (WRC-95)** also specified that for the revision of the Regions 1 and 3 Plan, no overall co-channel single entry *C*/*I* should be lower than 28 dB.

However, for the assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997, the overall equivalent protection margins were calculated using a co-channel overall protection ratio of 30 dB and lower and upper overall adjacent channel protection ratios of 14 dB[29].

Revision of the Regions 1 and 3 Plan at WRC-97 was generally based on a set of reference parameters such as the average e.i.r.p., the reference earth station receiving antenna, all test points placed within the –3 dB contour, a bandwidth of 27 MHz and the predetermined value of *C*/*N*.

Protection masks and associated calculation methods for interference into broadcast satellite systems involving digital emissions are given in Recommendation ITU-R BO.1293.

In Region 2, the following protection ratios have been adopted for the purpose of calculating the overall equivalent protection margin[30]:

28 dB for co-channel signals;

13.6 dB for adjacent-channel signals;

–9.9 dB for second adjacent-channel signals.

In Region 2, as a guide for planning, the reduction in the overall *C/I* ratio due to co-channel interference in the feeder link is taken as equivalent to a degradation in the down-link co-channel *C/I* ratio of approximately 0.5 dB not exceeded for 99% of the worst month, but the feeder-link and downlink Plans are evaluated on the basis of the overall equivalent protection margin, which includes the combined downlink and feeder-link contributions.

In Region 2, an overall equivalent protection margin of 0 dB, or greater, indicates that the individual protection ratios have been met for the co-channel, the adjacent channels and the second adjacent channels.

---

[29] The overall protection margin calculation method used is based on the first formula in § 1.12 of Annex 3 to Appendix **S30A**.

[30] The definitions in § 1.7, 1.8, 1.9, 1.10 and 1.11 of this Annex apply to these calculations.

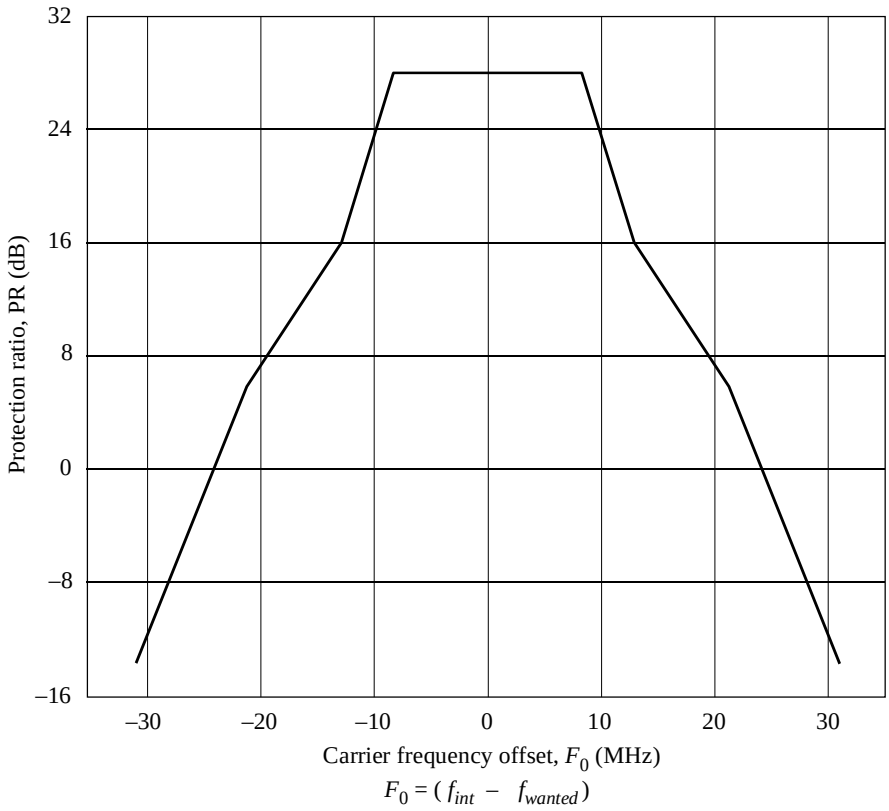
3.4.1 Adjacent channel protection ratio template for Region 2[31] (FMTV into FMTV)

The protection ratios for adjacent channels are derived from the template given in Fig. 6. The template is symmetrical and is given in terms of absolute levels for the *C/I* ratios.

The template is obtained by joining the segment for adjacent channels to the horizontal extension of the co-channel protection ratio value. The adjacent channel protection ratio cannot be adjusted relative to the co-channel value.

FIGURE 6

Protection ratio template (FMTV/FMTV), for planning of broadcasting-satellite systems in Region 2



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[31] See Annex 6 for the protection ratio template for interference between TV/FM signals in Regions 1 and 3.

The template is given by the following expressions:

$$PR = \begin{cases} 28 \text{ dB} & \text{for } |F_0| \leq 8.36 \text{ MHz} \\ -2.762\,|F_0| + 51.09 \text{ dB} & \text{for } 8.36 < |F_0| \leq 12.87 \text{ MHz} \\ -1.154\,|F_0| + 30.4 \text{ dB} & \text{for } 12.87 < |F_0| \leq 21.25 \text{ MHz} \\ -2.00\,|F_0| + 48.38 \text{ dB} & \text{for } |F_0| > 21.25 \text{ MHz} \end{cases}$$

where:

PR is the protection ratio in dB and $|F_0|$ is the carrier spacing between the interfering and wanted signals in MHz.

3.5 Channel spacing

3.5.1 Channel spacing in the Plans

In Regions 1 and 3, the spacing between the assigned frequencies of two adjacent channels is 19.18 MHz.

In Region 2, the spacing between the assigned frequencies of two adjacent channels is 14.58 MHz, which corresponds to 32 channels in the 500 MHz bandwidth allocated to the broadcasting-satellite service.

The Plans give the assigned frequencies for each channel.

However, in the Regions 1 and 3 Plan, for the implementation of assignments different frequency spacing may be used subject to the successful application of the modification procedure of Article 4, ITU-R Recommendations for protection masks should be used if available. In the absence of such Recommendations, the Bureau should apply the worst-case approach as adopted by the Radio Regulations Board.

3.5.2 Arrangement of channels in the same beam

Planning in Region 1 at the 1977 Conference was carried out by trying to restrict all the channels radiated within a single antenna beam within a frequency range of 400 MHz, in order to simplify receiver construction. Such a restriction was considered unnecessary for the revision of the Regions 1 and 3 Plan at WRC-97.

3.5.3 Spacing between assigned channel frequencies feeding a common antenna

In the 1977 Plan for Regions 1 and 3, owing to technical difficulties in the output circuit of a satellite transmitter, spacing between the assigned frequencies of two channels feeding a common antenna was required to be greater than 40 MHz. This restriction was not imposed in the revision of the Plan.

3.6 Figure of merit (*G*/*T*) of a receiving station in the broadcasting-satellite service

In planning the broadcasting-satellite service, the value of the figure of merit *G*/*T* for clear-sky conditions is:

for Regions 1 and 3:

The original 1977 broadcasting-satellite service Plan used values[32] of:

6 dB(K^{-1}) for individual reception

14 dB(K^{-1}) for community reception, *and*

for Region 2:

10 dB(K^{-1}) for individual reception.

The 1997 revision of the Regions 1 and 3 Plan is based on a uniform value of the figure of merit *G*/*T* equal to 11 dB(K^{-1}).

These values were calculated from a formula which allows for pointing error, polarization effects and equipment ageing.

See also Report ITU-R BO.473-3 (Annex 1).

3.7 Receiving antennas

3.7.1 Half-power beamwidth of receiving antennas

In the development of the original 1977 broadcasting-satellite service Plan for Regions 1 and 3, the minimum receiving antenna diameter was such that the half-power beamwidth was 2° for individual reception and 1° for community reception.

In revising this Plan at WRC-97, the minimum receiving antenna diameter was such that the half-power beamwidth was 2.96°.

For planning the broadcasting-satellite service in Region 2, the minimum receiving antenna diameter must be such that the half-power beamwidth φ_0 is 1.7°.

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[32] These values are still used for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997.

3.7.2 Receiving antenna reference patterns

The co-polar and cross-polar receiving antenna reference patterns are given in Figs. 7, 7*bis* and 8.

a) For Regions 1 and 3, the original 1977 Conference Plan was based on the antenna pattern[33] shown in Fig. 7 where the relative antenna gain (dB) is given by the curves for:

- individual reception, for which use should be made of:
  - Curve A for the co-polar component;
  - Curve B for the cross-polar component;
- community reception, for which use should be made of:
  - Curve A′ up to the intersection with Curve C, then Curve C, for the co-polar component;
  - Curve B for the cross-polar component.

The WRC-97 revision of the Regions 1 and 3 broadcasting-satellite service Plan was based on the absolute gain (dBi) patterns for a 60 cm antenna given in Recommendation ITU-R BO.1213 as shown in Fig. 7*bis*.

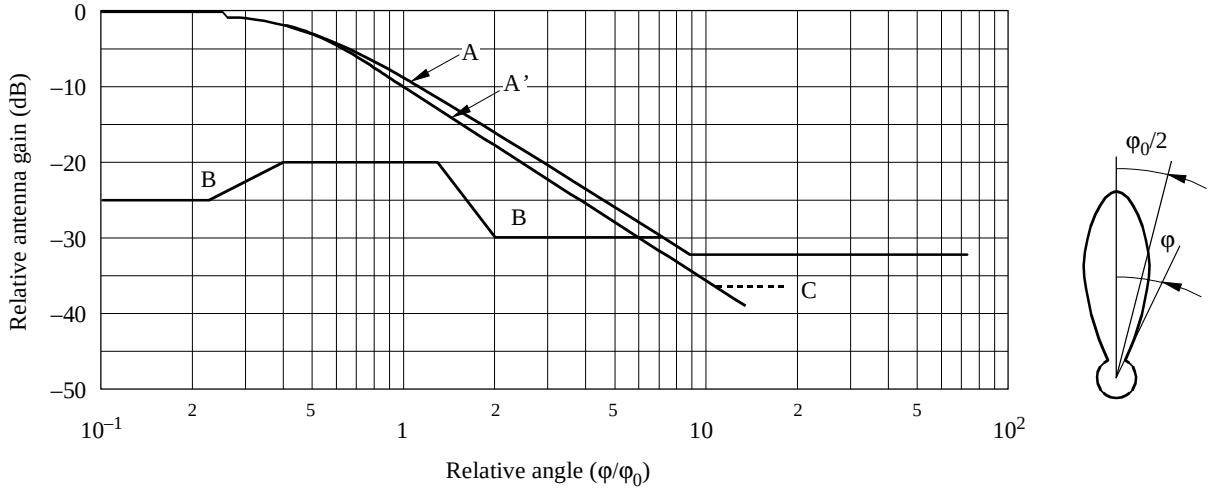
b) For Region 2, the relative antenna gain (dB) is given by the curves in Fig. 8 for individual reception, for which use should be made of:

- Curve A for the co-polar component;
- Curve B for the cross-polar component.

[33] This antenna pattern is used in the broadcasting-satellite service Plan for Regions 1 and 3 for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997.

FIGURE 7

Co-polar and cross-polar receiving antenna reference patterns in Regions 1 and 3



APS30/30A5-07

Curve A: Co-polar component for individual reception without side-lobe suppression (dB relative to main beam gain)

0	for $0 \leq \varphi \leq 0.25\ \varphi_0$
$-12 \left(\frac{\varphi}{\varphi_0}\right)^2$	for $0.25\ \varphi_0 < \varphi \leq 0.707\ \varphi_0$
$-\left[9.0 + 20 \log\left(\frac{\varphi}{\varphi_0}\right)\right]$	for $0.707\ \varphi_0 < \varphi \leq 1.26\ \varphi_0$
$-\left[8.5 + 25 \log\left(\frac{\varphi}{\varphi_0}\right)\right]$	for $1.26\ \varphi_0 < \varphi \leq 9.55\ \varphi_0$
–33	for $\varphi > 9.55\ \varphi_0$

Curve A′: Co-polar component for community reception without side-lobe suppression (dB relative to main beam gain)

0	for $0 \leq \varphi \leq 0.25\ \varphi_0$
$-12 \left(\frac{\varphi}{\varphi_0}\right)^2$	for $0.25\ \varphi_0 < \varphi \leq 0.86\ \varphi_0$
$-\left[10.5 + 25 \log\left(\frac{\varphi}{\varphi_0}\right)\right]$	for $\varphi > 0.86\ \varphi_0$ up to intersection with Curve C (then Curve C)

Curve B: Cross-polar component for both types of reception (dB relative to main beam gain)

–25	for $0 \leq \varphi \leq 0.25\ \varphi_0$
$-\left(30 + 40 \log\left\lvert\frac{\varphi}{\varphi_0} - 1\right\rvert\right)$	for $0.25\ \varphi_0 < \varphi \leq 0.44\ \varphi_0$

-20 for $0.44\,\varphi_0 < \varphi \leq 1.4\,\varphi_0$

$-\left(30 + 25 \log \left|\frac{\varphi}{\varphi_0} - 1\right|\right)$ for $1.4\,\varphi_0 < \varphi \leq 2\,\varphi_0$

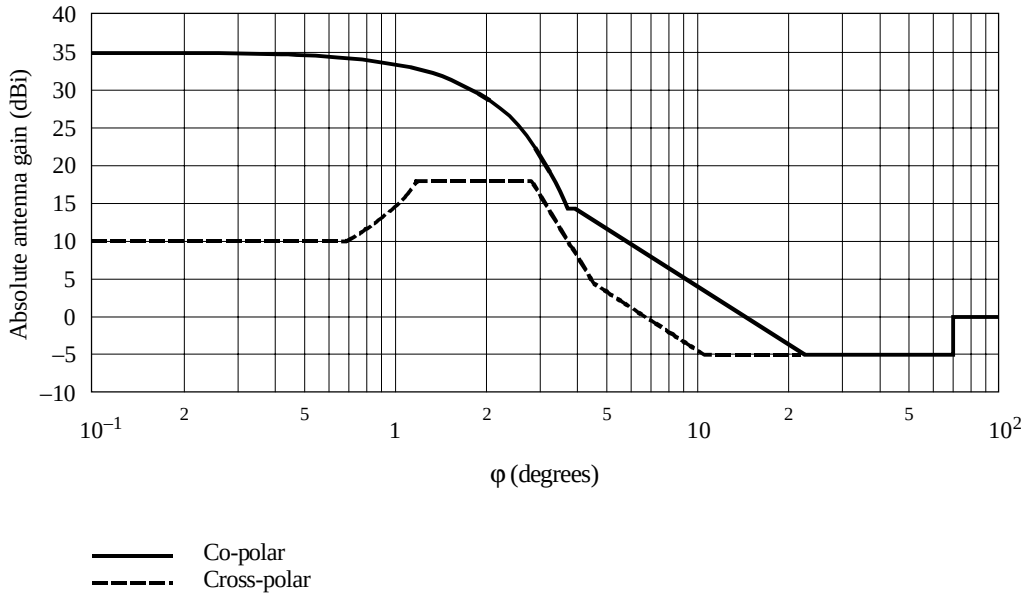
-30 until intersection with co-polar component curve; then co-polar component curve.

Curve C: Minus the on-axis gain (Curve C in this figure illustrates the particular case of an antenna with an on-axis gain of 37 dBi).

NOTE – for values of φ_0 see section 3.7.1

FIGURE 7*bis*

Reference receiving earth station antenna patterns used at WRC-97 for revising the Regions 1 and 3 broadcasting-satellite service Plan



APS30/30A5-07b

Co-polar pattern:

$$G_{co}(\varphi) = G_{max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda}\varphi\right)^2 \qquad \text{for } 0 \leq \varphi < \varphi m$$

where

$$\varphi_m = \frac{\lambda}{D}\sqrt{\frac{G_{max} - G_1}{0.0025}}$$

$$G_{co}(\varphi) = G_1 = 29 - 25 \log \varphi_r \qquad \text{for } \varphi_m \leq \varphi < \varphi_r$$

where

$$\varphi_r = 95\,\frac{\lambda}{D}$$

$G_{co}(\varphi) = 29 - 25 \log \varphi$ for $\varphi_r \leq \varphi < \varphi_b$

where

$$\varphi_b = 10^{(34/25)}$$

$G_{co}(\varphi) = -5$ dBi for $\varphi_b \leq \varphi < 70°$

$G_{co}(\varphi) = 0$ dBi for $70° \leq \varphi < 180°$

Cross-polar pattern:

$G_{cross}(\varphi) = G_{max} - 25$ for $0 \leq \varphi < 0{,}25\ \varphi_0$

where

$$\varphi_0 = 2\frac{\lambda}{D}\sqrt{\frac{3}{0.0025}} = 3 \text{ dB beamwidth}$$

$$G_{cross}(\varphi) = G_{max} - 25 + 8\left(\frac{\varphi - 0.25\ \varphi_0}{0.19\ \varphi_0}\right) \quad \text{for } 0.25\ \varphi_0 \leq \varphi < 0.44\ \varphi_0$$

$G_{cross}(\varphi) = G_{max} - 17$ for $0.44\ \varphi_0 \leq \varphi < \varphi_0$

$$G_{cross}(\varphi) = G_{max} - 17 - 13.5625\left|\frac{\varphi - \varphi_0}{\varphi_1 - \varphi_0}\right| \quad \text{for } \varphi_0 \leq \varphi < \varphi_1$$

where

$$\varphi_1 = \frac{\varphi_0}{2}\sqrt{10.1875}$$

$G_{cross}(\varphi) = 21 - 25 \log \varphi$ for $\varphi_1 \leq \varphi < \varphi_2$

where

$$\varphi_2 = 10^{(26/25)}$$

$G_{cross}(\varphi) = -5$ dBi for $\varphi_2 \leq \varphi < 70°$

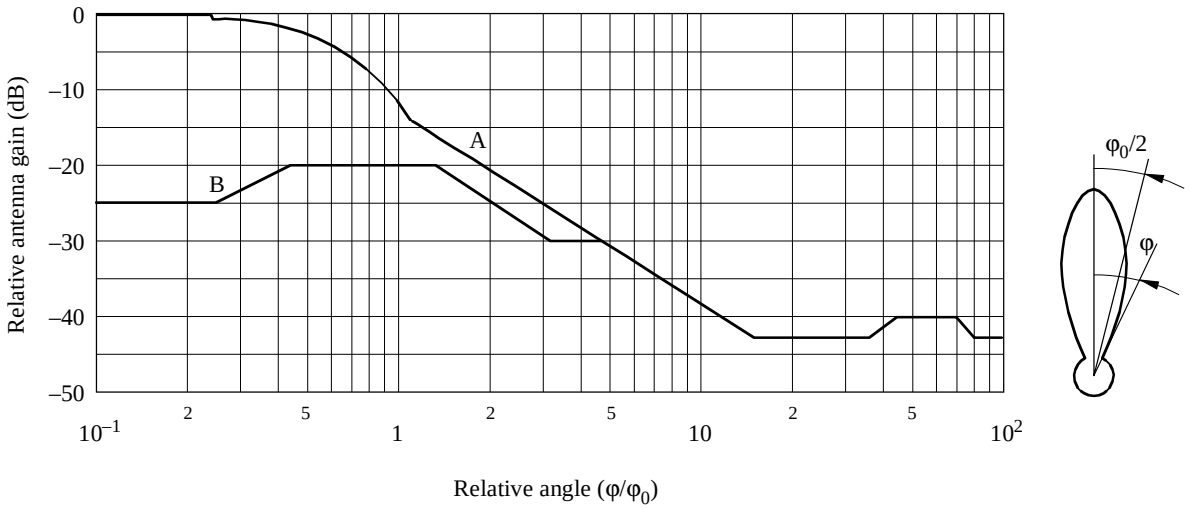
$G_{cross}(\varphi) = 0$ dBi for $70° \leq \varphi < 180°$

For the 60 cm antenna pattern which is to be used as a reference for replanning, the following parameters apply:

	Co-polar:	*Cross-polar*:
G_{max}	= 35.5 dBi	
G_1	= 13.84 dBi	
D/λ	= 23.4	
φ_m	= 3.66°	φ_0 = 2.96°
φ_r	= 4.04°	φ_1 = 4.73°
φ_b	= $10^{(34/25)}$	φ_2 = 10.96°

FIGURE 8

Reference patterns for co-polar and cross-polar components for receiving earth station antennas in Region 2



APS30/30A5-08

Curve A: Co-polar component without side-lobe suppression (dB relative to main beam gain)

0	for	$0 \le \varphi \le 0.25\ \varphi_0$
$-12\ (\varphi/\varphi_0)^2$	for	$0.25\ \varphi_0 < \varphi \le 1.13\ \varphi_0$
$-\{14 + 25 \log (\varphi/\varphi_0)\}$	for	$1.13\ \varphi_0 < \varphi \le 14.7\ \varphi_0$
–43.2	for	$14.7\ \varphi_0 < \varphi \le 35\ \varphi_0$
$-\{85.2 - 27.2 \log (\varphi/\varphi_0)\}$	for	$35\ \varphi_0 < \varphi \le 45.1\ \varphi_0$
–40.2	for	$45.1\ \varphi_0 < \varphi \le 70\ \varphi_0$
$-\{-55.2 + 51.7 \log (\varphi/\varphi_0)\}$	for	$70\ \varphi_0 < \varphi \le 80\ \varphi_0$
–43.2	for	$80\ \varphi_0 < \varphi \le 180°$

Curve B: Cross-polar component (dB relative to main beam gain)

–25	for	$0 \le \varphi \le 0.25\ \varphi_0$
$-\left(30 + 40 \log \left\lvert \frac{\varphi}{\varphi_0} - 1 \right\rvert\right)$	for	$0.25\ \varphi_0 < \varphi \le 0.44\ \varphi_0$
–20	for	$0.44\ \varphi_0 < \varphi \le 1.28\ \varphi_0$
$-\left(17.3 + 25 \log \left\lvert \frac{\varphi}{\varphi_0} \right\rvert\right)$	for	$1.28\ \varphi_0 < \varphi \le 3.22\ \varphi_0$

–30 until intersection with co-polar component curve; then co-polar component curve.

NOTE 1 – For values of φ_0 see section 3.7.1.

NOTE 2 – In the angular range between 0.1 φ_0 and 1.13 φ_0 the co-polar and cross-polar gains must not exceed the reference patterns.

NOTE 3 – At off-axis angles larger than 1.13 φ_0 and for 90% of all sidelobe peaks in each of the reference angular windows, the gain must not exceed the reference patterns. The reference angular windows are 1.13 φ_0 to 3 φ_0, 3 φ_0 to 6 φ_0, 6 φ_0 to 10 φ_0, 10 φ_0 to 20 φ_0, 20 φ_0 to 40 φ_0, 40 φ_0 to 75 φ_0 and 75 φ_0 to 180°.

3.8 Necessary bandwidth

The necessary bandwidths considered are as follows for:

– 625-line systems in Regions 1 and 3: 27 MHz;

– 525-line systems in Region 3: 27 MHz.

However, in Regions 1 and 3, if different bandwidths are submitted, they will be treated in accordance with applicable ITU-R Recommendations for protection masks when available. In the absence of such Recommendations, the Bureau will use the worst-case approach as adopted by the Radio Regulations Board.

In Region 2, the Plan is based on a channel bandwidth of 24 MHz[34], but different bandwidths may be implemented in accordance with the provisions of this Appendix, provided that applicable ITU-R Recommendations are available. In the absence of such Recommendations, the Bureau will use the worst-case approach as adopted by the Radio Regulations Board.

3.9 Guardbands

3.9.1 A guardband is defined as the portion of the frequency spectrum between the edge of the allocated band and the edge of the necessary bandwidth of the emission in the nearest channel.

3.9.2 For the planning of the broadcasting-satellite service, the guardbands chosen at the 1977 Conference to protect the services in adjacent frequency bands are shown in the table below.

Regions	Guardband at the lower edge of the band (MHz)	Guardband at the upper edge of the band (MHz)
1	14	11
2	12	12
3	14	11

[34] For France, Denmark and some of the United Kingdom requirements which use 625-line standards with greater video bandwidth, the channels shown in the Plan have a necessary bandwidth of 27 MHz. This is indicated by an appropriate symbol in the Plan.

For Regions 1 and 3, for analogue emissions the guardbands assume a maximum beam centre e.i.r.p. of 67 dBW (value relating to individual reception), and a filter roll-off of 2 dB/MHz. If smaller e.i.r.p. values are assumed, the guardbands can be reduced in width by 0.5 MHz for each decibel decrease in e.i.r.p. The degree of possible reduction also depends on improvements in technology and on the type of modulation. However, an appropriate ITU-R Recommendation concerning the sharing requirements is not yet available.

3.9.3 (SUP - WRC-97)

3.9.4 The guardbands at both the lower and upper edges may be used for transmissions in the space operation service.

3.10 Orbital spacing

The Plan for Regions 1 and 3 has been based generally on nominal orbital positions spaced uniformly at intervals of 6°. The Plan for Region 2 has been based on a non-uniform spacing.

3.11 Satellite station-keeping

Space stations in the broadcasting-satellite service must be maintained in position with an accuracy equal to or better than ±0.1° in the E-W directions. For such space stations, the maintenance of the tolerance ±0.1° in the N-S direction is recommended but is not a requirement.

3.12 Elevation angle of receiving antennas

The Plans have been based on the desirability of a minimum angle of elevation of 20° to minimize the required e.i.r.p. of the satellite and to reduce the effects of shadowing and the possibility of interference from terrestrial services. However, for areas situated in latitudes above about 60°, the angle of elevation is of necessity less than 20°. Attention is also drawn to § 2.1 for the Regions 1 and 3 Plan and to § 2.2.3 for the Region 2 Plan.

For mountainous areas where an elevation angle of 20° may not suffice, an angle of at least 30° has been provided, where possible, to provide an acceptable service. An angle of elevation of at least 40° has been considered for service areas subject to high precipitation, but exceptions were made in some cases in Region 2.

Some dry, non-mountainous areas may be given an acceptable service at angles of elevation less than 20°.

In areas with small elevation angles, the shadowing effect of tall buildings may have to be taken into account.

In choosing a satellite position designed to give the maximum angle of elevation at the ground, the influence of such a position on the eclipse period was taken into account at the 1977 Conference. In the revision of the Regions 1 and 3 Plan at WRC-97, this influence was not considered to be a significant constraint on the choice of orbital position.

3.13 Transmitting antennas

3.13.1 Cross-section of transmitted beam

Planning in Regions 1, 2 and 3 has been generally based on the use of satellite transmitting antennas with beams of elliptical cross-section.

If the cross-section of the emitted beam is elliptical, the effective beamwidth φ_0 is a function of the angle of rotation between the plane containing the satellite and the major axis of the beam cross-section and the plane in which the beamwidth is required.

The relationship between the maximum gain of an antenna and the half-power beamwidth can be derived from the expression:

$$G_m = \frac{27\,843}{ab}$$

where:

a and *b* are the angles (degrees) subtended at the satellite by the major and minor axes of the elliptical cross-section of the beam; an antenna efficiency of 55% was assumed.

However, in implementing their assignments, administrations can choose beams other than elliptical, as described in Annex 2 to this Appendix, subject to successful application of the modification procedure of this Appendix.

3.13.2 Minimum beamwidth of transmitting antenna

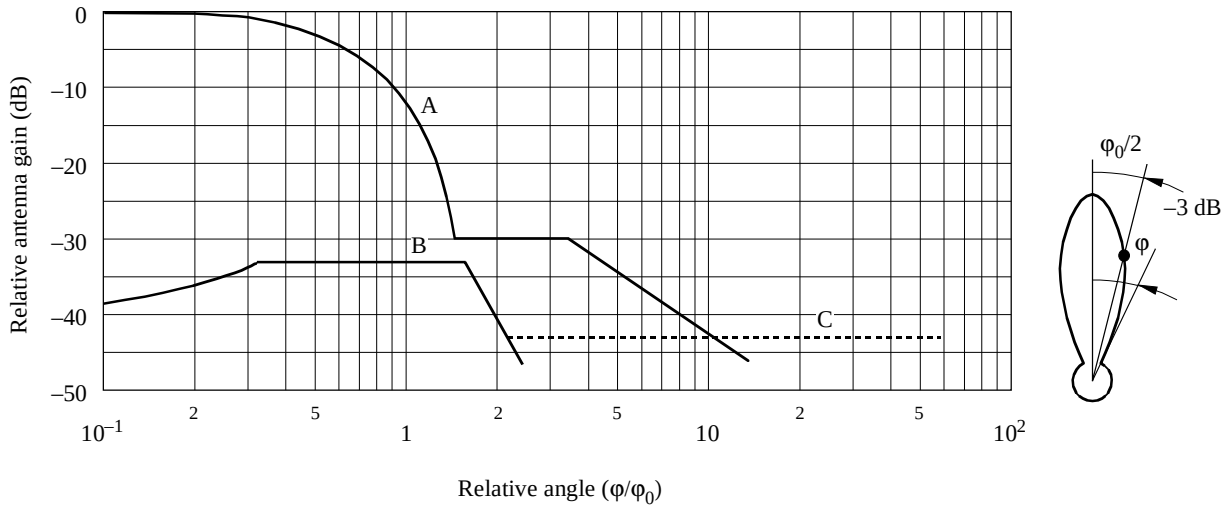
A minimum value of 0.6° for the half-power beamwidth of a transmitting antenna has been adopted for planning for Regions 1 and 3, and 0.8° for Region 2.

3.13.3 Transmitting antenna reference patterns

The reference patterns for the co-polar and cross-polar components of satellite transmitting antennas used in preparing the Plans are given in Fig. 9 for Regions 1 and 3, and in Fig. 10 for Region 2.

FIGURE 9

Reference patterns for co-polar and cross-polar components for satellite transmitting antennas in Regions 1 and 3



APS30/30A5-09

Curve A: Co-polar component (dB relative to main beam gain)

$-12\left(\frac{\varphi}{\varphi_0}\right)^2$ for $0 \le \varphi \le 1{,}58\,\varphi_0$

-30 for $1.58\,\varphi_0 < \varphi \le 3.16\,\varphi_0$

$-\left[17.5 + 25\log\left(\frac{\varphi}{\varphi_0}\right)\right]$ for $\varphi > 3.16\,\varphi_0$

after intersection with Curve C: as Curve C

Curve B: Cross-polar component (dB relative to main beam gain)

$-\left(40 + 40\log\left|\frac{\varphi}{\varphi_0} - 1\right|\right)$ for $0 \le \varphi \le 0.33\,\varphi_0$

-33 for $0.33\,\varphi_0 < \varphi \le 1.67\,\varphi_0$

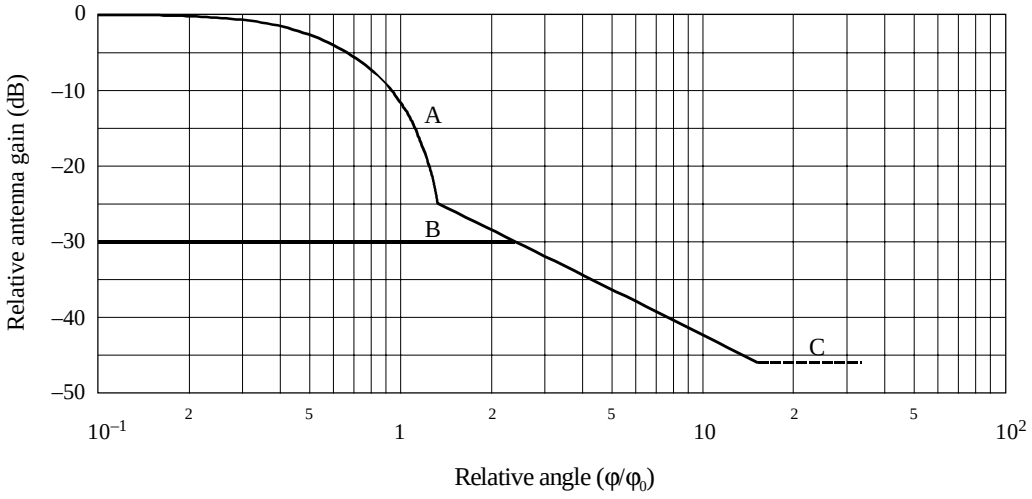
$-\left(40 + 40\log\left|\frac{\varphi}{\varphi_0} - 1\right|\right)$ for $\varphi > 1.67\,\varphi_0$

after intersection with Curve C: as Curve C

Curve C: Minus the on-axis gain (Curve C in this figure illustrates the particular case of an antenna with an on-axis gain of 43 dBi).

FIGURE 10

Reference patterns for co-polar and cross-polar components for satellite transmitting antennas in Region 2



APS30/30A5-10

Curve A: Co-polar component (dB relative to main beam gain)

$-12\ (\varphi/\varphi_0)^2$ for $0 \le (\varphi/\varphi_0) \le 1.45$

$-(22 + 20 \log (\varphi/\varphi_0))$ for $(\varphi/\varphi_0) > 1.45$

after intersection with curve C: Curve C

Curve B: Cross-polar component (dB relative to main beam gain)

-30 for $0 \le (\varphi/\varphi_0) \le 2.51$

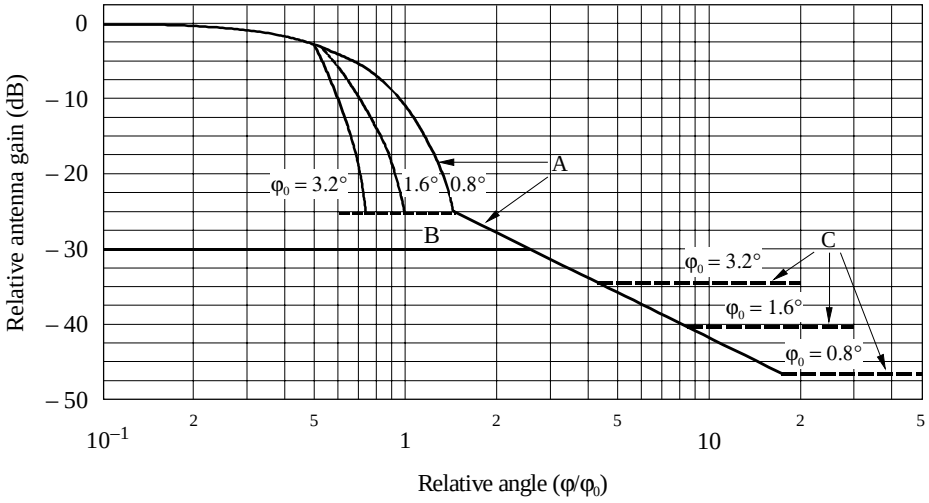
after intersection with co-polar pattern: co-polar pattern

Curve C: Minus the on-axis gain (Curve C in this figure illustrates the particular case of an antenna with an on-axis gain of 46 dBi).

In Region 2, when it was necessary to reduce interference, the pattern shown in Fig. 11A was used; this use is indicated in the Plan by an appropriate symbol. This pattern is derived from an antenna producing an elliptical beam with fast roll-off in the main lobe assuming a “beamlet” half-power beamwidth of 0.8^o. For Regions 1 and 3, the pattern shown in Fig. 11B, based on a “beamlet” beamwidth of 0.6^o was used. Curves for three different values of φ_0 are shown as examples in Fig. 11A and in Fig. 11B.

FIGURE 11A

Reference patterns for co-polar and cross-polar components for satellite transmitting antennas with roll-off in the main beam for Region 2



APS30/30A5-11A

Curve A: Co-polar component (dB relative to main beam gain)

$-12\ (\varphi/\varphi_0)^2$ for $0 \le (\varphi/\varphi_0) \le 0.5$

$$-12\left(\frac{\frac{\varphi}{\varphi_0} - x}{\frac{B_{min}}{\varphi_0}}\right)^2 \quad \text{for } 0.5 < (\varphi/\varphi_0) \le \left(\frac{1.45}{\varphi_0} B_{min} + x\right)$$

-25.23 for $\left(\frac{1.45}{\varphi_0} B_{min} + x\right) < (\varphi/\varphi_0) \le 1.45$

$-(22 + 20 \log (\varphi/\varphi_0))$ for $(\varphi/\varphi_0) > 1.45$

after intersection with curve C: Curve C

Curve B: Cross-polar component (dB relative to main beam gain)

-30 for $0 \le (\varphi/\varphi_0) < 2.51$

after intersection with co-polar pattern: co-polar pattern

Curve C: Minus the on-axis gain (Curves A and C represent examples of three antennas having different values of φ_0 as labelled in Fig. 11A. The on-axis gains of these antennas are approximately 34, 40 and 46 dBi, respectively).

where:

φ: off-axis angle (degrees)

φ_0: dimension of the minimum ellipse fitted around the downlink service area in the direction of interest (degrees)

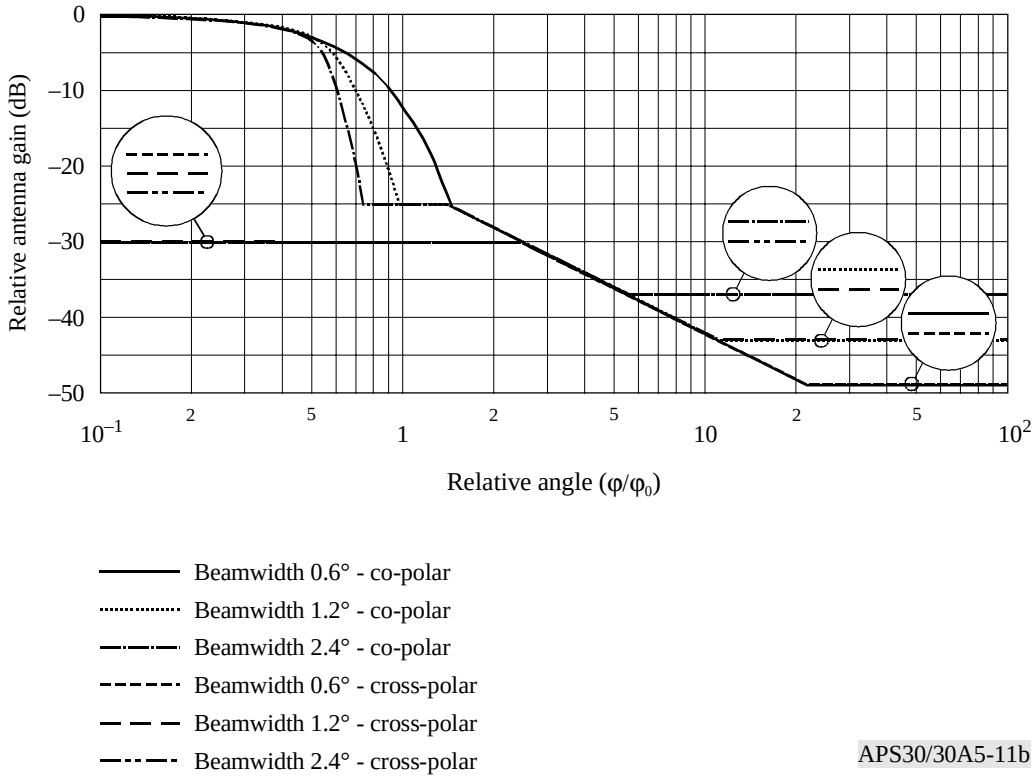
$B_{min} = 0.8°$ for Region 2 and $B_{min} = 0.6°$ for Regions 1 and 3

$$x = 0.5\left(1 - \frac{0.8}{\varphi_0}\right) \quad \text{in Region 2}$$

$$x = 0.5\left(1 - \frac{0.6}{\varphi_0}\right) \quad \text{in Regions 1 and 3}$$

FIGURE 11B

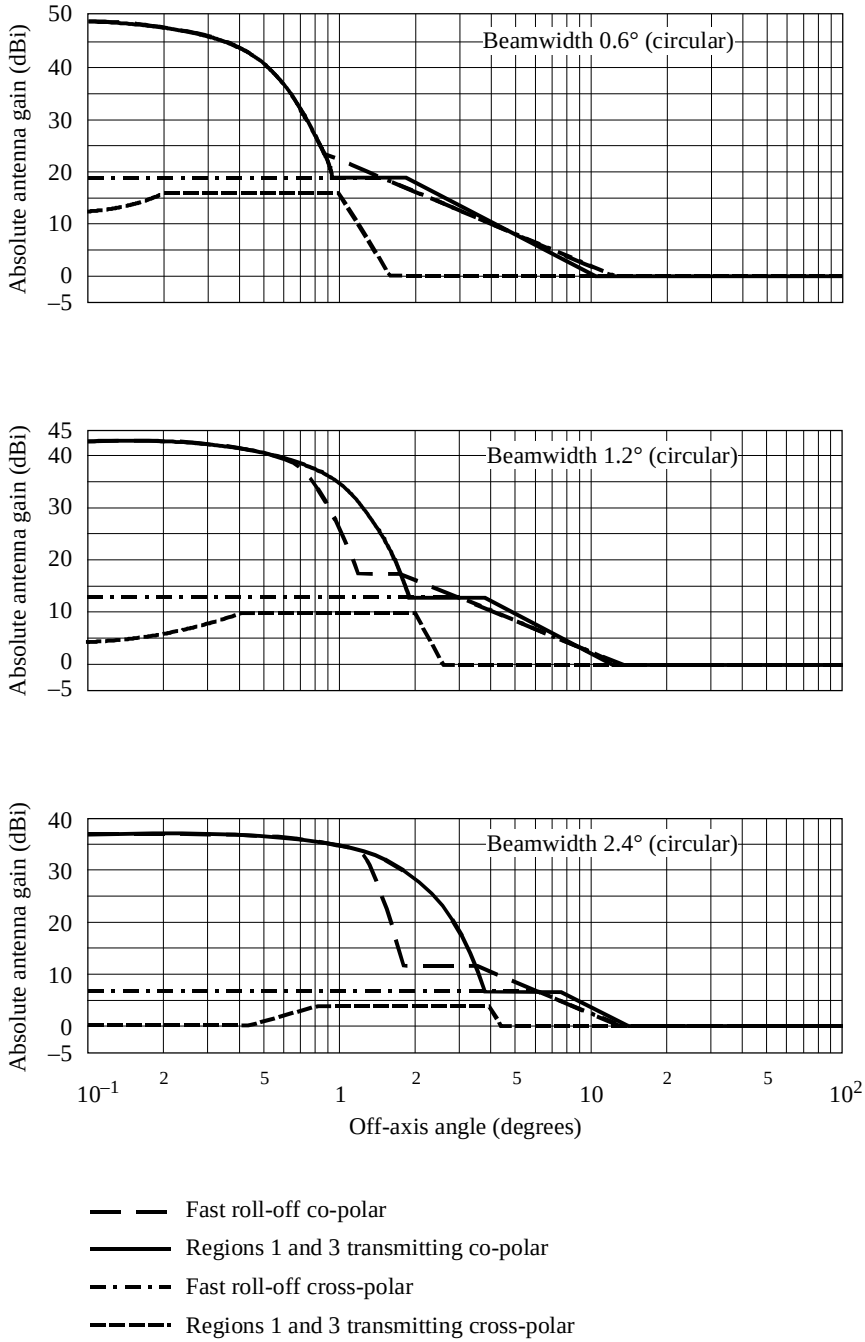
Fast roll-off antenna for Regions 1 and 3 Plan revision (beamlet beamwidth of 0.6°)



The difference in performance between the fast roll-off satellite transmitting antenna and the reference satellite transmitting antenna for Regions 1 and 3 is shown in Fig. 12.

FIGURE 12

Comparison between fast roll-off and Regions 1 and 3 reference satellite transmitting antennas



3.14 Satellite antenna pointing accuracy

3.14.1 The deviation of the antenna beam from its nominal pointing direction must not exceed a limit of 0.1° in any direction. Moreover, the angular rotation of a transmitting beam

about its axis must not exceed a limit of ±1°; the limit on rotation is not necessary for beams of circular cross-section using circular polarization[35].

3.14.2 The following factors contribute to the total variation in the area on the surface of the Earth illuminated by the satellite beam:

– variations in satellite station-keeping;

– the variations caused by the pointing tolerances, which become more significant for coverage areas with low angles of elevation;

– the effect of the yaw error, which increases as the beam ellipse lengthens.

3.14.3 The effect of these possible variations should be assessed on a case-by-case basis, since their total effect on the area covered will vary with the geometry of the satellite beam, and it would not be reasonable to indicate a single value of shift in the area covered for all situations.

3.14.4 If linear polarization is used for an emission, yaw error makes a significant contribution to increasing the transmitted cross-polarized component; this increases the interference with other carriers which were originally cross-polarized with the emission in question.

3.15 Limitation of output power in the satellite transmitter

The output power of a space station transmitter in the broadcasting-satellite service must not rise by more than 0.25 dB relative to its nominal value throughout the life of the satellite.

3.16 Power flux-density at edge of coverage area

The original 1977 broadcasting-satellite service Plan used the following values[36] of the power flux-density at the edge of the coverage area exceeded for 99% of the worst month:

−103 dB(W/m^2) for individual reception in Regions 1 and 3;

−107 dB(W/m^2) for individual reception in Region 2 for 24 MHz, as well as for 27 MHz with respect to the cases mentioned in the footnote to section 3.8.

−111 dB(W/m^2) for community reception in Regions 1 and 3.

The 1997 revision of the Regions 1 and 3 Plan was generally based on a uniform value of the power flux-density at the edge of coverage area equal to −108 dB(W/m^2). This corresponds to

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[35] In the original 1977 broadcasting-satellite service Plan for Regions 1 and 3, the angular rotation of a transmitting beam about its axis must not exceed a limit of ±2°. This limit is still applied for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997.

[36] These values are still used for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997.

the general reduction in e.i.r.p. of 5 dB referenced to the average e.i.r.p. of 63.9 dBW in the 1977 broadcasting-satellite service Plan.

3.17 Difference between the e.i.r.p. directed towards the edge of the coverage area and that on the axis of the beam

For planning, the absolute value of the difference between the e.i.r.p. directed towards the edge of the coverage area and that on the axis of the beam should preferably be 3 dB.

If the beam area is larger than the coverage area, the value will be less than 3 dB.

3.18 Use of energy dispersal

For planning, an energy dispersal value has been adopted which reduces by 22 dB the spectral power flux-density measured in a 4 kHz bandwidth in relation to that measured in the entire bandwidth: For frequency-modulated television signals, this reduction corresponds to a peak-to-peak deviation of 600 kHz. Digital modulation can achieve appropriate energy dispersal by proper implementation of digital modulation (e.g. by applying spectrum scrambling and/or interleaving).

ANNEX 6[37]

Criteria for sharing between services

1 Protection requirements for sharing between services in the 12 GHz band

1.1 The establishment of sharing criteria for the different services using the 12 GHz band should be based on the protection requirements listed in the table below.

1.2 The values given as “total acceptable” are those necessary to protect the wanted signal. The “single entry” values are those which should be used as a guide for determining sharing criteria. The total interference from all sources must be calculated, since satisfying the “single entry” criteria for each source may not guarantee that the total interference meets the

[37] Sections 1 and 2 of this Annex are applicable when the services of Regions 1 or 3 are involved. Section 3 is applicable to all Regions.

above protection requirements. A “single entry” is defined as the aggregate of emissions from any one station entering any receiver in the wanted service within the channel to be protected.

1.3 The carrier-to-interference ratio (*C*/*I*) refers to the ratio of the wanted-to-interfering power at the affected ground station. The value given shall be exceeded for 80% of the worst month for the fixed-satellite service, and for 99% of the worst month for the broadcasting service and the broadcasting-satellite service.

1.4 The term *N* refers to the post-demodulation noise power at a point of 0 dBm0 relative test tone level in any voice channel of an FDM/FM telephony system. The value given shall not be exceeded for 80% of the worst month.

1.5 The specified values of protection ratio (i.e. the carrier-to-interference power ratio corresponding to a specified picture quality) are applicable, for planning purposes, to television signals of any of the several television standards.

Wanted service[1]	**Wanted signal**[1]	**Interfering service**[1]	**Interfering signal**[1]	**Protection requirements**[2]	
				Total acceptable[3]	**Single entry**
BSS	TV/FM	BSS, FSS, FS, BS	TV/FM	*C*/*I* = 30 dB[4, 7]	*C*/*I* = 35 dB[4]
FSS	FDM/FM	BSS	TV/FM	*N* = 500 pW0p[8]	*N* = 300 pW0p
FSS	TV/FM	BSS, FSS	TV/FM	*C*/*I* = 32 dB[5]	*C*/*I* = 37 dB[5]
FSS	4φ-PSK	BSS, FSS	TV/FM	*C*/*I* = 30 dB	*C*/*I* = 35 dB
FSS	FDM/FM	FSS	FDM/FM	*N* = 1 000 pW0p	*N* = 400 pW0p
FS	FDM/FM	BSS	TV/FM	*N* = 1 000 pW0p	–125 dB(W/m^2/4 kHz) [6]
BS	TV/VSB	BSS	TV/FM	*C*/*I* = 50 dB	not applicable

1 BSS: broadcasting-satellite service
FSS: fixed-satellite service
BS: broadcasting service
FS: fixed service
TV: television
FM: frequency modulation
FDM: frequency division multiplex
4φ-PSK: four-level phase shift keying
VSB: vestigial sideband.

2 These limits include both up-link and down-link contributions.

3 Values in dB are protection ratios for the sum of interfering signals. Values in pW0p represent interference noise in the worst telephone channels caused by the sum of interfering signals.

4 For BSS satellites located at the interfaces of the Regions 1 and 3 Plan and the Region 2 Plan, the *C*/*I* ratios should be 1 dB higher.

5 See Recommendation ITU-R S.483-3.

6 This value may be suitably modified for tropical regions to take account of rain attenuation. Allowance may also be made for polarization discrimination.

7 *C*/*I*: ratio of carrier-to-interfering signal.

8 *N*: noise power.

1.6 For broadcasting-satellite service systems with FM/TV as the wanted signal, the protection ratios are given for particular reference conditions, the most important of which are:

a) frequency deviation of the wanted signal (12 MHz peak-to-peak);

b) quality of the wanted service (grade 4.5)[38];

c) co-channel carriers (no carrier-frequency offset).

1.7 If system design is based on conditions other than those of § *a)* and *b)* above, the FM/TV protection ratio is given by:

$$R = 12.5 - 20 \log (D_V/12) - Q + 1.1\, Q^2 \qquad \text{dB}$$

where:

D_V: nominal peak-to-peak frequency deviation (MHz);

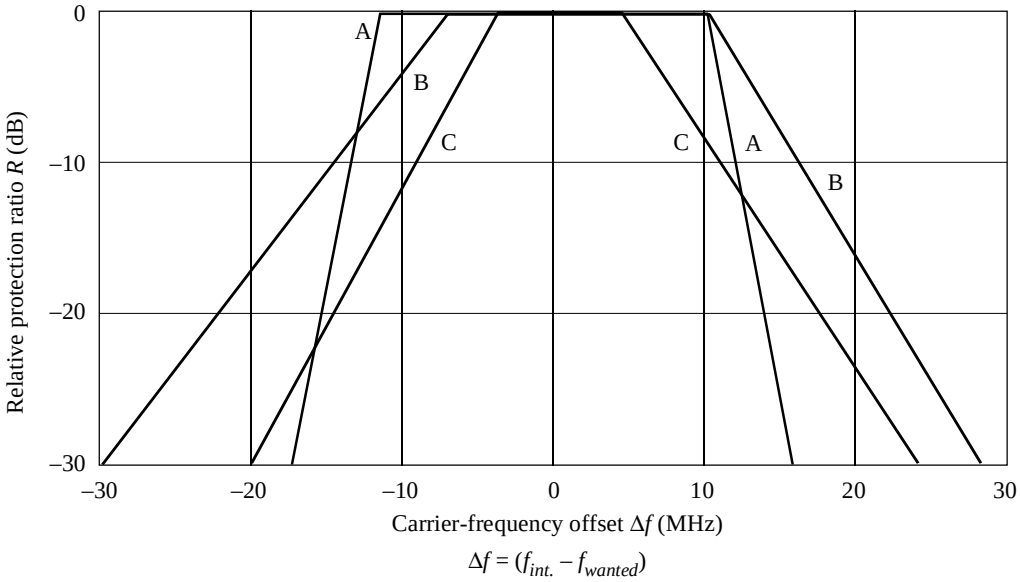
Q: the impairment grade, concerning the interference only.

1.8 When carriers are offset in frequency, condition of § *c)* does not apply and the adjacent channel protection ratios should be adjusted according to the frequency offset as shown in Fig. 1. For example, at a frequency offset of 20 MHz, the total acceptable ratio of protection against interference to an FM/TV signal from another FM/TV signal is 13 dB. The corresponding "single entry" value is 18 dB.

[38] Impairment grade on a 5-point scale as defined in Recommendation ITU-R BT.500-7.

FIGURE 1

Reference case protection ratios relative to co-channel values



Curves A : TV/VSB-wanted, TV/FM interfering
B : TV/FM-wanted, TV/FM interfering
C : TV/FM-wanted, TV/VSB interfering

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2 Reference antenna diameter for a fixed-satellite earth station to be used in calculating interference from space stations in the broadcasting-satellite service

2.1 For antennas larger than 100 λ (2.5 m) in the fixed-satellite service, the gain of the side-lobes is given by the expression 32 – 25 log θ, where θ is the angle from the boresight (Recommendation ITU-R S.465-5). The side-lobe gain is independent of antenna diameter.

2.2 However, in the case of transmitting earth stations, the level of interference radiated into the up-link of other satellite systems would be inversely proportional to the square of the antenna diameter. In this case, the interference decreases with increasing antenna diameter. Since the 11.7-12.2 GHz band is only assigned in the space-to-Earth direction in the fixed-satellite service, this point is not of direct concern to the broadcasting-satellite service.

2.3 Hence it does not appear appropriate, for antenna diameters greater than 100 λ, to specify a minimum antenna diameter for receiving earth stations in the fixed-satellite service sharing the band 11.7-12.2 GHz. It may be useful to consider a 4.5 m antenna having an efficiency of 60% and an on-axis gain of 53 dB as typical for the purpose of planning the sharing of this band.

3 Use of energy dispersal in the broadcasting-satellite service

3.1 Artificial energy dispersal is useful in promoting sharing between the broadcasting-satellite service and the other services to which the band is also allocated.

3.2 Such energy dispersal is achieved by the addition at baseband of a triangular waveform to the video signal to form a composite baseband which, in turn, is used to frequency-modulate the up-link carrier. The frequency of the triangular waveform is usually synchronized at a sub-multiple of the television frame frequency. Typical frequencies range from 12.5 Hz to 30 Hz.

3.3 The table below gives the relative reduction in spectral power flux-density in a 4 kHz bandwidth as a function of the peak-to-peak deviation due to the energy dispersal signal. This table is based on the following equation:

$$\text{Relative reduction (dB) in a 4 kHz band} = 10 \log \frac{\Delta F_{pp} + \delta f_{rms}}{4}$$

where:

ΔF_{pp}: peak-to-peak deviation due to the energy dispersal signal (kHz);

δf_{rms}: rms deviation due to "natural" energy dispersal (kHz).

In compiling the table below, a value of 40 kHz has been assumed for δf_{rms}, on the basis of the value of 10 dB for "natural" dispersion given in Table 4 of ITU-R draft Report 631 (Rev. 76).

Reduction of spectral power flux-density relative to a 4 kHz bandwidth

Peak-to-peak deviation (kHz)	Relative reduction (dB)
0	10
100	15.44
200	17.78
300	19.29
400	20.41
500	21.30
600	22.04
700	22.67
800	23.22
900	23.71
1 000	24.15

3.4 The value of energy dispersal for the broadcasting-satellite service has been determined such that the spectral power flux-density measured in a 4 kHz bandwidth is reduced by 22 dB relative to that measured in the entire bandwidth; this reduction corresponds to a peak-to-peak deviation of 600 kHz.

ANNEX 7

Orbital position limitations

A In applying the procedure of Article 4 for modifications to the appropriate Regional Plan, administrations should observe the following criteria:

1) No broadcasting satellite serving an area in Region 1 and using a frequency in the band 11.7-12.2 GHz shall occupy a nominal orbital position further west than 37° W or further east than 146° E.

2) No broadcasting satellite serving an area in Region 2 that involves an orbital position different from that contained in the Region 2 Plan shall occupy a nominal orbital position:

   a) further east than 54° W in the band 12.5-12.7 GHz; *or*

   b) further east than 44° W in the band 12.2-12.5 GHz; *or*

   c) further west than 175.2° W in the band 12.2-12.7 GHz.

   However, modifications necessary to resolve possible incompatibilities during the incorporation of the Regions 1 and 3 feeder-link Plan into the Radio Regulations shall be permitted.

3) Any new orbital position in the Regions 1 and 3 Plan in the range of the orbital arc between 37° W and 10° E associated with a new assignment, or resulting from a modification of an assignment in the Plan, shall be coincident with, or within 1° to the east of, a nominal orbital position in the Region 1 and 3 Plan at the date of entry into force of the Final Acts of the 1977 Conference (in force on 1 January 1979).

   In the event of a modification to an assignment in the Regions 1 and 3 Plan, the use of a new nominal orbital position not coincident with any nominal orbital position in the Plan at the date of entry into force of the Final Acts of the 1977 Conference (in force on 1 January 1979) shall involve an 8 dB reduction in the e.i.r.p. compared to that appearing in the Regions 1 and 3 Plan for the assignment before modification.

B The Region 2 Plan is based on the grouping of the space stations in nominal orbital positions of +0.2° and –0.2° from the centre of the cluster of satellites. Administrations may locate those satellites within a cluster at any orbital position within that cluster, provided they obtain the agreement of administrations having assignments to space stations in the same cluster. (See § 4.13.1 of Annex 3 to Appendix **S30A**.)

APPENDIX S30A

Provisions and associated Plans for feeder-links for the broadcasting-satellite service (11.7-12.5 GHz in Region 1, 12.2-12.7 GHz in Region 2 and 11.7-12.2 GHz in Region 3) in the frequency bands 14.5-14.8 GHz[1] and 17.3-18.1 GHz in Regions 1 and 3, and 17.3-17.8 GHz in Region 2

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[1] This use of the band 14.5-14.8 GHz is reserved for countries outside Europe.

ARTICLE 1

General definitions

1.1 *Regions 1 and 3 feeder link Plan:* The Plan for the feeder-links in the frequency bands 14.5-14.8 GHz[2] and 17.3-18.1 GHz for the broadcasting-satellite service in Regions 1 and 3 contained in this Appendix together with any modifications resulting from the successful application of the procedure of Article 4 herein referred to as the Regions 1 and 3 Plan.

1.2 *Region 2 feeder link Plan:* The Plan for the feeder-links in the frequency band 17.3-17.8 GHz for the broadcasting-satellite service in Region 2 contained in this Appendix, together with any modifications resulting from the successful application of the procedure of Article 4 herein referred to as the Region 2 Plan.

1.3 *Frequency assignment in conformity with the Plans:* Any frequency assignment for a receiving space station or transmitting earth station which appears in the Regions 1 and 3 Plan or the Region 2 Plan or for which the procedure of Article 4 has been successfully applied.

1.4 *1983 Conference:* Regional Administrative Radio Conference for the Planning in Region 2 of the Broadcasting-Satellite Service in the Frequency Band 12.2-12.7 GHz and Associated Feeder-links in the Frequency Band 17.3-17.8 GHz, called in short Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2 (RARC Sat-R2), Geneva, 1983.

1.5 *1985 Conference:* First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985, called in short WARC Orb-85.

1.6 *1988 Conference:* Second Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1988, called in short WARC Orb-88.

ARTICLE 2

Frequency bands

2.1 The provisions of this Appendix apply to the feeder-links in the fixed satellite service (Earth-to-space) in the frequency bands 14.5-14.8 GHz and 17.3-18.1 GHz for the broadcasting-satellite service in Regions 1 and 3, and 17.3-17.8 GHz for the broadcasting-satellite service in Region 2 and to other services to which these bands are allocated in Regions 1, 2 and 3 so far as their relationship to the fixed-satellite service (Earth-to-space) in these bands is concerned.

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[2] This use the band 14.5-14.8 GHz is reserved for countries outside Europe.

ARTICLE 3

Execution of the provisions and associated Plans

3.1 The Member States in Regions 1, 2 and 3 shall adopt, for their feeder-link space and earth stations in the fixed-satellite service (Earth-to-space) in the frequency bands referred to in this Appendix, the characteristics specified in the appropriate Regional Plan and the associated provisions.

3.2 The Member States shall not change the characteristics specified in the Region 1 and Region 3 Plans or in the Region 2 Plan, or bring into use assignments to receiving space stations or transmitting earth stations in the fixed-satellite service or to stations of the other services to which these frequency bands are allocated, except as provided for in the Radio Regulations and the appropriate Articles and Annexes of this Appendix.

3.3 The procedures for the use of interim systems in Region 2 for feeder-links in the fixed-satellite service for the bands covered by this Appendix are given in Resolution **42 (Rev.Orb-88)**.

ARTICLE 4

Procedure for modifications to the Plans

4.1 When an administration intends to make a modification to one of the Regional Plans, i.e. either:

a) to modify the characteristics of any of its frequency assignments in the fixed-satellite service which are shown in the appropriate Regional Plan, or for which the procedure in this Article has been successfully applied, whether or not the station has been brought into use; *or*

b) to include in the Plan a new frequency assignment in the fixed-satellite service; *or*

c) to cancel a frequency assignment in the fixed-satellite service,

the following procedure shall be applied before any notification of the frequency assignment is made to the Radiocommunication Bureau (see Article 5 and Resolution **42 (Rev.Orb-88)**).

4.1.1 Before an administration proposes to include in the Plan, under the provisions of § 4.1 *b)*, a new frequency assignment to a space station or to include in the Plan new frequency assignments to a space station whose orbital position is not designated in the Plan for this administration, all the assignments to the service area involved should have been brought into service or have been notified to the Bureau in accordance with the relevant provisions of the Plan.

4.2 Proposed modifications to a frequency assignment in conformity with one of the Regional Plans or proposed inclusion in that Plan of a new frequency assignment

For Regions 1 and 3

4.2.1 An administration proposing a modification to the characteristics of a frequency assignment in conformity with the Regions 1 and 3 Plan or the inclusion of a new frequency assignment in that Plan shall seek the agreement of those administrations:

4.2.1.1 of Regions 1 and 3 having a feeder-link frequency assignment in the fixed-satellite service (Earth-to-space) in the same channel or an adjacent channel, in the same orbital position or an adjacent orbital position in the range ±12.5°, which appears in the Plan or in respect of which proposed modifications to the Plan have already been published by the Bureau in accordance with the provisions of § 4.2.6.1 and 4.2.7 of this Article; *or*

4.2.1.2 having a frequency assignment in the band 17.7-18.1 GHz to an earth station in the fixed-satellite service (space-to-Earth), which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. **S9.7** and which is located within the coordination area of the feeder-link fixed-satellite earth station; *or*

4.2.1.3 having a frequency assignment in the bands 14.5-14.8 GHz or 17.7-18.1 GHz to a terrestrial station in use or intended to be brought into use within three years of the projected date of bringing the feeder-link modification into use, and which is located within the coordination area of the feeder-link fixed-satellite earth station; *or*

4.2.1.4 having an assignment for feeder-links in the fixed-satellite service (Earth-to-space) with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment, which is in conformity with the Region 2 feeder-link Plan, or in respect of which proposed modifications to the Plan have already been published by the Bureau in accordance with the provisions of § 4.2.6.1 and 4.2.7 of this Article;

4.2.1.5 which are considered affected.

4.2.1.6 The services of an administration are considered to be affected when the limits shown in Annex 1 are exceeded.

4.2.2 The agreement referred to in § 4.2.1 is not required when an administration proposes to bring into use, with characteristics[3] appearing in the Plan, a fixed feeder-link earth station or a transportable feeder-link earth station in the bands 14.5-14.8 GHz or 17.3-18.1 GHz.

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[3] The power to be taken into account is obtained by adding the values specified in columns 13 and 14 of the Plan.

For Region 2

4.2.3 An administration proposing a modification to the characteristics of a frequency assignment in conformity with the Region 2 Plan or the inclusion of a new frequency assignment in that Plan shall seek the agreement of those administrations:

4.2.3.1 of Region 2 having a feeder-link frequency assignment in the fixed- satellite service (Earth-to-space) in the same channel or an adjacent channel, which appears in the Plan or in respect of which proposed modifications to the Plan have already been published by the Bureau in accordance with the provisions of § 4.2.6.1 and 4.2.7 of this Article; *or*

4.2.3.2 having a frequency assignment in the band 17.7-17.8 GHz to an earth station in the fixed-satellite service (space-to-Earth), which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. **S9.7** and which is located within the coordination area of the feeder-link fixed-satellite earth station; *or*

4.2.3.3 having a frequency assignment in the band 17.7-17.8 GHz to a terrestrial station in use or intended to be brought into use within three years of the projected date of bringing the feeder-link modification into use, and which is located within the coordination area of the feeder-link fixed-satellite earth station; *or*

4.2.3.4 having an assignment for feeder-links in the fixed-satellite service (Earth-to-space) with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment, which is in conformity with the Regions 1 and 3 feeder-link Plan, or in respect of which proposed modifications to the Plan have already been published by the Bureau in accordance with the provisions of § 4.2.6.1 and 4.2.7 of this Article;

4.2.3.5 which are considered affected.

4.2.3.6 The services of an administration are considered to be affected when the limits shown in Annex 1 are exceeded.

4.2.4 The agreement referred to in § 4.2.3 is not required when an administration proposes to bring into use, with characteristics appearing in the Plan, a fixed feeder-link earth station in the band 17.3-17.8 GHz or a transportable feeder-link earth station in the band 17.3-17.7 GHz. Administrations may communicate to the Bureau the characteristics of such earth stations for inclusion in the Plan.

For all Regions

4.2.5 An administration intending to modify characteristics in one of the Regional Plans shall send to the Bureau, not earlier than eight years but preferably not later than eighteen months before the date on which the assignment is to be brought into use, the relevant information listed in Annex 2 to this Appendix.

4.2.6 If an administration wishes to modify its assignments in the Plans contained in Appendices **S30** and **S30A**, the eight-year period of § 4.2.5 will be applicable in lieu of the five-year period specified in § 4.3.5 of Appendix **S30**.

4.2.6.1 Where as a result of the intended modification the limits defined in Annex 1 are not exceeded, this fact shall be indicated when submitting to the Bureau the information required by § 4.2.5. The Bureau shall then publish this information in a special section of its Weekly Circular.

4.2.6.2 In all other cases the administration shall notify the Bureau of the names of the administrations whose agreement it considers should be sought in order to arrive at the agreement referred to in § 4.2.1 and 4.2.3 as well as of those with which agreement has already been reached.

4.2.7 The Bureau shall determine on the basis of Annex 1 the administrations whose frequency assignments are considered to be affected within the meaning of § 4.2.1 and 4.2.3. The Bureau shall include the names of those administrations with the information received under § 4.2.6.2 and shall publish the complete information in a special section of its Weekly Circular. The Bureau shall immediately send the results of its calculations to the administration proposing the modification to the Plan.

4.2.8 The Bureau shall send a telegram to the administrations listed in the special section of the weekly circular drawing their attention to the information it contains and shall send them the results of its calculations.

4.2.9 An administration which feels that it should have been included in the list of administrations whose services are considered to be affected may, giving the technical reasons for so doing, request the Bureau to include its name. The Bureau shall study this request on the basis of Annex 1 and shall send a copy of the request with an appropriate recommendation to the administration proposing the modification to the Plan.

4.2.10 Any modification to a frequency assignment which is in conformity with the Plan or any inclusion in the Plan of a new frequency assignment which would have the effect of exceeding the limits specified in Annex 1 shall be subject to the agreement of all affected administrations.

4.2.11 The administration seeking agreement or the administration with which agreement is sought may request any additional technical information it considers necessary. The administrations shall inform the Bureau of such requests.

4.2.12 Comments from administrations on the information published pursuant to § 4.2.7 should be sent either directly to the administration proposing the modification or through the Bureau. In any event the Bureau shall be informed that comments have been made.

4.2.13 An administration which has not notified its comments either to the administration seeking agreement or to the Bureau, within a period of four months following the date of the Weekly Circular referred to in § 4.2.6.1 or § 4.2.7 shall be understood to have agreed to the proposed modification. This time-limit may be extended by up to three months for an administration which has requested additional information under § 4.2.11 or for an administration which has requested the assistance of the Bureau under § 4.2.21. In the latter case the Bureau shall inform the administrations concerned of this request.

4.2.14 If, in seeking agreement, an administration modifies its initial proposal, it shall again apply the provisions of § 4.2.5 and the consequent procedure with respect to any other administration whose services might be affected as a result of modifications to the initial proposal.

4.2.15 If no comments have been received on the expiry of the periods specified in § 4.2.13, or if agreement has been reached with the administrations which have made comments and with which agreement is necessary, the administration proposing the modification may continue with the appropriate procedure in Article 5 and shall inform the Bureau, indicating the final characteristics of the frequency assignment together with the names of the administrations with which agreement has been reached.

4.2.16 The agreement of the administrations affected may also be obtained in accordance with this Article, for a specified period.

4.2.17 When the proposed modification to the Plan involves developing countries, administrations shall seek all practicable solutions conducive to the economical development of the broadcasting-satellite systems of these countries.

4.2.18 The Bureau shall publish in a special section of its Weekly Circular the information received under § 4.2.15 together with the names of any administrations with which the provisions of this Article have been successfully applied. The frequency assignment concerned shall enjoy the same status as those appearing in the Plan and will be considered as a frequency assignment in conformity with the Plan.

4.2.19 When an administration proposing to modify the characteristics of a frequency assignment or to make a new frequency assignment receives notice of disagreement from an administration whose agreement it has sought, it should first endeavour to solve the problem by exploring all possible means of meeting its requirement. If the problem still cannot be solved by such means, the administration whose agreement has been sought should endeavour to overcome the difficulties as far as possible, and shall state the technical reasons for any disagreement if the administration seeking the agreement requests it to do so.

4.2.20 If no agreement is reached between the administrations concerned, the Bureau shall carry out any study that may be requested by these administrations; the Bureau shall inform them of the result of the study and shall make such recommendations as it may be able to offer for the solution of the problem.

4.2.21 An administration may at any stage in the procedure described, or before applying it, request the assistance of the Bureau, particularly in seeking the agreement of another administration.

4.2.22 The relevant provisions of Article 5 shall be applied when frequency assignments are notified to the Bureau.

4.3 Cancellation of frequency assignments

When a frequency assignment in conformity with one of the Regional Plans is no longer required, whether or not as a result of a modification, the administration concerned shall immediately so inform the Bureau. The Bureau shall publish this information in a special section of its weekly circular and delete the assignment from the Plan.

4.4 Master copies of the Plans

4.4.1 The Bureau shall maintain up-to-date master copies of the Plans as well as master copies of the margin reports, including for each assignment the overall equivalent protection margins in respect of Region 2 and the feeder-link equivalent protection margins and the overall equivalent protection margins in respect of Regions 1 and 3, taking account of the application of the procedure specified in this Article. Each master copy of the margin reports shall contain the overall equivalent protection margins derived from the Plan as established by the 1983 Conference in the case of Region 2 and the feeder-link equivalent protection margins and the overall equivalent protection margins for the 1988 Conference in the case of Regions 1 and 3 and those derived from all modifications to the Plans as a result of the successful completion of the modification procedure of this Article.

4.4.2 The Secretary-General shall be informed by the Bureau of any modifications made to the Regional Plans and shall publish up-to-date versions of the Plans in an appropriate form when justified by the circumstances.

ARTICLE 5

Coordination, notification, examination and recording in the Master International Frequency Register of frequency assignments to feeder-link transmitting earth stations and receiving space stations in the fixed-satellite service

5.1 Coordination and notification

5.1.1 When an administration wishes to determine whether it is possible to use, at a given location, an amount of power control which is in excess of that contained in column 14 of the Regions 1 and 3 feeder-link Plan, it shall request the Bureau to determine the amount of permissible power control (not to exceed 10 dB) from that given location using the procedure contained in § 3.11 of Annex 3 to this Appendix.

5.1.2 Whenever an administration intends to bring into use a frequency assignment to a transmitting earth station or receiving space station in the fixed-satellite service in the bands between 14.5 GHz and 14.8 GHz and between 17.3 GHz and 18.1 GHz in Regions 1 and 3, and between 17.3 GHz and 17.8 GHz in Region 2, it shall notify this frequency assignment to the Bureau. For this purpose, the notifying administration shall apply the following provisions.

5.1.3 Before an administration in Region 1 or 3 notifies to the Bureau or brings into use any frequency assignment to a transmitting feeder-link earth station in the bands 14.5-14.8 GHz and 17.7-18.1 GHz with an e.i.r.p. greater than the sum of the values specified in columns 13 and 14 of the Plan, it shall effect coordination of this assignment with each administration whose

territory lies wholly or partly within the coordination area of the planned earth station using the method detailed in Appendix **S7**.

5.1.4 Before an administration in Region 1 or 3 notifies to the Bureau or brings into use any frequency assignment to a transmitting feeder-link earth station in the bands 14.5-14.8 GHz and 17.7-18.1 GHz, it shall effect coordination of this assignment with each administration whose territory lies wholly or partly within the coordination area of the planned earth station, using the method detailed in Appendix **S7**, in respect of notices concerning stations of the mobile and fixed services in the bands 14.5-14.8 GHz and 17.7-18.1 GHz and of the fixed-satellite service (space-to-Earth) in the band 17.7-18.1 GHz received by the Bureau prior to 29 August 1988 for recording in the International Master Frequency Register (Master Register).

5.1.5 If an administration with which coordination is sought under § 5.1.4 does not respond within three months, the administration intending to bring into use a frequency assignment to a feeder-link earth station shall notify this frequency assignment in accordance with § 5.1.2 above.

5.1.6 For any notification under § 5.1.2, an individual notice for each frequency assignment shall be drawn up as prescribed in Annex 2, the various sections of which specify the basic characteristics to be provided as appropriate. It is recommended that the notifying administration should also supply any other data it may consider useful.

5.1.7 Each notice must reach the Bureau not earlier than three years before the date on which the frequency assignment is to be brought into use. In any case, the notice must reach the Bureau not later than three months before that date.

5.1.8 Any frequency assignment the notice of which reaches the Bureau after the applicable period specified in § 5.1.7 shall, where it is to be recorded, bear a remark in the Master Register to indicate that it is not in conformity with § 5.1.7.

5.1.9 Any notice made under § 5.1.2 which does not contain the characteristics specified in Annex 2 shall be returned by the Bureau immediately by airmail to the notifying administration with the relevant reasons.

5.1.10 Upon receipt of a complete notice, the Bureau shall include its particulars, with the date of receipt, in its weekly circular which shall contain the particulars of all such notices received since the publication of the previous circular.

5.1.11 The circular shall constitute the acknowledgements to the notifying administration of the receipt of a complete notice.

5.1.12 Complete notices shall be considered by the Bureau in order of receipt. The Bureau shall not postpone its finding unless it lacks sufficient data to reach a decision; moreover, the Bureau shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Bureau until it has reached a finding with respect to such earlier notice.

5.2 Examination and recording

5.2.1 The Bureau shall examine each notice:

a) with respect to its conformity with the Convention and the relevant provisions of the Radio Regulations (with the exception of those relating to § *b)*, *c)*, *d)* and *e)* below); *and*

b) with respect to its conformity with the appropriate Regional Plan; *or*

c) with respect to its conformity with the appropriate Regional Plan, however, having characteristics differing from those in the Plan in one or more of the following aspects:

- use of a reduced e.i.r.p.,
- use of a reduced coverage area entirely situated within the coverage area appearing in the Plan,
- use of other modulating signals in accordance with the provisions of § 3.1.3 to Annex 5 of Appendix **S30**,
- in the case of Region 2, use of an orbital position under the conditions specified in paragraph B of Annex 7 to Appendix **S30**,
- in the case of Regions 1 and 3, use of an orbital position under the conditions specified in § 3.15 of Annex 3[4],

d) for Region 2, with respect to its conformity with the provisions of Resolution **42 (Rev.Orb-88)**;

e) for Regions 1 and 3, with respect to its conformity with the provisions of § 5.1.3 and also its conformity with § 5.1.4 or 5.1.5 relating to coordination.

5.2.2 When the Bureau reaches a favourable finding with respect to § 5.2.1 *a)*, 5.2.1 *b)* and 5.2.1 *e)*, the frequency assignment of an administration shall be recorded in the Master Register. The date of receipt of the notice by the Bureau shall be entered in Column 2d. In relations between administrations all frequency assignments brought into use in conformity with the Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments.

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[4] The Bureau shall also apply this provision to paragraph 5.21 *c)* of Appendix **S30** for Regions 1 and 3.

5.2.2.1 When the Bureau reaches a favourable finding with respect to § 5.2.1 *a)*, 5.2.1 *c)* and 5.2.1 *e)*, the frequency assignment shall be recorded in the Master Register. The date of receipt of the notice by the Bureau shall be entered in Column 2d. In relations between administrations, all frequency assignments brought into use in conformity with the Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments. When recording these assignments, the Bureau shall indicate by an appropriate symbol the characteristics having a value different from that appearing in the Plan.

5.2.2.2 In the case of Region 2, when the Bureau reaches a favourable finding with respect to § 5.2.1 *a)* but an unfavourable finding with respect to § 5.2.1 *b)* and 5.2.1 *c)*, it shall examine the notice with respect to the successful application of the provisions of Resolution **42 (Rev.Orb-88)**. A frequency assignment for which the provisions of Resolution **42 (Rev.Orb-88)** have been successfully applied shall be recorded in the Master Register with an appropriate symbol to indicate its interim status. The date of receipt of the notice by the Bureau shall be entered in Column 2d. In relations between administrations all frequency assignments brought into use following the successful application of the provisions of Resolution **42 (Rev.Orb-88)** and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments. If the finding with respect to § 5.2.1 *d)* is unfavourable, the notice shall be returned immediately by airmail to the notifying administration.

5.2.2.3 In the case of Regions 1 and 3, when the Bureau reaches a favourable finding with respect to § 5.2.1 *a)* but an unfavourable finding with respect to § 5.2.1 *b)* and 5.2.1 *c)*, the notice shall be returned immediately by airmail to the notifying administration with the Bureau's reasons for this finding and with such suggestions as the Bureau may be able to offer with a view to a satisfactory solution of the problem.

5.2.2.4 In the case of Regions 1 and 3, when the Bureau reaches a favourable finding with respect to § 5.2.1 *a)*, 5.2.1 *b)* and 5.2.1 *c)* but an unfavourable finding with respect to § 5.2.1 *e)*, the notice shall be returned immediately by airmail to the notifying administration with the Bureau's reasons for this finding and with such suggestions as the Bureau may be able to offer with a view to a satisfactory solution of the problem. If the unfavourable finding under § 5.2.1 *e)* is due to the coordination under § 5.1.3 only not being effected, the administration shall undertake only to bring this assignment into use with an e.i.r.p. level not greater than the sum of the values specified in columns 13 and 14 of the Regions 1 and 3 Plan.

5.2.2.5 When an assignment is recorded as a result of a favourable finding with respect to § 5.2.1 *e)*, a remark shall be included indicating that coordination has been effected.

5.2.3 Whenever a frequency assignment is recorded in the Master Register, the finding reached by the Bureau shall be indicated by a symbol in Column 13a.

5.2.4 When the Bureau reaches an unfavourable finding with respect to § 5.2.1 *a)*, 5.2.1 *b)* and 5.2.1 *c)*, the notice shall be returned immediately by airmail to the notifying administration with the Bureau's reasons for this finding and with such suggestions as the Bureau may be able to offer with a view to a satisfactory solution of the problem.

5.2.5 When the notifying administration resubmits the notice and the finding of the Bureau becomes favourable with respect to the appropriate parts of § 5.2.1, the notice shall be treated as in § 5.2.2, 5.2.2.1 or 5.2.2.2 as appropriate.

5.2.6 If the notifying administration resubmits the notice without modification and insists on its reconsideration, and if the Bureau's finding with respect to § 5.2.1 remains unfavourable, the notice is returned to the notifying administration in accordance with § 5.2.4. In this case, the notifying administration undertakes not to bring into use the frequency assignment until the condition specified in § 5.2.5 is fulfilled.

5.2.7 If a frequency assignment notified in advance of bringing into use in conformity with § 5.1.3 has received a favourable finding by the Bureau with respect to the provisions of § 5.2.1, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

5.2.8 When the Bureau has received confirmation that the frequency assignment has been brought into use, the Bureau shall remove the symbol in the Master Register.

5.2.9 The date in Column 2c shall be the date of bringing into use notified by the administration concerned. It is given for information only.

5.3 Cancellation of entries in the Master Register

5.3.1 If an administration has not confirmed the bringing into use of a frequency assignment under § 5.2.8, the Bureau will make inquiries of the administration not earlier than six months after the expiry of the period specified in § 5.1.3. On receipt of the relevant information, the Bureau will either modify the date of coming into use or cancel the entry.

5.3.2 If the use of any recorded frequency assignment is permanently discontinued, the notifying administration shall so inform the Bureau within three months, whereupon the entry shall be removed from the Master Register.

ARTICLE 6

Procedure concerning coordination, notification and recording in the Master International Frequency Register of frequency assignments to receiving terrestrial stations in Regions 1 and 3 in the bands 14.5-14.8 GHz and 17.7-18.1 GHz, and in Region 2 in the band 17.7-17.8 GHz, when frequency assignments to feeder-link transmitting earth stations for the broadcasting-satellite service in conformity with the Regions 1 and 3 Plan or the Region 2 Plan are involved

6.1 Administrations planning to implement assignments for terrestrial stations in Regions 1 and 3 in the bands 14.5-14.8 GHz and 17.7-18.1 GHz, and in Region 2 in the 17.7-17.8 GHz band should evaluate the level of interference assessed on the basis of coordination contours calculated in accordance with Appendix **S7**[5], which might be caused by the closest feeder-link earth station which could be located on the border of the territory of another administration. Should the administration planning terrestrial stations find that interference may be caused by such a feeder-link earth station, it may request the administration responsible for the feeder-link earth station to indicate the geographical coordinates, the antenna characteristics and the elevation angle of the horizon around its actual and planned feeder-link earth stations.

6.2 In the case of Region 2, when the entry in the Plan contains information on specific earth stations, this shall be used in the interference calculations mentioned in § 6.1 above. When such information is not contained in the Region 2 Plan, an administration which receives a request under § 6.1 shall, within a period of three months, communicate the details of the feeder-link earth stations to the administration planning the terrestrial station, and to the Bureau in order to update the Plan.

6.3 In the case of Regions 1 and 3, an administration which receives a request under § 6.1 shall, within a period of three months, communicate the details of the feeder-link stations to the administration planning the terrestrial station, and to the Bureau for information.

6.4 If, at the end of a period of three months, the administration responsible for the terrestrial station does not receive a reply, it may request the assistance of the Bureau.

6.5 If the administration responsible for the feeder-link earth station does not communicate to the Bureau, within a period of three months, the information requested under § 6.1, this administration shall only implement its feeder-link earth station provided it does not cause harmful interference to the terrestrial station under consideration.

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[5] In the case of Regions 1 and 3, the feeder-link earth-station power to be taken into account is obtained by adding the values specified in columns 13 and 14 of the Plan.

6.6 If, as a result of the application of this Article, an agreement is reached with the administration responsible for the feeder-link earth station or no comments have been received, the administration responsible for the terrestrial station may notify this station under Article **S11** for recording in the Master Register. A remark shall be included indicating either that an agreement has been reached or that no comments have been received.

ARTICLE 7

Procedure concerning coordination, notification and recording in the Master International Frequency Register of frequency assignments to stations in the fixed-satellite service (space-to-earth) in Regions 1 and 3 in the band 17.7-18.1 GHz and in Region 2 in the band 17.7-17.8 GHz, and to stations in the broadcasting-satellite service in Region 2 in the band 17.3-17.8 GHz when frequency assignments to feeder-links for broadcasting-satellite stations appearing in the Regions 1 and 3 Plan or the Region 2 Plan are involved

7.1 The provisions of Articles **S9** and **S11** and Appendix **S8** are applicable to transmitting space stations in the fixed-satellite service in the band 17.7-18.1 GHz, and the provisions of Resolution **33** are applicable to space stations in the broadcasting-satellite service in Region 2 in the band 17.3-17.8 GHz together with the provisions of Annex 4, except that in relation to feeder-link stations, the relevant criteria mentioned in Appendix **S8** are replaced by those given in Section 1 of Annex 4.

7.2 Administrations planning to implement assignments for receiving earth stations in Regions 1 and 3 in the 17.7-18.1 GHz band and in Region 2 in the 17.7-17.8 GHz band in the fixed-satellite service (space-to-Earth) should evaluate the level of interference, assessed on the basis of coordination contours calculated in accordance with Section 3 of Annex 4, which might be caused by the closest feeder-link earth station which could be located on the border of the territory of another administration. Should the administration planning receiving earth stations find that interference may be caused by such a feeder-link earth station, it may request the administration responsible for the feeder-link earth stations to indicate the geographical coordinates, the antenna characteristics and the elevation angle of the horizon around its actual and planned feeder-link earth stations.

7.3 In the case of Region 2, when the entry in the Plan contains information on specific earth stations this shall be used in the interference calculations mentioned in § 7.2 above. When such information is not contained in the Plan an administration which receives a request under § 7.2 shall, within a period of three months, communicate the details of the feeder-link earth stations to the administration planning the receiving earth station, and to the Bureau in order to update the Plan.

7.4 In the case of Regions 1 and 3, an administration which receives a request under § 7.2 shall, within a period of three months, communicate the details of the feeder-link earth stations to the administration planning the receiving earth station, and to the Bureau for information.

7.5 If, at the end of the period of three months, the administration responsible for the fixed-satellite receiving earth station does not receive a reply, it may request the assistance of the Bureau.

7.6 If the administration responsible for the feeder-link earth stations does not communicate to the Bureau, within a period of three months, the information requested under § 7.2, this administration shall only implement its feeder-link earth station provided it does not cause harmful interference to the fixed-satellite earth station under consideration.

7.7 If, as a result of the application of this Article, an agreement is reached with the administration responsible for the feeder-link earth station or no comments have been received, and when the station is recorded in the Master Register in accordance with Article **S11**, the Bureau shall enter a remark indicating either that an agreement has been reached or that no comments have been received.

ARTICLE 8

Miscellaneous provisions relating to the procedures*

Section I – Studies and Recommendations

8.1.1 If it is requested by any administration, the Board, using such means at its disposal as are appropriate in the circumstances, shall conduct a study of cases of alleged contravention or non-observance of these provisions, or of harmful interference.

8.1.2 The Board shall thereupon prepare and forward to the administrations concerned a report containing its findings and recommendations for the solution of the problem.

8.1.3 On receiving the Board's recommendations for the solution of the problem, an administration shall promptly acknowledge the receipt by telegram and shall subsequently indicate the action it intends to take. In cases when the Board's suggestions or recommendations are unacceptable to the administrations concerned, further efforts should be made by the Board to find an acceptable solution to the problem.

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* *Note by the Secretariat:* WRC-97 did not review this Article. The subject matter is also dealt with in Articles **S13** and **S14**, which were reviewed by WRC-97.

8.1.4 In a case where, as a result of a study, the Board submits to one or more administrations suggestions or recommendations for the solution of a problem, and where no answer has been received from one or more of these administrations within a period of four months, the Board shall consider that the suggestions or recommendations concerned are unacceptable to the administrations which did not answer. If it was the requesting administration which failed to answer within this period, the Board shall close the study.

Section II – Miscellaneous provisions

8.2.1 If it is requested by any administration, particularly by an administration of a country in need of special assistance, the Board, using such means at its disposal as are appropriate in the circumstances, shall render the following assistance:

a) computation necessary in the application of Annexes 1, 3 and 4;

b) any other assistance of a technical nature for completion of the procedures in this Appendix.

8.2.2 In making a request to the Board under § 8.2.1, the administration shall furnish the Board with the necessary information.

ARTICLE 9

Plan for feeder-links for the broadcasting-satellite service in the fixed-satellite service in the frequency band 17.3-17.8 GHz in Region 2

9.1 COLUMN HEADINGS OF THE PLAN

Col. 1 *Beam identification* (column 1 contains the symbol designating the country or the geographical area taken from Table B1 of the Preface to the International Frequency List followed by the symbol designating the service area).

Col. 2 *Nominal orbital position*, in degrees and hundredths of a degree.

Col. 3 *Channel number* (see Table 2 showing channel numbers and corresponding assigned frequencies).

Col. 4 *Boresight geographical coordinates*, in degrees and hundredths of a degree.

Col. 5 *Antenna beamwidth*. This column contains two figures corresponding to the major axis and the minor axis respectively of the elliptical cross section half-power beam, in degrees and hundredths of a degree.

Col. 6 *Orientation of the ellipse* determined as follows: in a plane normal to the beam axis, the direction of a major axis of the ellipse is specified as the angle measured anticlockwise from a line parallel to the equatorial plane to the major axis of the ellipse to the nearest degree.

Col. 7 *Polarization* (1 = direct, 2 = indirect)[6].

Col. 8 Earth station *e.i.r.p.* in the direction of maximum radiation, in dBW.

Col. 9 *Remarks*[7].

9.2 TEXT FOR NOTES IN REMARKS COLUMN OF THE PLAN

1 Fast roll-off space station receiving antenna as defined in Annex 3 (§ 4.6.3).

2 Television standard with 625 lines using greater video bandwidth and necessary bandwidth of 27 MHz.

3 This assignment may cause interference to feeder-link assignments* of Spain, Guinea-Bissau and Portugal in the Regions 1 and 3 feeder-link Plan adopted at the 1988 Conference and shall only be brought into use if:

a) the administrations of Spain, Guinea-Bissau and Portugal agree; *or*

b) their feeder-link equivalent protection margins, as defined in § 1.7 of Annex 3, are positive.

The affected administrations shall be informed by the notifying administration of the required changes in characteristics before this assignment is brought into use.

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6 See Annex 3 (§ 4.8) to this Appendix.

7 The location of earth stations, together with the antenna characteristics and elevation angle of the horizon, are given as an annex to this Plan, and will be published when the Plan is republished in accordance with § 4.4.2 of Article 4.

* *Note by the Secretariat:* Since the orbital positions of these countries were changed by WRC-97, this paragraph might need to be revised.

4 This assignment may be utilized in the geographical area of Anguilla (AIA) (which is in the beam area).

5 Feeder-link earth stations for this assignment may also be located in the territories of Puerto Rico and the United States Virgin Islands. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

6 Feeder-link earth stations for this assignment may also be located in the States of Alaska and Hawaii. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

7 The feeder-link earth station for this assignment may also be located at the point with geographical coordinates 3° 31′ West, 48° 46′ North. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

8 Feeder-link earth stations for this assignment may also be located at the points with the following geographical coordinates:

47° 55′ West	15° 47′ South	34° 53′ West	08° 04′ South
43° 13′ West	22° 55′ South	60° 02′ West	03° 06′ South
46° 38′ West	23° 33′ South	38° 31′ West	12° 56′ South
51° 13′ West	30° 02′ South	49° 15′ West	16° 40′ South

Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

9/GR. . This assignment is part of a group, the number of which follows the symbol. The group consists of the beams and has the number of channels assigned to it as indicated in Table 1.

a) The overall equivalent protection margin to be used for the application of Article 4 and Resolution **42 (Rev.Orb-88)** shall be calculated on the following basis:

– for the calculation of interference to assignments that are part of a group, only the interference contributions from assignments that are not part of the same group are to be included; *and*

– for the calculation of interference from assignments belonging to a group of assignments that are not part of that same group, only the worst interference contribution from that group shall be used on a test point to test point basis.

b) If an administration notifies the same frequency in more than one beam of a group for use at the same time, the overall *C/I* produced by all emissions from that group shall not exceed the *C/I* calculated on the basis of § *a)* above.

TABLE 1

Group	Beams in the group	Number of channels assigned to the group
GR1	ALS00002 HWA00002 USAPSA02	32 channels
GR2	ALS00003 HWA00003 USAPSA03	32 channels
GR3	ARGINSU4 ARGSUR04	16 channels
GR4	ARGINSU5 ARGSUR05	12 channels
GR5	BOLAND01 CLMAND01 EQACAND1 EQAGAND1 PRUAND02 VENAND03	16 channels
GR6	B SU111 B SU211	32 channels
GR7	B CE311 B CE411 B CE511	32 channels
GR8	B NO611 B NO711 B NO811	32 channels
GR9	B SU112 B SU212 B CE312 B CE412	32 channels
GR10	CAN01101 CAN01201	32 channels
GR11	*Not used*	
GR12	CAN01203 CAN01303 CAN01403	32 channels
GR13	CAN01304 CAN01404 CAN01504	32 channels
GR14	CAN01405 CAN01505 CAN01605	32 channels
GR15	*Not used*	
GR16	CHLCONT4 CHLCONT6	16 channels
GR17	CHLCONT5 PAQPAC01 CHLPAC02	16 channels
GR18	CRBBER01 CRBBLZ01 CRBJMC01 CRBBAH01 CRBEC001	16 channels
GR19	EQACOO01 EQAGOO01	16 channels
GR20	PTRVIR01 USAEHO02	32 channels
GR21	PTRVIR02 USAEHO03	32 channels
GR22	VEN02VEN VEN11VEN	4 channels

Country symbols

1 For the explanation of symbols designating countries or geographical areas in Region 2, see the Preface to the International Frequency List.

2 One additional symbol, CRB, has been created for the purposes of the 1983 Conference only, to designate to geographical area in the Caribbean Area. The five Caribbean beams are identified as follows:

CRBBAH01, CRBBER01, CRBBLZ01, CRBEC001 and CRBJMC01

and are intended collectively to provide coverage for the following countries or geographical areas: AIA, ATG, BAH, BER, BLZ, BRB, CYM, DMA, GRD, GUY, JMC, LCA, MSR, SCN, SUR, TCA, TRD, VCT and VRG to be so used if approved by them.

TABLE 2

Table showing correspondence between channel numbers and assigned frequencies

Channel No.	Assigned frequency (MHz)	Channel No.	Assigned frequency (MHz)
1	17 324.00	17	17 557.28
2	17 338.58	18	17 571.86
3	17 353.16	19	17 586.44
4	17 367.74	20	17 601.02
5	17 382.32	21	17 615.60
6	17 396.90	22	17 630.18
7	17 411.48	23	17 644.76
8	17 426.06	24	17 659.34
9	17 440.64	25	17 673.92
10	17 455.22	26	17 688.50
11	17 469.80	27	17 703.08
12	17 484.38	28	17 717.66
13	17 498.96	29	17 732.24
14	17 513.54	30	17 746.82
15	17 528.12	31	17 761.40
16	17 542.70	32	17 775.98

17 324.00 MHz (1)

1	2	3	4		5		6	7	8	9
ALS00002	–166.20	1	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS000/03	–175.20	1	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	–94.20	1	–52.98	–59.81	3.40	0.68	19	1	87.4	9/GR3
ARGSUR04	–94.20	1	–65.04	–43.33	3.32	1.50	40	1	87.4	9/GR3
B CE311	–64.20	1	–40.60	–6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	–45.20	1	–40.27	–6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	–64.20	1	–50.97	–15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	–45.20	1	–50.71	–15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	–64.20	1	–53.10	–2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	–74.20	1	–59.60	–11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	–74.20	1	–60.70	–1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	–74.20	1	–68.76	–4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	–81.20	1	–51.12	–25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	–45.20	1	–50.75	–25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	–81.20	1	–44.51	–16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	–45.20	1	–44.00	–16.87	3.20	1.96	58	1	87.4	8 9/GR9
BAHIFRB1	–87.20	1	–76.06	24.16	1.81	0.70	142	1	87.4	
BERBERMU	–96.20	1	–64.77	32.32	0.60	0.60	90	2	87.4	
BERBER02	–31.00	1	–64.77	32.32	0.60	0.60	90	1	87.4	2 3
BOLAND01	–115.20	1	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CAN01101	–138.20	1	–114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01201	–138.20	1	–114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01202	–72.70	1	–81.34	50.02	7.96	2.55	5	1	87.4	
CAN01203	–129.20	1	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01303	–129.20	1	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01304	–91.20	1	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01403	–129.20	1	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01404	–91.20	1	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01405	–82.20	1	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01504	–91.20	1	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01505	–82.20	1	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01605	–82.20	1	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01606	–70.70	1	–80.77	50.03	7.88	2.53	6	1	87.4	
CHLCONT5	–106.20	1	–72.23	–35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	–106.20	1	–80.06	–30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	–115.20	1	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	–103.20	1	–74.50	5.87	3.98	1.96	118	1	87.4	
EQACAND1	–115.20	1	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	–115.20	1	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
FLKANT01	–57.20	1	–44.54	–60.13	3.54	0.68	12	1	87.4	2
FLKFALKS	–31.00	1	–59.90	–51.64	0.60	0.60	90	1	87.4	2 3
GRD00002	–42.20	1	–61.58	12.29	0.60	0.60	90	1	87.4	
HWA00002	–166.20	1	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
HWA00003	–175.20	1	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
MEX01NTE	–78.20	1	–105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	–69.20	1	–94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	–136.20	1	–107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	–127.20	1	–96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	–106.20	1	–109.18	–27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	–99.20	1	–58.66	–23.32	1.45	1.04	76	1	87.4	
PRUAND02	–115.20	1	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	–101.20	1	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	–110.20	1	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
SPMFRAN3	–53.20	1	–67.24	47.51	3.16	0.79	7	1	87.4	2 7
TRD00001	–84.70	1	–61.23	10.70	0.60	0.60	90	1	87.4	
URG00001	–71.70	1	–56.22	–32.52	1.02	0.89	11	1	87.4	
USAEH001	–61.70	1	–87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	–101.20	1	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	–110.20	1	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	–119.20	1	–96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	–166.20	1	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	–175.20	1	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	–148.20	1	–111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	–157.20	1	–113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	–115.20	1	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
VRG00001	–79.70	1	–64.37	18.48	0.60	0.60	90	1	87.4	4

17 338.58 MHz (2)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	2	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	2	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	2	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	2	–62.85	–29.80	3.24	2.89	47	2	87.4	
ATNBEAM1	–52.80	2	–66.44	14.87	1.83	0.68	39	2	87.4	
B CE311	–63.80	2	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	2	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	2	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	2	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	2	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	2	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	2	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	2	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	2	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	2	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	2	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	2	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	2	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	–137.80	2	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01201	–137.80	2	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01202	–72.30	2	–81.23	50.12	7.99	2.53	5	2	87.4	
CAN01203	–128.80	2	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01303	–128.80	2	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01304	–90.80	2	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01403	–128.80	2	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01404	–90.80	2	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01405	–81.80	2	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01504	–90.80	2	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01505	–81.80	2	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01605	–81.80	2	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01606	–70.30	2	–80.64	50.02	7.88	2.52	6	2	87.4	
CHLCONT4	–105.80	2	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	2	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	2	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	2	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	2	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	2	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	2	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CTR00201	–130.80	2	–84.33	9.67	0.82	0.68	119	2	87.4	
EQAC0001	–94.80	2	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	2	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
GUY00302	–33.80	2	–59.07	4.77	1.43	0.85	91	2	87.4	
HNDIFRB2	–107.30	2	–86.23	15.16	1.14	0.85	8	1	87.4	
HTI00002	–83.30	2	–73.28	18.96	0.82	0.68	11	2	87.4	
HWA00002	–165.80	2	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
HWA00003	–174.80	2	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
MEX01NTE	–77.80	2	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	2	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	2	–96.39	19.88	3.19	1.87	158	2	87.4	1
PRU00004	–85.80	2	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	2	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	2	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
TCA00001	–115.80	2	–71.79	21.53	0.60	0.60	90	2	87.4	
USAEH001	–61.30	2	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	2	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	2	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	2	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	2	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	2	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	2	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	2	–113.01	40.71	3.74	1.79	149	2	87.4	
VCT00001	–79.30	2	–61.18	13.23	0.60	0.60	90	2	87.4	
VEN11VEN	–103.80	2	–66.79	6.90	2.50	1.77	122	2	87.4	

17 353.16 MHz (3)

1	2	3	4		5		6	7	8	9
ALS00002	−166.20	3	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	−175.20	3	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	−94.20	3	−52.98	−59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	−55.20	3	−44.17	−59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	−94.20	3	−65.04	−43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	−55.20	3	−63.68	−43.01	2.54	2.38	152	1	87.4	9/GR4
ATGSJN01	−79.70	3	−61.79	17.07	0.60	0.60	90	1	87.4	
B CE311	−64.20	3	−40.60	−6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	−45.20	3	−40.27	−6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	−64.20	3	−50.97	−15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	−45.20	3	−50.71	−15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	−64.20	3	−53.10	−2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	−74.20	3	−59.60	−11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	−74.20	3	−60.70	−1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	−74.20	3	−68.76	−4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	−81.20	3	−51.12	−25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	−45.20	3	−50.75	−25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	−81.20	3	−44.51	−16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	−45.20	3	−44.00	−16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	−96.20	3	−64.77	32.32	0.60	0.60	90	2	87.4	
BOLAND01	−115.20	3	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
BOL00001	−87.20	3	−64.61	−16.71	2.52	2.19	85	1	87.4	
BRB00001	−92.70	3	−59.85	12.93	0.60	0.60	90	2	87.4	
CAN01101	−138.20	3	−114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01201	−138.20	3	−114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01202	−72.70	3	−81.34	50.02	7.96	2.55	5	1	87.4	
CAN01203	−129.20	3	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01303	−129.20	3	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01304	−91.20	3	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01403	−129.20	3	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01404	−91.20	3	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01405	−82.20	3	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01504	−91.20	3	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01505	−82.20	3	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01605	−82.20	3	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01606	−70.70	3	−80.77	50.03	7.88	2.53	6	1	87.4	
CHLCONT5	−106.20	3	−72.23	−35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	−106.20	3	−80.06	−30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	−115.20	3	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	−103.20	3	−74.50	5.87	3.98	1.96	118	1	87.4	
CUB00001	−89.20	3	−79.81	21.62	2.24	0.68	168	1	87.4	
EQACAND1	−115.20	3	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	−115.20	3	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
GRD00002	−42.20	3	−61.58	12.29	0.60	0.60	90	1	87.4	
GRD00059	−57.20	3	−61.58	12.29	0.60	0.60	90	1	87.4	
GRLDNK01	−53.20	3	−44.89	66.56	2.70	0.82	173	1	87.4	2
HWA00002	−166.20	3	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
HWA00003	−175.20	3	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
MEX01NTE	−78.20	3	−105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	−69.20	3	−94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	−136.20	3	−107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	−127.20	3	−96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	−106.20	3	−109.18	−27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	−99.20	3	−58.66	−23.32	1.45	1.04	76	1	87.4	
PRUAND02	−115.20	3	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	−101.20	3	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	−110.20	3	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
SURINAM2	−84.70	3	−55.69	4.35	1.00	0.69	86	1	87.4	
URG00001	−71.70	3	−56.22	−32.52	1.02	0.89	11	1	87.4	
USAEH001	−61.70	3	−87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	−101.20	3	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	−110.20	3	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	−119.20	3	−96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	−166.20	3	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	−175.20	3	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	−148.20	3	−111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	−157.20	3	−113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	−115.20	3	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5

17 367.74 MHz (4)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	4	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	4	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	4	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	4	–62.85	–29.80	3.24	2.89	47	2	87.4	
B CE311	–63.80	4	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	4	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	4	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	4	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	4	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	4	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	4	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	4	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	4	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	4	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	4	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	4	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	4	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	–137.80	4	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01201	–137.80	4	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01202	–72.30	4	–81.23	50.12	7.99	2.53	5	2	87.4	
CAN01203	–128.80	4	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01303	–128.80	4	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01304	–90.80	4	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01403	–128.80	4	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01404	–90.80	4	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01405	–81.80	4	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01504	–90.80	4	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01505	–81.80	4	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01605	–81.80	4	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01606	–70.30	4	–80.64	50.02	7.88	2.52	6	2	87.4	
CHLCONT4	–105.80	4	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	4	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	4	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	4	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	4	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	4	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	4	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CYM00001	–115.80	4	–80.58	19.57	0.60	0.60	90	2	87.4	
DOMIFRB2	–83.30	4	–70.51	18.79	0.98	0.69	167	2	87.4	
EQAC0001	–94.80	4	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	4	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
GUFMGG02	–52.80	4	–56.42	8.47	4.16	0.81	123	2	87.4	2 7
HWA00002	–165.80	4	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
HWA00003	–174.80	4	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
JMC00005	–33.80	4	–77.27	18.12	0.60	0.60	90	2	87.4	
LCAIFRB1	–79.30	4	–61.15	13.90	0.60	0.60	90	2	87.4	
MEX01NTE	–77.80	4	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	4	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	4	–96.39	19.88	3.19	1.87	158	2	87.4	1
PRU00004	–85.80	4	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	4	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	4	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
SLVIFRB2	–107.30	4	–88.91	13.59	0.60	0.60	90	1	87.4	
USAEH001	–61.30	4	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	4	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	4	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	4	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	4	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	4	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	4	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	4	–113.01	40.71	3.74	1.79	149	2	87.4	
VEN11VEN	–103.80	4	–66.79	6.90	2.50	1.77	122	2	87.4	

17 382.32 MHz (5)

1	2	3	4		5		6	7	8	9
ALS00002	–166.20	5	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	–175.20	5	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	–94.20	5	–52.98	–59.81	3.40	0.68	19	1	87.4	9/GR3
ARGSUR04	–94.20	5	–65.04	–43.33	3.32	1.50	40	1	87.4	9/GR3
B CE311	–64.20	5	–40.60	–6.07	3.04	2.06	174	1	87.4	89/GR7
B CE312	–45.20	5	–40.27	–6.06	3.44	2.09	174	1	87.4	89/GR9
B CE411	–64.20	5	–50.97	–15.27	3.86	1.38	49	1	87.4	89/GR7
B CE412	–45.20	5	–50.71	–15.30	3.57	1.56	52	1	87.4	89/GR9
B CE511	–64.20	5	–53.10	–2.90	2.44	2.13	104	1	87.4	89/GR7
B NO611	–74.20	5	–59.60	–11.62	2.85	1.69	165	2	87.4	89/GR8
B NO711	–74.20	5	–60.70	–1.78	3.54	1.78	126	2	87.4	89/GR8
B NO811	–74.20	5	–68.76	–4.71	2.37	1.65	73	2	87.4	89/GR8
B SU111	–81.20	5	–51.12	–25.63	2.76	1.05	50	1	87.4	89/GR6
B SU112	–45.20	5	–50.75	–25.62	2.47	1.48	56	1	87.4	89/GR9
B SU211	–81.20	5	–44.51	–16.95	3.22	1.36	60	1	87.4	89/GR6
B SU212	–45.20	5	–44.00	–16.87	3.20	1.96	58	1	87.4	89/GR9
BAHIFRB1	–87.20	5	–76.06	24.16	1.81	0.70	142	1	87.4	
BERBERMU	–96.20	5	–64.77	32.32	0.60	0.60	90	2	87.4	
BERBER02	–31.00	5	–64.77	32.32	0.60	0.60	90	1	87.4	2 3
BOLAND01	–115.20	5	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CAN01101	–138.20	5	–114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01201	–138.20	5	–114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01202	–72.70	5	–81.34	50.02	7.96	2.55	5	1	87.4	
CAN01203	–129.20	5	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01303	–129.20	5	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01304	–91.20	5	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01403	–129.20	5	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01404	–91.20	5	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01405	–82.20	5	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01504	–91.20	5	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01505	–82.20	5	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01605	–82.20	5	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01606	–70.70	5	–80.77	50.03	7.88	2.53	6	1	87.4	
CHLCONT5	–106.20	5	–72.23	–35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	–106.20	5	–80.06	–30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	–115.20	5	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	–103.20	5	–74.50	5.87	3.98	1.96	118	1	87.4	
EQACAND1	–115.20	5	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	–115.20	5	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
FLKANT01	–57.20	5	–44.54	–60.13	3.54	0.68	12	1	87.4	2
FLKFALKS	–31.00	5	–59.90	–51.64	0.60	0.60	90	1	87.4	2 3
GRD00002	–42.20	5	–61.58	12.29	0.60	0.60	90	1	87.4	
HWA00002	–166.20	5	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
HWA00003	–175.20	5	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
MEX01NTE	–78.20	5	–105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	–69.20	5	–94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	–136.20	5	–107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	–127.20	5	–96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	–106.20	5	–109.18	–27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	–99.20	5	–58.66	–23.32	1.45	1.04	76	1	87.4	
PRUAND02	–115.20	5	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	–101.20	5	–93.94	36.32	8.24	3.56	171	1	87.4	169/GR20
PTRVIR02	–110.20	5	–95.23	36.29	8.27	3.37	168	1	87.4	169/GR21
SPMFRAN3	–53.20	5	–67.24	47.51	3.16	0.79	7	1	87.4	2 7
TRD00001	–84.70	5	–61.23	10.70	0.60	0.60	90	1	87.4	
URG00001	–71.70	5	–56.22	–32.52	1.02	0.89	11	1	87.4	
USAEH001	–61.70	5	–87.57	36.17	6.42	3.49	12	1	87.4	156
USAEH002	–101.20	5	–93.94	36.32	8.24	3.56	171	1	87.4	169/GR20
USAEH003	–110.20	5	–95.23	36.29	8.27	3.37	168	1	87.4	169/GR21
USAEH004	–119.20	5	–96.45	36.21	8.20	3.12	165	1	87.4	156
USAPSA02	–166.20	5	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	–175.20	5	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	–148.20	5	–111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	–157.20	5	–113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	–115.20	5	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
VRG00001	–79.70	5	–64.37	18.48	0.60	0.60	90	1	87.4	4

17 396.90 MHz (6)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	6	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	6	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	6	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	6	–62.85	–29.80	3.24	2.89	47	2	87.4	
ATNBEAM1	–52.80	6	–66.44	14.87	1.83	0.68	39	2	87.4	
B CE311	–63.80	6	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	6	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	6	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	6	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	6	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	6	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	6	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	6	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	6	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	6	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	6	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	6	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	6	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	–137.80	6	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01201	–137.80	6	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01202	–72.30	6	–81.23	50.12	7.99	2.53	5	2	87.4	
CAN01203	–128.80	6	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01303	–128.80	6	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01304	–90.80	6	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01403	–128.80	6	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01404	–90.80	6	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01405	–81.80	6	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01504	–90.80	6	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01505	–81.80	6	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01605	–81.80	6	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01606	–70.30	6	–80.64	50.02	7.88	2.52	6	2	87.4	
CHLCONT4	–105.80	6	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	6	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	6	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	6	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	6	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	6	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	6	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CTR00201	–130.80	6	–84.33	9.67	0.82	0.68	119	2	87.4	
EQAC0001	–94.80	6	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	6	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
GUY00302	–33.80	6	–59.07	4.77	1.43	0.85	91	2	87.4	
HNDIFRB2	–107.30	6	–86.23	15.16	1.14	0.85	8	1	87.4	
HTI00002	–83.30	6	–73.28	18.96	0.82	0.68	11	2	87.4	
HWA00002	–165.80	6	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
HWA00003	–174.80	6	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
MEX01NTE	–77.80	6	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	6	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	6	–96.39	19.88	3.19	1.87	158	2	87.4	1
PRU00004	–85.80	6	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	6	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	6	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
TCA00001	–115.80	6	–71.79	21.53	0.60	0.60	90	2	87.4	
USAEH001	–61.30	6	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	6	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	6	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	6	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	6	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	6	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	6	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	6	–113.01	40.71	3.74	1.79	149	2	87.4	
VCT00001	–79.30	6	–61.18	13.23	0.60	0.60	90	2	87.4	
VEN11VEN	–103.80	6	–66.79	6.90	2.50	1.77	122	2	87.4	

17 411.48 MHz (7)

1	2	3	4		5		6	7	8	9
ALS00002	–166.20	7	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	–175.20	7	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	–94.20	7	–52.98	–59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	–55.20	7	–44.17	–59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	–94.20	7	–65.04	–43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	–55.20	7	–63.68	–43.01	2.54	2.38	152	1	87.4	9/GR4
ATGSJN01	–79.70	7	–61.79	17.07	0.60	0.60	90	1	87.4	
B CE311	–64.20	7	–40.60	–6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	–45.20	7	–40.27	–6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	–64.20	7	–50.97	–15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	–45.20	7	–50.71	–15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	–64.20	7	–53.10	–2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	–74.20	7	–59.60	–11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	–74.20	7	–60.70	–1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	–74.20	7	–68.76	–4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	–81.20	7	–51.12	–25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	–45.20	7	–50.75	–25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	–81.20	7	–44.51	–16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	–45.20	7	–44.00	–16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	–96.20	7	–64.77	32.32	0.60	0.60	90	2	87.4	
BOLAND01	–115.20	7	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
BOL00001	–87.20	7	–64.61	–16.71	2.52	2.19	85	1	87.4	
BRB00001	–92.70	7	–59.85	12.93	0.60	0.60	90	2	87.4	
CAN01101	–138.20	7	–114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01201	–138.20	7	–114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01202	–72.70	7	–81.34	50.02	7.96	2.55	5	1	87.4	
CAN01203	–129.20	7	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01303	–129.20	7	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01304	–91.20	7	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01403	–129.20	7	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01404	–91.20	7	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01405	–82.20	7	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01504	–91.20	7	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01505	–82.20	7	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01605	–82.20	7	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01606	–70.70	7	–80.77	50.03	7.88	2.53	6	1	87.4	
CHLCONT5	–106.20	7	–72.23	–35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	–106.20	7	–80.06	–30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	–115.20	7	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	–103.20	7	–74.50	5.87	3.98	1.96	118	1	87.4	
CUB00001	–89.20	7	–79.81	21.62	2.24	0.68	168	1	87.4	
EQACAND1	–115.20	7	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	–115.20	7	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
GRD00002	–42.20	7	–61.58	12.29	0.60	0.60	90	1	87.4	
GRD00059	–57.20	7	–61.58	12.29	0.60	0.60	90	1	87.4	
GRLDNK01	–53.20	7	–44.89	66.56	2.70	0.82	173	1	87.4	2
HWA00002	–166.20	7	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
HWA00003	–175.20	7	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
MEX01NTE	–78.20	7	–105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	–69.20	7	–94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	–136.20	7	–107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	–127.20	7	–96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	–106.20	7	–109.18	–27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	–99.20	7	–58.66	–23.32	1.45	1.04	76	1	87.4	
PRUAND02	–115.20	7	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	–101.20	7	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	–110.20	7	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
SURINAM2	–84.70	7	–55.69	4.35	1.00	0.69	86	1	87.4	
URG00001	–71.70	7	–56.22	–32.52	1.02	0.89	11	1	87.4	
USAEH001	–61.70	7	–87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	–101.20	7	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	–110.20	7	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	–119.20	7	–96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	–166.20	7	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	–175.20	7	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	–148.20	7	–111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	–157.20	7	–113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	–115.20	7	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5

17 426.06 MHz (8)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	8	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	8	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	8	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	8	–62.85	–29.80	3.24	2.89	47	2	87.4	
B CE311	–63.80	8	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	8	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	8	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	8	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	8	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	8	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	8	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	8	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	8	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	8	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	8	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	8	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	8	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	–137.80	8	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01201	–137.80	8	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01202	–72.30	8	–81.23	50.12	7.99	2.53	5	2	87.4	
CAN01203	–128.80	8	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01303	–128.80	8	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01304	–90.80	8	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01403	–128.80	8	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01404	–90.80	8	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01405	–81.80	8	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01504	–90.80	8	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01505	–81.80	8	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01605	–81.80	8	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01606	–70.30	8	–80.64	50.02	7.88	2.52	6	2	87.4	
CHLCONT4	–105.80	8	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	8	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	8	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	8	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	8	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	8	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	8	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CYM00001	–115.80	8	–80.58	19.57	0.60	0.60	90	2	87.4	
DOMIFRB2	–83.30	8	–70.51	18.79	0.98	0.69	167	2	87.4	
EQAC0001	–94.80	8	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	8	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
GUFMGG02	–52.80	8	–56.42	8.47	4.16	0.81	123	2	87.4	2 7
HWA00002	–165.80	8	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
HWA00003	–174.80	8	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
JMC00005	–33.80	8	–77.27	18.12	0.60	0.60	90	2	87.4	
LCAIFRB1	–79.30	8	–61.15	13.90	0.60	0.60	90	2	87.4	
MEX01NTE	–77.80	8	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	8	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	8	–96.39	19.88	3.19	1.87	158	2	87.4	1
PRU00004	–85.80	8	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	8	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	8	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
SLVIFRB2	–107.30	8	–88.91	13.59	0.60	0.60	90	1	87.4	
USAEH001	–61.30	8	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	8	–93.85	36.31	8.26	3.55	71	2	87.4	1 6 9/GR20
USAEH003	–109.80	8	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	8	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	8	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	8	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	8	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	8	–113.01	40.71	3.74	1.79	149	2	87.4	
VEN11VEN	–103.80	8	–66.79	6.90	2.50	1.77	122	2	87.4	

17 440.64 MHz (9)

1	2	3	4		5		6	7	8	9
ALS00002	–166.20	9	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	–175.20	9	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	–94.20	9	–52.98	–59.81	3.40	0.68	19	1	87.4	9/GR3
ARGSUR04	–94.20	9	–65.04	–43.33	3.32	1.50	40	1	87.4	9/GR3
B CE311	–64.20	9	–40.60	–6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	–45.20	9	–40.27	–6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	–64.20	9	–50.97	–15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	–45.20	9	–50.71	–15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	–64.20	9	–53.10	–2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	–74.20	9	–59.60	–11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	–74.20	9	–60.70	–1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	–74.20	9	–68.76	–4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	–81.20	9	–51.12	–25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	–45.20	9	–50.75	–25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	–81.20	9	–44.51	–16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	–45.20	9	–44.00	–16.87	3.20	1.96	58	1	87.4	8 9/GR9
BAHIFRB1	–87.20	9	–76.06	24.16	1.81	0.70	142	1	87.4	
BERBERMU	–96.20	9	–64.77	32.32	0.60	0.60	90	2	87.4	
BERBER02	–31.00	9	–64.77	32.32	0.60	0.60	90	1	87.4	2 3
BOLAND01	–115.20	9	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CAN01101	–138.20	9	–114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01201	–138.20	9	–114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01202	–72.70	9	–81.34	50.02	7.96	2.55	5	1	87.4	
CAN01203	–129.20	9	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01303	–129.20	9	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01304	–91.20	9	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01403	–129.20	9	–113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01404	–91.20	9	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01405	–82.20	9	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01504	–91.20	9	–86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01505	–82.20	9	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01605	–82.20	9	–84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01606	–70.70	9	–80.77	50.03	7.88	2.53	6	1	87.4	
CHLCONT5	–106.20	9	–72.23	–35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	–106.20	9	–80.06	–30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	–115.20	9	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	–103.20	9	–74.50	5.87	3.98	1.96	118	1	87.4	
EQACAND1	–115.20	9	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	–115.20	9	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
FLKANT01	–57.20	9	–44.54	–60.13	3.54	0.68	12	1	87.4	2
FLKFALKS	–31.00	9	–59.90	–51.64	0.60	0.60	90	1	87.4	2 3
GRD00002	–42.20	9	–61.58	12.29	0.60	0.60	90	1	87.4	
HWA00002	–166.20	9	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
HWA00003	–175.20	9	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
MEX01NTE	–78.20	9	–105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	–69.20	9	–94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	–136.20	9	–107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	–127.20	9	–96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	–106.20	9	–109.18	–27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	–99.20	9	–58.66	–23.32	1.45	1.04	76	1	87.4	
PRUAND02	–115.20	9	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	–101.20	9	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	–110.20	9	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
SPMFRAN3	–53.20	9	–67.24	47.51	3.16	0.79	7	1	87.4	2 7
TRD00001	–84.70	9	–61.23	10.70	0.60	0.60	90	1	87.4	
URG00001	–71.70	9	–56.22	–32.52	1.02	0.89	11	1	87.4	
USAEH001	–61.70	9	–87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	–101.20	9	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	–110.20	9	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	–119.20	9	–96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	–166.20	9	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	–175.20	9	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	–148.20	9	–111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	–157.20	9	–113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	–115.20	9	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
VRG00001	–79.70	9	–64.37	18.48	0.60	0.60	90	1	87.4	4

17 455.22 MHz (10)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	10	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	10	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	10	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	10	–62.85	–29.80	3.24	2.89	47	2	87.4	
ATNBEAM1	–52.80	10	–66.44	14.87	1.83	0.68	39	2	87.4	
B CE311	–63.80	10	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	10	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	10	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	10	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	10	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	10	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	10	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	10	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	10	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	10	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	10	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	10	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	10	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	–137.80	10	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01201	–137.80	10	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01202	–72.30	10	–81.23	50.12	7.99	2.53	5	2	87.4	
CAN01203	–128.80	10	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01303	–128.80	10	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01304	–90.80	10	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01403	–128.80	10	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01404	–90.80	10	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01405	–81.80	10	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01504	–90.80	10	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01505	–81.80	10	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01605	–81.80	10	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01606	–70.30	10	–80.64	50.02	7.88	2.52	6	2	87.4	
CHLCONT4	–105.80	10	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	10	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	10	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	10	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	10	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	10	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	10	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CTR00201	–130.80	10	–84.33	9.67	0.82	0.68	119	2	87.4	
EQAC0001	–94.80	10	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	10	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
GUY00302	–33.80	10	–59.07	4.77	1.43	0.85	91	2	87.4	
HNDIFRB2	–107.30	10	–86.23	15.16	1.14	0.85	8	1	87.4	
HTI00002	–83.30	10	–73.28	18.96	0.82	0.68	11	2	87.4	
HWA00002	–165.80	10	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
HWA00003	–174.80	10	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
MEX01NTE	–77.80	10	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	10	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	10	–96.39	19.88	3.19	1.87	158	2	87.4	1
PRU00004	–85.80	10	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	10	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	10	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
TCA00001	–115.80	10	–71.79	21.53	0.60	0.60	90	2	87.4	
USAEH001	–61.30	10	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	10	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	10	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	10	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	10	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	10	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	10	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	10	–113.01	40.71	3.74	1.79	149	2	87.4	
VCT00001	–79.30	10	–61.18	13.23	0.60	0.60	90	2	87.4	
VEN11VEN	–103.80	10	–66.79	6.90	2.50	1.77	122	2	87.4	

17 469.80 MHz (11)

1	2	3	4		5		6	7	8	9
ALS00002	−166.20	11	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	−175.20	11	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	−94.20	11	−52.98	−59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	−55.20	11	−44.17	−59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	−94.20	11	−65.04	−43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	−55.20	11	−63.68	−43.01	2.54	2.38	152	1	87.4	9/GR4
ATGSJN01	−79.70	11	−61.79	17.07	0.60	0.60	90	1	87.4	
B CE311	−64.20	11	−40.60	−6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	−45.20	11	−40.27	−6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	−64.20	11	−50.97	−15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	−45.20	11	−50.71	−15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	−64.20	11	−53.10	−2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	−74.20	11	−59.60	−11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	−74.20	11	−60.70	−1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	−74.20	11	−68.76	−4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	−81.20	11	−51.12	−25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	−45.20	11	−50.75	−25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	−81.20	11	−44.51	−16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	−45.20	11	−44.00	−16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	−96.20	11	−64.77	32.32	0.60	0.60	90	2	87.4	
BOLAND01	−115.20	11	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
BOL00001	−87.20	11	−64.61	−16.71	2.52	2.19	85	1	87.4	
BRB00001	−92.70	11	−59.85	12.93	0.60	0.60	90	2	87.4	
CAN01101	−138.20	11	−114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01201	−138.20	11	−114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01202	−72.70	11	−81.34	50.02	7.96	2.55	5	1	87.4	
CAN01203	−129.20	11	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01303	−129.20	11	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01304	−91.20	11	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01403	−129.20	11	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01404	−91.20	11	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01405	−82.20	11	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01504	−91.20	11	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01505	−82.20	11	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01605	−82.20	11	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01606	−70.70	11	−80.77	50.03	7.88	2.53	6	1	87.4	
CHLCONT5	−106.20	11	−72.23	−35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	−106.20	11	−80.06	−30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	−115.20	11	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	−103.20	11	−74.50	5.87	3.98	1.96	118	1	87.4	
CUB00001	−89.20	11	−79.81	21.62	2.24	0.68	168	1	87.4	
EQACAND1	−115.20	11	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	−115.20	11	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
GRD00002	−42.20	11	−61.58	12.29	0.60	0.60	90	1	87.4	
GRD00059	−57.20	11	−61.58	12.29	0.60	0.60	90	1	87.4	
GRLDNK01	−53.20	11	−44.89	66.56	2.70	0.82	173	1	87.4	2
GUY00201	−84.70	11	−59.19	4.78	1.44	0.85	95	1	87.4	
HWA00002	−166.20	11	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
HWA00003	−175.20	11	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
MEX01NTE	−78.20	11	−105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	−69.20	11	−94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	−136.20	11	−107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	−127.20	11	−96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	−106.20	11	−109.18	−27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	−99.20	11	−58.66	−23.32	1.45	1.04	76	1	87.4	
PRUAND02	−115.20	11	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	−101.20	11	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	−110.20	11	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
URG00001	−71.70	11	−56.22	−32.52	1.02	0.89	11	1	87.4	
USAEH001	−61.70	11	−87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	−101.20	11	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	−110.20	11	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	−119.20	11	−96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	−166.20	11	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	−175.20	11	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	−148.20	11	−111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	−157.20	11	−113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	−115.20	11	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5

17 484.38 MHz (12)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	12	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	12	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	12	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	12	–62.85	–29.80	3.24	2.89	47	2	87.4	
B CE311	–63.80	12	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	12	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	12	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	12	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	12	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	12	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	12	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	12	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	12	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	12	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	12	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	12	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	12	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	–137.80	12	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01201	–137.80	12	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01202	–72.30	12	–81.23	50.12	7.99	2.53	5	2	87.4	
CAN01203	–128.80	12	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01303	–128.80	12	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01304	–90.80	12	–86.57	50.48	8.58	2.54	178	2	87.4	9/GR13
CAN01403	–128.80	12	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01404	–90.80	12	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01405	–81.80	12	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01504	–90.80	12	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01505	–81.80	12	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01605	–81.80	12	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01606	–70.30	12	–80.64	50.02	7.88	2.52	6	2	87.4	
CHLCONT4	–105.80	12	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	12	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	12	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	12	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	12	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	12	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	12	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CYM00001	–115.80	12	–80.58	19.57	0.60	0.60	90	2	87.4	
DOMIFRB2	–83.30	12	–70.51	18.79	0.98	0.69	167	2	87.4	
EQAC0001	–94.80	12	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	12	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
GUFMGG02	–52.80	12	–56.42	8.47	4.16	0.81	123	2	87.4	2 7
HWA00002	–165.80	12	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
HWA00003	–174.80	12	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
JMC00005	–33.80	12	–77.27	18.12	0.60	0.60	90	2	87.4	
LCAIFRB1	–79.30	12	–61.15	13.90	0.60	0.60	90	2	87.4	
MEX01NTE	–77.80	12	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	12	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	12	–96.39	19.88	3.19	1.87	158	2	87.4	1
PRU00004	–85.80	12	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	12	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	12	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
SLVIFRB2	–107.30	12	–88.91	13.59	0.60	0.60	90	1	87.4	
USAEH001	–61.30	12	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	12	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	12	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	12	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	12	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	12	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	12	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	12	–113.01	40.71	3.74	1.79	149	2	87.4	
VEN11VEN	–103.80	12	–66.79	6.90	2.50	1.77	122	2	87.4	

17 498.96 MHz (13)

1	2	3	4		5		6	7	8	9
ALS00002	−166.20	13	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	−175.20	13	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	−94.20	13	−52.98	−59.81	3.40	0.68	19	1	87.4	9/GR3
ARGSUR04	−94.20	13	−65.04	−43.33	3.32	1.50	40	1	87.4	9/GR3
B CE311	−64.20	13	−40.60	−6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	−45.20	13	−40.27	−6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	−64.20	13	−50.97	−15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	−45.20	13	−50.71	−15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	−64.20	13	−53.10	−2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	−74.20	13	−59.60	−11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	−74.20	13	−60.70	−1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	−74.20	13	−68.76	−4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	−81.20	13	−51.12	−25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	−45.20	13	−50.75	−25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	−81.20	13	−44.51	−16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	−45.20	13	−44.00	−16.87	3.20	1.96	58	1	87.4	8 9/GR9
BAHIFRB1	−87.20	13	−76.06	24.16	1.81	0.70	142	1	87.4	
BERBERMU	−96.20	13	−64.77	32.32	0.60	0.60	90	2	87.4	
BERBER02	−31.00	13	−64.77	32.32	0.60	0.60	90	1	87.4	2 3
BOLAND01	−115.20	13	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
CAN01101	−138.20	13	−114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01201	−138.20	13	−114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01202	−72.70	13	−81.34	50.02	7.96	2.55	5	1	87.4	
CAN01203	−129.20	13	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01303	−129.20	13	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01304	−91.20	13	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01403	−129.20	13	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01404	−91.20	13	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01405	−82.20	13	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01504	−91.20	13	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01505	−82.20	13	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01605	−82.20	13	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01606	−70.70	13	−80.77	50.03	7.88	2.53	6	1	87.4	
CHLCONT5	−106.20	13	−72.23	−35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	−106.20	13	−80.06	−30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	−115.20	13	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	−103.20	13	−74.50	5.87	3.98	1.96	118	1	87.4	
EQACAND1	−115.20	13	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	−115.20	13	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
FLKANT01	−57.20	13	−44.54	−60.13	3.54	0.68	12	1	87.4	2
FLKFALKS	−31.00	13	−59.90	−51.64	0.60	0.60	90	1	87.4	2 3
GRD00002	−42.20	13	−61.58	12.29	0.60	0.60	90	1	87.4	
HWA00002	−166.20	13	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
HWA00003	−175.20	13	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
MEX01NTE	−78.20	13	−105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	−69.20	13	−94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	−136.20	13	−107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	−127.20	13	−96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	−106.20	13	−109.18	−27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	−99.20	13	−58.66	−23.32	1.45	1.04	76	1	87.4	
PRUAND02	−115.20	13	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	−101.20	13	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	−110.20	13	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
SPMFRAN3	−53.20	13	−67.24	47.51	3.16	0.79	7	1	87.4	2 7
TRD00001	−84.70	13	−61.23	10.70	0.60	0.60	90	1	87.4	
URG00001	−71.70	13	−56.22	−32.52	1.02	0.89	11	1	87.4	
USAEH001	−61.70	13	−87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	−101.20	13	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	−110.20	13	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	−119.20	13	−96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	−166.20	13	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	−175.20	13	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	−148.20	13	−111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	−157.20	13	−113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	−115.20	13	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
VRG00001	−79.70	13	−64.37	18.48	0.60	0.60	90	1	87.4	4

17 513.54 MHz (14)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	14	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	14	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	14	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	14	–62.85	–29.80	3.24	2.89	47	2	87.4	
ATNBEAM1	–52.80	14	–66.44	14.87	1.83	0.68	39	2	87.4	
B CE311	–63.80	14	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	14	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	14	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	14	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	14	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	14	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	14	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	14	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	14	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	14	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	14	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	14	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	14	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	–137.80	14	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01201	–137.80	14	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01202	–72.30	14	–81.23	50.12	7.99	2.53	5	2	87.4	
CAN01203	–128.80	14	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01303	–128.80	14	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01304	–90.80	14	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01403	–128.80	14	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01404	–90.80	14	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01405	–81.80	14	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01504	–90.80	14	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01505	–81.80	14	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01605	–81.80	14	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01606	–70.30	14	–80.64	50.02	7.88	2.52	6	2	87.4	
CHLCONT4	–105.80	14	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	14	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	14	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	14	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	14	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	14	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	14	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CTR00201	–130.80	14	–84.33	9.67	0.82	0.68	119	2	87.4	
EQAC0001	–94.80	14	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	14	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
GUY00302	–33.80	14	–59.07	4.77	1.43	0.85	91	2	87.4	
HNDIFRB2	–107.30	14	–86.23	15.16	1.14	0.85	8	1	87.4	
HTI00002	–83.30	14	–73.28	18.96	0.82	0.68	11	2	87.4	
HWA00002	–165.80	14	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
HWA00003	–174.80	14	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
MEX01NTE	–77.80	14	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	14	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	14	–96.39	19.88	3.19	1.87	158	2	87.4	1
PRU00004	–85.80	14	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	14	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	14	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
TCA00001	–115.80	14	–71.79	21.53	0.60	0.60	90	2	87.4	
USAEH001	–61.30	14	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	14	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	14	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	14	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	14	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	14	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	14	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	14	–113.01	40.71	3.74	1.79	149	2	87.4	
VCT00001	–79.30	14	–61.18	13.23	0.60	0.60	90	2	87.4	
VEN11VEN	–103.80	14	–66.79	6.90	2.50	1.77	122	2	87.4	

17 528.12 MHz (15)

1	2	3	4		5		6	7	8	9
ALS00002	−166.20	15	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	−175.20	15	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	−94.20	15	−52.98	−59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	−55.20	15	−44.17	−59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	−94.20	15	−65.04	−43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	−55.20	15	−63.68	−43.01	2.54	2.38	152	1	87.4	9/GR4
ATGSJN01	−79.70	15	−61.79	17.07	0.60	0.60	90	1	87.4	
B CE311	−64.20	15	−40.60	−6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	−45.20	15	−40.27	−6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	−64.20	15	−50.97	−15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	−45.20	15	−50.71	−15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	−64.20	15	−53.10	−2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	−74.20	15	−59.60	−11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	−74.20	15	−60.70	−1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	−74.20	15	−68.76	−4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	−81.20	15	−51.12	−25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	−45.20	15	−50.75	−25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	−81.20	15	−44.51	−16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	−45.20	15	−44.00	−16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	−96.20	15	−64.77	32.32	0.60	0.60	90	2	87.4	
BOLAND01	−115.20	15	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
BOL00001	−87.20	15	−64.61	−16.71	2.52	2.19	85	1	87.4	
BRB00001	−92.70	15	−59.85	12.93	0.60	0.60	90	2	87.4	
CAN01101	−138.20	15	−114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01201	−138.20	15	−114.60	51.08	7.28	1.10	160	1	87.4	9/GR10
CAN01202	−72.70	15	−81.34	50.02	7.96	2.55	5	1	87.4	
CAN01203	−129.20	15	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01303	−129.20	15	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01304	−91.20	15	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01403	−129.20	15	−113.02	51.08	7.47	1.26	162	1	87.4	9/GR12
CAN01404	−91.20	15	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01405	−82.20	15	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01504	−91.20	15	−86.71	50.48	8.58	2.54	178	1	87.4	9/GR13
CAN01505	−82.20	15	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01605	−82.20	15	−84.11	50.20	8.31	2.58	1	1	87.4	9/GR14
CAN01606	−70.70	15	−80.77	50.03	7.88	2.53	6	1	87.4	
CHLCONT5	−106.20	15	−72.23	−35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	−106.20	15	−80.06	−30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	−115.20	15	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	−103.20	15	−74.50	5.87	3.98	1.96	118	1	87.4	
CUB00001	−89.20	15	−79.81	21.62	2.24	0.68	168	1	87.4	
EQACAND1	−115.20	15	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	−115.20	15	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
GRD00002	−42.20	15	−61.58	12.29	0.60	0.60	90	1	87.4	
GRD00059	−57.20	15	−61.58	12.29	0.60	0.60	90	1	87.4	
GRLDNK01	−53.20	15	−44.89	66.56	2.70	0.82	173	1	87.4	2
GUY00201	−84.70	15	−59.19	4.78	1.44	0.85	95	1	87.4	
HWA00002	−166.20	15	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
HWA00003	−175.20	15	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
MEX01NTE	−78.20	15	−105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	−69.20	15	−94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	−136.20	15	−107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	−127.20	15	−96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	−106.20	15	−109.18	−27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	−99.20	15	−58.66	−23.32	1.45	1.04	76	1	87.4	
PRUAND02	−115.20	15	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	−101.20	15	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	−110.20	15	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
URG00001	−71.70	15	−56.22	−32.52	1.02	0.89	11	1	87.4	
USAEH001	−61.70	15	−87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	−101.20	15	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	−110.20	15	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	−119.20	15	−96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	−166.20	15	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	−175.20	15	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	−148.20	15	−111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	−157.20	15	−113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	−115.20	15	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5

17 542.70 MHz (16)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	16	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	16	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	16	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	16	–62.85	–29.80	3.24	2.89	47	2	87.4	
B CE311	–63.80	16	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	16	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	16	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	16	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	16	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	16	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	16	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	16	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	16	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	16	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	16	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	16	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	16	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	–137.80	16	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01201	–137.80	16	–114.10	50.92	7.22	1.11	160	2	87.4	9/GR10
CAN01202	–72.30	16	–81.23	50.12	7.99	2.53	5	2	87.4	
CAN01203	–128.80	16	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01303	–128.80	16	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01304	–90.80	16	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01403	–128.80	16	–113.04	51.04	7.53	1.26	162	2	87.4	9/GR12
CAN01404	–90.80	16	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01405	–81.80	16	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01504	–90.80	16	–86.57	50.48	8.59	2.54	178	2	87.4	9/GR13
CAN01505	–81.80	16	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01605	–81.80	16	–83.80	50.22	8.35	2.57	2	2	87.4	9/GR14
CAN01606	–70.30	16	–80.64	50.02	7.88	2.52	6	2	87.4	
CHLCONT4	–105.80	16	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	16	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	16	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	16	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	16	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	16	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	16	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CYM00001	–115.80	16	–80.58	19.57	0.60	0.60	90	2	87.4	
DOMIFRB2	–83.30	16	–70.51	18.79	0.98	0.69	167	2	87.4	
EQAC0001	–94.80	16	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	16	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
GUFMGG02	–52.80	16	–56.42	8.47	4.16	0.81	123	2	87.4	2 7
HWA00002	–165.80	16	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
HWA00003	–174.80	16	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
JMC00005	–33.80	16	–77.27	18.12	0.60	0.60	90	2	87.4	
LCAIFRB1	–79.30	16	–61.15	13.90	0.60	0.60	90	2	87.4	
MEX01NTE	–77.80	16	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	16	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	16	–96.39	19.88	3.19	1.87	158	2	87.4	1
PRU00004	–85.80	16	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	16	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	16	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
SLVIFRB2	–107.30	16	–88.91	13.59	0.60	0.60	90	1	87.4	
USAEH001	–61.30	16	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	16	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	16	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	16	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	16	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	16	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	16	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	16	–113.01	40.71	3.74	1.79	149	2	87.4	
VEN11VEN	–103.80	16	–66.79	6.90	2.50	1.77	122	2	87.4	

17 557.28 MHz (17)

1	2	3	4		5		6	7	8	9
ALS00002	−166.20	17	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	−175.20	17	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	−94.20	17	−52.98	−59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	−55.20	17	−44.17	−59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	−94.20	17	−65.04	−43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	−55.20	17	−63.68	−43.01	2.54	2.38	152	1	87.4	9/GR4
B CE311	−64.20	17	−40.60	−6.07	3.04	2.06	174	1	87.4	9/GR3
B CE312	−45.20	17	−40.27	−6.06	3.44	2.09	174	1	87.4	9/GR4
B CE411	−64.20	17	−50.97	−15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	−45.20	17	−50.71	−15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	−64.20	17	−53.10	−2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	−74.20	17	−59.60	−11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	−74.20	17	−60.70	−1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	−74.20	17	−68.76	−4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	−81.20	17	−51.12	−25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	−45.20	17	−50.75	−25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	−81.20	17	−44.51	−16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	−45.20	17	−44.00	−16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	−96.20	17	−64.77	32.32	0.60	0.60	90	2	87.4	
BERBER02	−31.00	17	−64.77	32.32	0.60	0.60	90	1	87.4	2 3
BOLAND01	−115.20	17	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
CAN01101	−138.20	17	−125.63	57.24	3.45	1.27	157	1	87.4	9/GR10
CAN01201	−138.20	17	−112.04	55.95	3.35	0.97	151	1	87.4	9/GR10
CAN01202	−72.70	17	−107.70	55.63	2.74	1.12	32	1	87.4	
CAN01203	−129.20	17	−111.48	55.61	3.08	1.15	151	1	87.4	9/GR12
CAN01303	−129.20	17	−102.42	57.12	3.54	0.91	154	1	87.4	9/GR12
CAN01304	−91.20	17	−99.12	57.36	1.98	1.72	2	1	87.4	9/GR13
CAN01403	−129.20	17	−89.75	52.02	4.68	0.78	148	1	87.4	9/GR12
CAN01404	−91.20	17	−84.82	52.42	3.10	2.05	152	1	87.4	9/GR13
CAN01405	−82.20	17	−84.00	52.39	2.84	2.29	172	1	87.4	9/GR14
CAN01504	−91.20	17	−72.66	53.77	3.57	1.67	156	1	87.4	9/GR13
CAN01505	−82.20	17	−71.77	53.79	3.30	1.89	162	1	87.4	9/GR14
CAN01605	−82.20	17	−61.50	49.55	2.65	1.40	143	1	87.4	9/GR14
CAN01606	−70.70	17	−61.30	49.55	2.40	1.65	148	1	87.4	
CHLCONT5	−106.20	17	−72.23	−35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	−106.20	17	−80.06	−30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	−115.20	17	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	−103.20	17	−74.50	5.87	3.98	1.96	118	1	87.4	
EQACAND1	−115.20	17	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	−115.20	17	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
FLKFALKS	−31.00	17	−59.90	−51.64	0.60	0.60	90	1	87.4	2 3
HWA00002	−166.20	17	−165.79	23.42	4.20	0.68	160	1	87.4	9/GR1
HWA00003	−175.20	17	−166.10	23.42	4.25	0.68	159	1	87.4	9/GR2
JMC00002	−92.70	17	−77.30	18.12	0.62	0.62	90	2	87.4	
MEX01NTE	−78.20	17	−105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	−69.20	17	−94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	−136.20	17	−107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	−127.20	17	−96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	−106.20	17	−109.18	−27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	−99.20	17	−58.66	−23.32	1.45	1.04	76	1	87.4	
PRUAND02	−115.20	17	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	−101.20	17	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	−110.20	17	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
SCN00001	−79.70	17	−62.46	17.44	0.60	0.60	90	1	87.4	
SPMFRAN3	−53.20	17	−67.24	47.51	3.16	0.79	7	1	87.4	2 7
SURINAM2	−84.70	17	−55.69	4.35	1.00	0.69	86	1	87.4	
URG00001	−71.70	17	−56.22	−32.52	1.02	0.89	11	1	87.4	
USAEH001	−61.70	17	−87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	−101.20	17	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	−110.20	17	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	−119.20	17	−96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	−166.20	17	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	−175.20	17	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	−148.20	17	−111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	−157.20	17	−113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	−115.20	17	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5

17 571.86 MHz (18)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	18	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	18	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	18	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	18	–62.85	–29.80	3.24	2.89	47	2	87.4	
ATNBEAM1	–52.80	18	–66.44	14.87	1.83	0.68	39	2	87.4	
B CE311	–63.80	18	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	18	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	18	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	18	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	18	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	18	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	18	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	18	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	18	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	18	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	18	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	18	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	18	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
BLZ00001	–115.80	18	–88.68	17.27	0.62	0.62	90	2	87.4	
CAN01101	–137.80	18	–125.60	57.24	3.45	1.27	157	2	87.4	9/GR10
CAN01201	–137.80	18	–111.92	55.89	3.33	0.98	151	2	87.4	9/GR10
CAN01202	–72.30	18	–107.64	55.62	2.75	1.11	32	2	87.4	
CAN01203	–128.80	18	–111.43	55.56	3.07	1.15	151	2	87.4	9/GR12
CAN01303	–128.80	18	–102.39	57.12	3.54	0.92	154	2	87.4	9/GR12
CAN01304	–90.80	18	–99.00	57.33	1.96	1.73	1	2	87.4	9/GR13
CAN01403	–128.80	18	–89.70	52.02	4.67	0.79	148	2	87.4	9/GR12
CAN01404	–90.80	18	–84.78	52.41	3.09	2.06	153	2	87.4	9/GR13
CAN01405	–81.80	18	–84.02	52.34	2.82	2.30	172	2	87.4	9/GR14
CAN01504	–90.80	18	–72.68	53.78	3.57	1.67	157	2	87.4	9/GR13
CAN01505	–81.80	18	–71.76	53.76	3.30	1.89	162	2	87.4	9/GR14
CAN01605	–81.80	18	–61.54	49.50	2.66	1.39	144	2	87.4	9/GR14
CAN01606	–70.30	18	–61.32	49.51	2.41	1.65	148	2	87.4	
CHLCONT4	–105.80	18	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	18	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	18	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	18	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	18	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	18	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	18	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CTR00201	–130.80	18	–84.33	9.67	0.82	0.68	119	2	87.4	
DMAIFRB1	–79.30	18	–61.30	15.35	0.60	0.60	90	2	87.4	
EQAC0001	–94.80	18	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	18	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
HWA00002	–165.80	18	–165.79	23.32	4.20	0.68	160	2	87.4	9/GR1
HWA00003	–174.80	18	–166.10	23.42	4.25	0.68	159	2	87.4	9/GR2
MEX01NTE	–77.80	18	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	18	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	18	–96.39	19.88	3.19	1.87	158	2	87.4	1
NCG00003	–107.30	18	–84.99	12.90	1.05	1.01	176	1	87.4	
PRU00004	–85.80	18	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	18	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	18	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH001	–61.30	18	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	18	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	18	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	18	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	18	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	18	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	18	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	18	–113.01	40.71	3.74	1.79	149	2	87.4	
VEN11VEN	–103.80	18	–66.79	6.90	2.50	1.77	122	2	87.4	

17 586.44 MHz (19)

1	2	3	4		5		6	7	8	9
ALS00002	−166.20	19	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	−175.20	19	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	−94.20	19	−52.98	−59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	−55.20	19	−44.17	−59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	−94.20	19	−65.04	−43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	−55.20	19	−63.68	−43.01	2.54	2.38	152	1	87.4	9/GR4
B CE311	−64.20	19	−40.60	−6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	−45.20	19	−40.27	−6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	−64.20	19	−50.97	−15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	−45.20	19	−50.71	−15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	−64.20	19	−53.10	−2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	−74.20	19	−59.60	−11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	−74.20	19	−60.70	−1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	−74.20	19	−68.76	−4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	−81.20	19	−51.12	−25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	−45.20	19	−50.75	−25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	−81.20	19	−44.51	−16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	−45.20	19	−44.00	−16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	−96.20	19	−64.77	32.32	0.60	0.60	90	2	87.4	
BOLAND01	−115.20	19	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
BOL00001	−87.20	19	−64.61	−16.71	2.52	2.19	85	1	87.4	
BRB00001	−92.70	19	−59.85	12.93	0.60	0.60	90	2	87.4	
CAN01101	−138.20	19	−125.63	57.24	3.45	1.27	157	1	87.4	9/GR10
CAN01201	−138.20	19	−112.04	55.95	3.35	0.97	151	1	87.4	9/GR10
CAN01202	−72.70	19	−107.70	55.63	2.74	1.12	32	1	87.4	
CAN01203	−129.20	19	−111.48	55.61	3.08	1.15	151	1	87.4	9/GR12
CAN01303	−129.20	19	−102.42	57.12	3.54	0.91	154	1	87.4	9/GR12
CAN01304	−91.20	19	−99.12	57.36	1.98	1.72	2	1	87.4	9/GR13
CAN01403	−129.20	19	−89.75	52.02	4.68	0.78	148	1	87.4	9/GR12
CAN01404	−91.20	19	−84.82	52.42	3.10	2.05	152	1	87.4	9/GR13
CAN01405	−82.20	19	−84.00	52.39	2.84	2.29	172	1	87.4	9/GR14
CAN01504	−91.20	19	−72.66	53.77	3.57	1.67	156	1	87.4	9/GR13
CAN01505	−82.20	19	−71.77	53.79	3.30	1.89	162	1	87.4	9/GR14
CAN01605	−82.20	19	−61.50	49.55	2.65	1.40	143	1	87.4	9/GR14
CAN01606	−70.70	19	−61.30	49.55	2.40	1.65	148	1	87.4	
CHLCONT5	−106.20	19	−72.23	−35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	−106.20	19	−80.06	−30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	−115.20	19	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	−103.20	19	−74.50	5.87	3.98	1.96	118	1	87.4	
CUB00001	−89.20	19	−79.81	21.62	2.24	0.68	168	1	87.4	
EQACAND1	−115.20	19	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	−115.20	19	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
GRD00059	−57.20	19	−61.58	12.29	0.60	0.60	90	1	87.4	
GRLDNK01	−53.20	19	−44.89	66.56	2.70	0.82	173	1	87.4	2
GUY00201	−84.70	19	−59.19	4.78	1.44	0.85	95	1	87.4	
HWA00002	−166.20	19	−165.79	23.42	4.20	0.68	160	1	87.4	9/GR1
HWA00003	−175.20	19	−166.10	23.42	4.25	0.68	159	1	87.4	9/GR2
MEX01NTE	−78.20	19	−105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	−69.20	19	−94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	−136.20	19	−107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	−127.20	19	−96.39	19.88	3.18	1.87	157	1	87.4	1
MSR00001	−79.70	19	−61.73	16.75	0.60	0.60	90	1	87.4	4
PAQPAC01	−106.20	19	−109.18	−27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	−99.20	19	−58.66	−23.32	1.45	1.04	76	1	87.4	
PRUAND02	−115.20	19	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	−101.20	19	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	−110.20	19	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
URG00001	−71.70	19	−56.22	−32.52	1.02	0.89	11	1	87.4	
USAEH001	−61.70	19	−87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	−101.20	19	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	−110.20	19	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	−119.20	19	−96.45	36.31	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	−166.20	19	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	−175.20	19	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	−148.20	19	−111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	−157.20	19	−113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	−115.20	19	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5

17 601.02 MHz (20)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	20	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	20	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	20	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	20	–62.85	–29.80	3.24	2.89	47	2	87.4	
B CE311	–63.80	20	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	20	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	20	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	20	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	20	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	20	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	20	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	20	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	20	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	20	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	20	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	20	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	20	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	–137.80	20	–125.60	57.24	3.45	1.27	157	2	87.4	9/GR10
CAN01201	–137.80	20	–111.92	55.89	3.33	0.98	151	2	87.4	9/GR10
CAN01202	–72.30	20	–107.64	55.62	2.75	1.11	32	2	87.4	
CAN01203	–128.80	20	–111.43	55.56	3.07	1.15	151	2	87.4	9/GR12
CAN01303	–128.80	20	–102.39	57.12	3.54	0.92	154	2	87.4	9/GR12
CAN01304	–90.80	20	–99.00	57.33	1.96	1.73	1	2	87.4	9/GR13
CAN01403	–128.80	20	–89.70	52.02	4.67	0.79	148	2	87.4	9/GR12
CAN01404	–90.80	20	–84.78	52.41	3.09	2.06	153	2	87.4	9/GR13
CAN01405	–81.80	20	–84.02	52.34	2.82	2.30	172	2	87.4	9/GR14
CAN01504	–90.80	20	–72.68	53.78	3.57	1.67	157	2	87.4	9/GR13
CAN01505	–81.80	20	–71.76	53.76	3.30	1.89	162	2	87.4	9/GR14
CAN01605	–81.80	20	–61.54	49.50	2.66	1.39	144	2	87.4	9/GR14
CAN01606	–70.30	20	–61.32	49.51	2.41	1.65	148	2	87.4	
CHLCONT4	–105.80	20	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	20	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	20	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	20	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	20	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	20	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	20	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
EQAC0001	–94.80	20	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	20	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
GRD00003	–79.30	20	–61.62	12.34	0.60	0.60	90	2	87.4	
GTMIFRB2	–107.30	20	–90.50	15.64	1.03	0.74	84	1	87.4	
GUFMGG02	–52.80	20	–56.42	8.47	4.16	0.81	123	2	87.4	2 7
HWA00002	–165.80	20	–165.79	23.32	4.20	0.68	160	2	87.4	9/GR1
HWA00003	–174.80	20	–166.10	23.42	4.25	0.68	159	2	87.4	9/GR2
MEX01NTE	–77.80	20	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	20	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	20	–96.39	19.88	3.19	1.87	158	2	87.4	1
PNRIFRB2	–121.00	20	–80.15	8.46	1.01	0.73	170	1	87.4	
PRU00004	–85.80	20	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	20	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	20	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH001	–61.30	20	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	20	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	20	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	20	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	20	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	20	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	20	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	20	–113.01	40.71	3.74	1.79	149	2	87.4	
VEN02VEN	–103.80	20	–66.79	6.90	2.50	1.77	122	2	87.4	9/GR22
VEN11VEN	–103.80	20	–66.79	6.90	2.50	1.77	122	2	87.4	9/GR22

17 615.60 MHz (21)

1	2	3	4		5		6	7	8	9
ALS00002	–166.20	21	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	–175.20	21	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	–94.20	21	–52.98	–59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	–55.20	21	–44.17	–59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	–94.20	21	–65.04	–43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	–55.20	21	–63.68	–43.01	2.54	2.38	152	1	87.4	9/GR4
B CE311	–64.20	21	–40.60	–6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	–45.20	21	–40.27	–6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	–64.20	21	–50.97	–15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	–45.20	21	–50.71	–15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	–64.20	21	–53.10	–2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	–74.20	21	–59.60	–11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	–74.20	21	–60.70	–1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	–74.20	21	–68.76	–4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	–81.20	21	–51.12	–25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	–45.20	21	–50.75	–25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	–81.20	21	–44.51	–16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	–45.20	21	–44.00	–16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	–96.20	21	–64.77	32.32	0.60	0.60	90	2	87.4	
BOLAND01	–115.20	21	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CAN01101	–138.20	21	–125.63	57.24	3.45	1.27	157	1	87.4	9/GR10
CAN01201	–138.20	21	–112.04	55.95	3.35	0.97	151	1	87.4	9/GR10
CAN01202	–72.70	21	–107.70	55.63	2.74	1.12	32	1	87.4	
CAN01203	–129.20	21	–111.48	55.61	3.08	1.15	151	1	87.4	9/GR12
CAN01303	–129.20	21	–102.42	57.12	3.54	0.91	154	1	87.4	9/GR12
CAN01304	–91.20	21	–99.12	57.36	1.98	1.72	2	1	87.4	9/GR13
CAN01403	–129.20	21	–89.75	52.02	4.68	0.78	148	1	87.4	9/GR12
CAN01404	–91.20	21	–84.82	52.42	3.10	2.05	152	1	87.4	9/GR13
CAN01405	–82.20	21	–84.00	52.39	2.84	2.29	172	1	87.4	9/GR14
CAN01504	–91.20	21	–72.66	53.77	3.57	1.67	156	1	87.4	9/GR13
CAN01505	–82.20	21	–71.77	53.79	3.30	1.89	162	1	87.4	9/GR14
CAN01605	–82.20	21	–61.50	49.55	2.65	1.40	143	1	87.4	9/GR14
CAN01606	–70.70	21	–61.30	49.55	2.40	1.65	148	1	87.4	
CHLCONT5	–106.20	21	–72.23	–35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	–106.20	21	–80.06	–30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	–115.20	21	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	–103.20	21	–74.50	5.87	3.98	1.96	118	1	87.4	
EQACAND1	–115.20	21	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	–115.20	21	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
HWA00002	–166.20	21	–165.79	23.42	4.20	0.68	160	1	87.4	9/GR1
HWA00003	–175.20	21	–166.10	23.42	4.25	0.68	159	1	87.4	9/GR2
JMC00002	–92.70	21	–77.30	18.12	0.62	0.62	90	2	87.4	
MEX01NTE	–78.20	21	–105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	–69.20	21	–94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	–136.20	21	–107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	–127.20	21	–96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	–106.20	21	–109.18	–27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	–99.20	21	–58.66	–23.32	1.45	1.04	76	1	87.4	
PRUAND02	–115.20	21	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	–101.20	21	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	–110.20	21	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
SCN00001	–79.70	21	–62.46	17.44	0.60	0.60	90	1	87.4	
SPMFRAN3	–53.20	21	–67.24	47.51	3.16	0.79	7	1	87.4	2 7
SURINAM2	–84.70	21	–55.69	4.35	1.00	0.69	86	1	87.4	
URG00001	–71.70	21	–56.22	–32.52	1.02	0.89	11	1	87.4	
USAEH001	–61.70	21	–87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	–101.20	21	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	–110.20	21	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	–119.20	21	–96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	–166.20	21	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	–175.20	21	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	–148.20	21	–111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	–157.20	21	–113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	–115.20	21	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5

17 630.18 MHz (22)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	22	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	22	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	22	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	22	–62.85	–29.80	3.24	2.89	47	2	87.4	
ATNBEAM1	–52.80	22	–66.44	14.87	1.83	0.68	39	2	87.4	
B CE311	–63.80	22	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	22	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	22	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	22	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	22	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	22	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	22	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	22	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	22	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	22	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	22	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	22	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	22	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
BLZ00001	–115.80	22	–88.68	17.27	0.62	0.62	90	2	87.4	
CAN01101	–137.80	22	–125.60	57.24	3.45	1.27	157	2	87.4	9/GR10
CAN01201	–137.80	22	–111.92	55.89	3.33	0.98	151	2	87.4	9/GR10
CAN01202	–72.30	22	–107.64	55.62	2.75	1.11	32	2	87.4	
CAN01203	–128.80	22	–111.43	55.56	3.07	1.15	151	2	87.4	9/GR12
CAN01303	–128.80	22	–102.39	57.12	3.54	0.92	154	2	87.4	9/GR12
CAN01304	–90.80	22	–99.00	57.33	1.96	1.73	1	2	87.4	9/GR13
CAN01403	–128.80	22	–89.70	52.02	4.67	0.79	148	2	87.4	9/GR12
CAN01404	–90.80	22	–84.78	52.41	3.09	2.06	153	2	87.4	9/GR13
CAN01405	–81.80	22	–84.02	52.34	2.82	2.30	172	2	87.4	9/GR14
CAN01504	–90.80	22	–72.68	53.78	3.57	1.67	157	2	87.4	9/GR13
CAN01505	–81.80	22	–71.76	53.76	3.30	1.89	162	2	87.4	9/GR14
CAN01605	–81.80	22	–61.54	49.50	2.66	1.39	144	2	87.4	9/GR14
CAN01606	–70.30	22	–61.32	49.51	2.41	1.65	148	2	87.4	
CHLCONT4	–105.80	22	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	22	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	22	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	22	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	22	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	22	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	22	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CTR00201	–130.80	22	–84.33	9.67	0.82	0.68	119	2	87.4	
DMAIFRB1	–79.30	22	–61.30	15.35	0.60	0.60	90	2	87.4	
EQAC0001	–94.80	22	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	22	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
HWA00002	–165.80	22	–165.79	23.32	4.20	0.68	160	2	87.4	9/GR1
HWA00003	–174.80	22	–166.10	23.42	4.25	0.68	159	2	87.4	9/GR2
MEX01NTE	–77.80	22	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	22	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	22	–96.39	19.88	3.19	1.87	158	2	87.4	1
NCG00003	–107.30	22	–84.99	12.90	1.05	1.01	176	1	87.4	
PRU00004	–85.80	22	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	22	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	22	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH001	–61.30	22	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	22	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	22	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	22	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	22	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	22	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	22	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	22	–113.01	40.71	3.74	1.79	149	2	87.4	
VEN11VEN	–103.80	22	–66.79	6.90	2.50	1.77	122	2	87.4	

17 644.76 MHz (23)

1	2	3	4		5		6	7	8	9
ALS00002	−166.20	23	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	−175.20	23	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	−94.20	23	−52.98	−59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	−55.20	23	−44.17	−59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	−94.20	23	−65.04	−43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	−55.20	23	−63.68	−43.01	2.54	2.38	152	1	87.4	9/GR4
B CE311	−64.20	23	−40.60	−6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	−45.20	23	−40.27	−6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	−64.20	23	−50.97	−15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	−45.20	23	−50.71	−15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	−64.20	23	−53.10	−2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	−74.20	23	−59.60	−11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	−74.20	23	−60.70	−1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	−74.20	23	−68.76	−4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	−81.20	23	−51.12	−25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	−45.20	23	−50.75	−25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	−81.20	23	−44.51	−16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	−45.20	23	−44.00	−16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	−96.20	23	−64.77	32.32	0.60	0.60	90	2	87.4	
BOLAND01	−115.20	23	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
BOL00001	−87.20	23	−64.61	−16.71	2.52	2.19	85	1	87.4	
BRB00001	−92.70	23	−59.85	12.93	0.60	0.60	90	2	87.4	
CAN01101	−138.20	23	−125.63	57.24	3.45	1.27	157	1	87.4	9/GR10
CAN01201	−138.20	23	−112.04	55.95	3.35	0.97	151	1	87.4	9/GR10
CAN01202	−72.70	23	−107.70	55.63	2.74	1.12	32	1	87.4	
CAN01203	−129.20	23	−111.48	55.61	3.08	1.15	151	1	87.4	9/GR12
CAN01303	−129.20	23	−102.42	57.12	3.54	0.91	154	1	87.4	9/GR12
CAN01304	−91.20	23	−99.12	57.36	1.98	1.72	2	1	87.4	9/GR13
CAN01403	−129.20	23	−89.75	52.02	4.68	0.78	148	1	87.4	9/GR12
CAN01404	−91.20	23	−84.82	52.42	3.10	2.05	152	1	87.4	9/GR13
CAN01405	−82.20	23	−84.00	52.39	2.84	2.29	172	1	87.4	9/GR14
CAN01504	−91.20	23	−72.66	53.77	3.57	1.67	156	1	87.4	9/GR13
CAN01505	−82.20	23	−71.77	53.79	3.30	1.89	162	1	87.4	9/GR14
CAN01605	−82.20	23	−61.50	49.55	2.65	1.40	143	1	87.4	9/GR14
CAN01606	−70.70	23	−61.30	49.55	2.40	1.65	148	1	87.4	
CHLCONT5	−106.20	23	−72.23	−35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	−106.20	23	−80.06	−30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	−115.20	23	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	−103.20	23	−74.50	5.87	3.98	1.96	118	1	87.4	
CUB00001	−89.20	23	−79.81	21.62	2.24	0.68	168	1	87.4	
EQACAND1	−115.20	23	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	−115.20	23	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
GRD00059	−57.20	23	−61.58	12.29	0.60	0.60	90	1	87.4	
GRLDNK01	−53.20	23	−44.89	66.56	2.70	0.82	173	1	87.4	2
GUY00201	−84.70	23	−59.19	4.78	1.44	0.85	95	1	87.4	
HWA00002	−166.20	23	−165.79	23.42	4.20	0.68	160	1	87.4	9/GR1
HWA00003	−175.20	23	−166.10	23.42	4.25	0.68	159	1	87.4	9/GR2
MEX01NTE	−78.20	23	−105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	−69.20	23	−94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	−136.20	23	−107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	−127.20	23	−96.39	19.88	3.18	1.87	157	1	87.4	1
MSR00001	−79.70	23	−61.73	16.75	0.60	0.60	90	1	87.4	4
PAQPAC01	−106.20	23	−109.18	−27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	−99.20	23	−58.66	−23.32	1.45	1.04	76	1	87.4	
PRUAND02	−115.20	23	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	−101.20	23	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	−110.20	23	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
URG00001	−71.70	23	−56.22	−32.52	1.02	0.89	11	1	87.4	
USAEH001	−61.70	23	−87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	−101.20	23	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	−110.20	23	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	−119.20	23	−96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	−166.20	23	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	−175.20	23	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	−148.20	23	−111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	−157.20	23	−113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	−115.20	23	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5

17 659.34 MHz (24)

1	2	3	4		5		6	7	8	9
ALS00002	−165.80	24	−109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	−174.80	24	−116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	−93.80	24	−63.96	−30.01	3.86	1.99	48	2	87.4	
ARGNORT5	−54.80	24	−62.85	−29.80	3.24	2.89	47	2	87.4	
B CE311	−63.80	24	−40.60	−6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	−44.80	24	−40.26	−6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	−63.80	24	−50.97	−15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	−44.80	24	−50.71	−15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	−63.80	24	−53.11	−2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	−73.80	24	−59.60	−11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	−73.80	24	−60.70	−1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	−73.80	24	−68.75	−4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	−101.80	24	−45.99	−19.09	2.22	0.79	62	2	87.4	8
B SU111	−80.80	24	−51.10	−25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	−44.80	24	−50.76	−25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	−80.80	24	−44.51	−16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	−44.80	24	−43.99	−16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	−137.80	24	−125.60	57.24	3.45	1.27	157	2	87.4	9/GR10
CAN01201	−137.80	24	−111.92	55.89	3.33	0.98	151	2	87.4	9/GR10
CAN01202	−72.30	24	−107.64	55.62	2.75	1.11	32	2	87.4	
CAN01203	−128.80	24	−111.43	55.56	3.07	1.15	151	2	87.4	9/GR12
CAN01303	−128.80	24	−102.39	57.12	3.54	0.92	154	2	87.4	9/GR12
CAN01304	−90.80	24	−99.00	57.33	1.96	1.73	1	2	87.4	9/GR13
CAN01403	−128.80	24	−89.70	52.02	4.67	0.79	148	2	87.4	9/GR12
CAN01404	−90.80	24	−84.78	52.41	3.09	2.06	153	2	87.4	9/GR13
CAN01405	−81.80	24	−84.02	52.34	2.82	2.30	172	2	87.4	9/GR14
CAN01504	−90.80	24	−72.68	53.78	3.57	1.67	157	2	87.4	9/GR13
CAN01505	−81.80	24	−71.76	53.76	3.30	1.89	162	2	87.4	9/GR14
CAN01605	−81.80	24	−61.54	49.50	2.66	1.39	144	2	87.4	9/GR14
CAN01606	−70.30	24	−61.32	49.51	2.41	1.65	148	2	87.4	
CHLCONT4	−105.80	24	−69.59	−23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	−105.80	24	−73.52	−55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	−92.30	24	−76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	−92.30	24	−64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	−92.30	24	−88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	−92.30	24	−60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	−92.30	24	−79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
EQAC0001	−94.80	24	−78.31	−1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	−94.80	24	−90.36	−0.57	0.94	0.89	99	1	87.4	9/GR19
GRD00003	−79.30	24	−61.62	12.34	0.60	0.60	90	2	87.4	
GTMIFRB2	−107.30	24	−90.50	15.64	1.03	0.74	84	1	87.4	
GUFMGG02	−52.80	24	−56.42	8.47	4.16	0.81	123	2	87.4	2 7
HWA00002	−165.80	24	−165.79	23.32	4.20	0.68	160	2	87.4	9/GR1
HWA00003	−174.80	24	−166.10	23.42	4.25	0.68	159	2	87.4	9/GR2
MEX01NTE	−77.80	24	−105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	−135.80	24	−107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	−126.80	24	−96.39	19.88	3.19	1.87	158	2	87.4	1
PNRIFRB2	−121.00	24	−80.15	8.46	1.01	0.73	170	1	87.4	
PRU00004	−85.80	24	−74.19	−8.39	3.74	2.45	112	2	87.4	
PTRVIR01	−100.80	24	−93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	−109.80	24	−95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH001	−61.30	24	−87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	−100.80	24	−93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	−109.80	24	−95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	−118.80	24	−96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	−165.80	24	−109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	−174.80	24	−116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	−147.80	24	−111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	−156.80	24	−113.01	40.71	3.74	1.79	149	2	87.4	
VEN02VEN	−103.80	24	−66.79	6.90	2.50	1.77	122	2	87.4	9/GR22
VEN11VEN	−103.80	24	−66.79	6.90	2.50	1.77	122	2	87.4	9/GR22

17 673.92 MHz (25)

1	2	3	4		5		6	7	8	9
ALS00002	–166.20	25	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	–175.20	25	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	–94.20	25	–52.98	–59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	–55.20	25	–44.17	–59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	–94.20	25	–65.04	–43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	–55.20	25	–63.68	–43.01	2.54	2.38	152	1	87.4	9/GR4
B CE311	–64.20	25	–40.60	–6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	–45.20	25	–40.27	–6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	–64.20	25	–50.97	–15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	–45.20	25	–50.71	–15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	–64.20	25	–53.10	–2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	–74.20	25	–59.60	–11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	–74.20	25	–60.70	–1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	–74.20	25	–68.76	–4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	–81.20	25	–51.12	–25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	–45.20	25	–50.75	–25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	–81.20	25	–44.51	–16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	–45.20	25	–44.00	–16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	–96.20	25	–64.77	32.32	0.60	0.60	90	2	87.4	
BOLAND01	–115.20	25	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CAN01101	–138.20	25	–125.63	57.24	3.45	1.27	157	1	87.4	9/GR10
CAN01201	–138.20	25	–112.04	55.95	3.35	0.97	151	1	87.4	9/GR10
CAN01202	–72.70	25	–107.70	55.63	2.74	1.12	32	1	87.4	
CAN01203	–129.20	25	–111.48	55.61	3.08	1.15	151	1	87.4	9/GR12
CAN01303	–129.20	25	–102.42	57.12	3.54	0.91	154	1	87.4	9/GR12
CAN01304	–91.20	25	–99.12	57.36	1.98	1.72	2	1	87.4	9/GR13
CAN01403	–129.20	25	–89.75	52.02	4.68	0.78	148	1	87.4	9/GR12
CAN01404	–91.20	25	–84.82	52.42	3.10	2.05	152	1	87.4	9/GR13
CAN01405	–82.20	25	–84.00	52.39	2.84	2.29	172	1	87.4	9/GR14
CAN01504	–91.20	25	–72.66	53.77	3.57	1.67	156	1	87.4	9/GR13
CAN01505	–82.20	25	–71.77	53.79	3.30	1.89	162	1	87.4	9/GR14
CAN01605	–82.20	25	–61.50	49.55	2.65	1.40	143	1	87.4	9/GR14
CAN01606	–70.70	25	–61.30	49.55	2.40	1.65	148	1	87.4	
CHLCONT5	–106.20	25	–72.23	–35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	–106.20	25	–80.06	–30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	–115.20	25	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	–103.20	25	–74.50	5.87	3.98	1.96	118	1	87.4	
EQACAND1	–115.20	25	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	–115.20	25	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
HWA00002	–166.20	25	–165.79	23.42	4.20	0.68	160	1	87.4	9/GR1
HWA00003	–175.20	25	–166.10	23.42	4.25	0.68	159	1	87.4	9/GR2
JMC00002	–92.70	25	–77.30	18.12	0.62	0.62	90	2	87.4	
MEX01NTE	–78.20	25	–105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	–69.20	25	–94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	–136.20	25	–107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	–127.20	25	–96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	–106.20	25	–109.18	–27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	–99.20	25	–58.66	–23.32	1.45	1.04	76	1	87.4	
PRUAND02	–115.20	25	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	–101.20	25	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	–110.20	25	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
SCN00001	–79.70	25	–62.46	17.44	0.60	0.60	90	1	87.4	
SPMFRAN3	–53.20	25	–67.24	47.51	3.16	0.79	7	1	87.4	2 7
SURINAM2	–84.70	25	–55.69	4.35	1.00	0.69	86	1	87.4	
URG00001	–71.70	25	–56.22	–32.52	1.02	0.89	11	1	87.4	
USAEH001	–61.70	25	–87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	–101.20	25	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	–110.20	25	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	–119.20	25	–96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	–166.20	25	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	–175.20	25	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	–148.20	25	–111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	–157.20	25	–113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	–115.20	25	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5

17 688.50 MHz (26)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	26	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	26	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	26	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	26	–62.85	–29.80	3.24	2.89	47	2	87.4	
ATNBEAM1	–52.80	26	–66.44	14.87	1.83	0.68	39	2	87.4	
B CE311	–63.80	26	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	26	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	26	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	26	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	26	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	26	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	26	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	26	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	26	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	26	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	26	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	26	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	26	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
BLZ00001	–115.80	26	–88.68	17.27	0.62	0.62	90	2	87.4	
CAN01101	–137.80	26	–125.60	57.24	3.45	1.27	157	2	87.4	9/GR10
CAN01201	–137.80	26	–111.92	55.89	3.33	0.98	151	2	87.4	9/GR10
CAN01202	–72.30	26	–107.64	55.62	2.75	1.11	32	2	87.4	
CAN01203	–128.80	26	–111.43	55.56	3.07	1.15	151	2	87.4	9/GR12
CAN01303	–128.80	26	–102.39	57.12	3.54	0.92	154	2	87.4	9/GR12
CAN01304	–90.80	26	–99.00	57.33	1.96	1.73	1	2	87.4	9/GR13
CAN01403	–128.80	26	–89.70	52.02	4.67	0.79	148	2	87.4	9/GR12
CAN01404	–90.80	26	–84.78	52.41	3.09	2.06	153	2	87.4	9/GR13
CAN01405	–81.80	26	–84.02	52.34	2.82	2.30	172	2	87.4	9/GR14
CAN01504	–90.80	26	–72.68	53.78	3.57	1.67	157	2	87.4	9/GR13
CAN01505	–81.80	26	–71.76	53.76	3.30	1.89	162	2	87.4	9/GR14
CAN01605	–81.80	26	–61.54	49.50	2.66	1.39	144	2	87.4	9/GR14
CAN01606	–70.30	26	–61.32	49.51	2.41	1.65	148	2	87.4	
CHLCONT4	–105.80	26	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	26	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	26	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	26	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	26	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	26	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	26	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CTR00201	–130.80	26	–84.33	9.67	0.82	0.68	119	2	87.4	
DMAIFRB1	–79.30	26	–61.30	15.35	0.60	0.60	90	2	87.4	
EQAC0001	–94.80	26	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	26	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
HWA00002	–165.80	26	–165.79	23.32	4.20	0.68	160	2	87.4	9/GR1
HWA00003	–174.80	26	–166.10	23.42	4.25	0.68	159	2	87.4	9/GR2
MEX01NTE	–77.80	26	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	26	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	26	–96.39	19.88	3.19	1.87	158	2	87.4	1
NCG00003	–107.30	26	–84.99	12.90	1.05	1.01	176	1	87.4	
PRU00004	–85.80	26	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	26	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	26	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH001	–61.30	26	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	26	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	26	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	26	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	26	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	26	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	26	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	26	–113.01	40.71	3.74	1.79	149	2	87.4	
VEN11VEN	–103.80	26	–66.79	6.90	2.50	1.77	122	2	87.4	

17 703.08 MHz (27)

1	2	3	4		5		6	7	8	9
ALS00002	−166.20	27	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	−175.20	27	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	−94.20	27	−52.98	−59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	−55.20	27	−44.17	−59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	−94.20	27	−65.04	−43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	−55.20	27	−63.68	−43.01	2.54	2.38	152	1	87.4	9/GR4
B CE311	−64.20	27	−40.60	−6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	−45.20	27	−40.27	−6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	−64.20	27	−50.97	−15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	−45.20	27	−50.71	−15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	−64.20	27	−53.10	−2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	−74.20	27	−59.60	−11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	−74.20	27	−60.70	−1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	−74.20	27	−68.76	−4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	−81.20	27	−51.12	−25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	−45.20	27	−50.75	−25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	−81.20	27	−44.51	−16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	−45.20	27	−44.00	−16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	−96.20	27	−64.77	32.32	0.60	0.60	90	2	87.4	
BOLAND01	−115.20	27	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
BOL00001	−87.20	27	−64.61	−16.71	2.52	2.19	85	1	87.4	
BRB00001	−92.70	27	−59.85	12.93	0.60	0.60	90	2	87.4	
CAN01101	−138.20	27	−125.63	57.24	3.45	1.27	157	1	87.4	9/GR10
CAN01201	−138.20	27	−112.04	55..95	3.35	0.97	151	1	87.4	9/GR10
CAN01202	−72.70	27	−107.70	55.63	2.74	1.12	32	1	87.4	
CAN01203	−129.20	27	−111.48	55.61	3.08	1.15	151	1	87.4	9/GR12
CAN01303	−129.20	27	−102.42	57.12	3.54	0.91	154	1	87.4	9/GR12
CAN01304	−91.20	27	−99.12	57.36	1.98	1.72	2	1	87.4	9/GR13
CAN01403	−129.20	27	−89.75	52.02	4.68	0.78	148	1	87.4	9/GR12
CAN01404	−91.20	27	−84.82	52.42	3.10	2.05	152	1	87.4	9/GR13
CAN01405	−82.20	27	−84.00	52.39	2.84	2.29	172	1	87.4	9/GR14
CAN01504	−91.20	27	−72.66	53.77	3.57	1.67	156	1	87.4	9/GR13
CAN01505	−82.20	27	−71.77	53.79	3.30	1.89	162	1	87.4	9/GR14
CAN01605	−82.20	27	−61.50	49.55	2.65	1.40	143	1	87.4	9/GR14
CAN01606	−70.70	27	−61.30	49.55	2.40	1.65	148	1	87.4	
CHLCONT5	−106.20	27	−72.23	−35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	−106.20	27	−80.06	−30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	−115.20	27	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	−103.20	27	−74.50	5.87	3.98	1.96	118	1	87.4	
CUB00001	−89.20	27	−79.81	21.62	2.24	0.68	168	1	87.4	
EQACAND1	−115.20	27	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	−115.20	27	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
GRD00059	−57.20	27	−61.58	12.29	0.60	0.60	90	1	87.4	
GRLDNK01	−53.20	27	−44.89	66.56	2.70	0.82	173	1	87.4	2
GUY00201	−84.70	27	−59.19	4.78	1.44	0.85	95	1	87.4	
HWA00002	−166.20	27	−165.79	23.42	4.20	0.68	160	1	87.4	9/GR1
HWA00003	−175.20	27	−166.10	23.42	4.25	0.68	159	1	87.4	9/GR2
MEX01NTE	−78.20	27	−105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	−69.20	27	−94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	−136.20	27	−107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	−127.20	27	−96.39	19.88	3.18	1.87	157	1	87.4	1
MSR00001	−79.70	27	−61.73	16.75	0.60	0.60	90	1	87.4	4
PAQPAC01	−106.20	27	−109.18	−27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	−99.20	27	−58.66	−23.32	1.45	1.04	76	1	87.4	
PRUAND02	−115.20	27	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	−101.20	27	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	−110.20	27	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
URG00001	−71.70	27	−56.22	−32.52	1.02	0.89	11	1	87.4	
USAEH001	−61.70	27	−87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	−101.20	27	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	−110.20	27	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	−119.20	27	−96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	−166.20	27	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	−175.20	27	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	−148.20	27	−111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	−157.20	27	−113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	−115.20	27	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5

17 717.66 MHz (28)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	28	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	28	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	28	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	28	–62.85	–29.80	3.24	2.89	47	2	87.4	
B CE311	–63.80	28	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	28	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	28	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	28	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	28	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	28	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	28	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	28	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	28	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	28	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	28	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	28	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	28	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	–137.80	28	–125.60	57.24	3.45	1.27	157	2	87.4	9/GR10
CAN01201	–137.80	28	–111.92	55.89	3.33	0.98	151	2	87.4	9/GR10
CAN01202	–72.30	28	–107.64	55.62	2.75	1.11	32	2	87.4	
CAN01203	–128.80	28	–111.43	55.56	3.07	1.15	151	2	87.4	9/GR12
CAN01303	–128.80	28	–102.39	57.12	3.54	0.92	154	2	87.4	9/GR12
CAN01304	–90.80	28	–99.00	57.33	1.96	1.73	1	2	87.4	9/GR13
CAN01403	–128.80	28	–89.70	52.02	4.67	0.79	148	2	87.4	9/GR12
CAN01404	–90.80	28	–84.78	52.41	3.09	2.06	153	2	87.4	9/GR13
CAN01405	–81.80	28	–84.02	52.34	2.82	2.30	172	2	87.4	9/GR14
CAN01504	–90.80	28	–72.68	53.78	3.57	1.67	157	2	87.4	9/GR13
CAN01505	–81.80	28	–71.76	53.76	3.30	1.89	162	2	87.4	9/GR14
CAN01605	–81.80	28	–61.54	49.50	2.66	1.39	144	2	87.4	9/GR14
CAN01606	–70.30	28	–61.32	49.51	2.41	1.65	148	2	87.4	
CHLCONT4	–105.80	28	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	28	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	28	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	28	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	28	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	28	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	28	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
EQAC0001	–94.80	28	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	28	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
GRD00003	–79.30	28	–61.62	12.34	0.60	0.60	90	2	87.4	
GTMIFRB2	–107.30	28	–90.50	15.64	1.03	0.74	84	1	87.4	
GUFMGG02	–52.80	28	–56.42	8.47	4.16	0.81	123	2	87.4	2 7
HWA00002	–165.80	28	–165.79	23.32	4.20	0.68	160	2	87.4	9/GR1
HWA00003	–174.80	28	–166.10	23.42	4.25	0.68	159	2	87.4	9/GR2
MEX01NTE	–77.80	28	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	28	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	28	–96.39	19.88	3.19	1.87	158	2	87.4	1
PNRIFRB2	–121.00	28	–80.15	8.46	1.01	0.73	170	1	87.4	
PRU00004	–85.80	28	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	28	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	28	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH001	–61.30	28	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	28	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	28	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	28	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	28	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	28	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	28	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	28	–113.01	40.71	3.74	1.79	149	2	87.4	
VEN02VEN	–103.80	28	–66.79	6.90	2.50	1.77	122	2	87.4	9/GR22
VEN11VEN	–103.80	28	–66.79	6.90	2.50	1.77	122	2	87.4	9/GR22

17 732.24 MHz (29)

1	2	3	4		5		6	7	8	9
ALS00002	–166.20	29	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	–175.20	29	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	–94.20	29	–52.98	–59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	–55.20	29	–44.17	–59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	–94.20	29	–65.04	–43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	–55.20	29	–63.68	–43.01	2.54	2.38	152	1	87.4	9/GR4
B CE311	–64.20	29	–40.60	–6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	–45.20	29	–40.27	–6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	–64.20	29	–50.97	–15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	–45.20	29	–50.71	–15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	–64.20	29	–53.10	–2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	–74.20	29	–59.60	–11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	–74.20	29	–60.70	–1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	–74.20	29	–68.76	–4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	–81.20	29	–51.12	–25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	–45.20	29	–50.75	–25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	–81.20	29	–44.51	–16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	–45.20	29	–44.00	–16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	–96.20	29	–64.77	32.32	0.60	0.60	90	2	87.4	
BOLAND01	–115.20	29	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CAN01101	–138.20	29	–125.63	57.24	3.45	1.27	157	1	87.4	9/GR10
CAN01201	–138.20	29	–112.04	55.95	3.35	0.97	151	1	87.4	9/GR10
CAN01202	–72.70	29	–107.70	55.63	2.74	1.12	32	1	87.4	
CAN01203	–129.20	29	–111.48	55.61	3.08	1.15	151	1	87.4	9/GR12
CAN01303	–129.20	29	–102.42	57.12	3.54	0.91	154	1	87.4	9/GR12
CAN01304	–91.20	29	–99.12	57.36	1.98	1.72	2	1	87.4	9/GR13
CAN01403	–129.20	29	–89.75	52.02	4.68	0.78	148	1	87.4	9/GR12
CAN01404	–91.20	29	–84.82	52.42	3.10	2.05	152	1	87.4	9/GR13
CAN01405	–82.20	29	–84.00	52.39	2.84	2.29	172	1	87.4	9/GR14
CAN01504	–91.20	29	–72.66	53.77	3.57	1.67	156	1	87.4	9/GR13
CAN01505	–82.20	29	–71.77	53.79	3.30	1.89	162	1	87.4	9/GR14
CAN01605	–82.20	29	–61.50	49.55	2.65	1.40	143	1	87.4	9/GR14
CAN01606	–70.70	29	–61.30	49.55	2.40	1.65	148	1	87.4	
CHLCONT5	–106.20	29	–72.23	–35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	–106.20	29	–80.06	–30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	–115.20	29	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	–103.20	29	–74.50	5.87	3.98	1.96	118	1	87.4	
EQACAND1	–115.20	29	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	–115.20	29	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
HWA00002	–166.20	29	–165.79	23.42	4.20	0.68	160	1	87.4	9/GR1
HWA00003	–175.20	29	–166.10	23.42	4.25	0.68	159	1	87.4	9/GR2
JMC00002	–92.70	29	–77.30	18.12	0.62	0.62	90	2	87.4	
MEX01NTE	–78.20	29	–105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	–69.20	29	–94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	–136.20	29	–107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	–127.20	29	–96.39	19.88	3.18	1.87	157	1	87.4	1
PAQPAC01	–106.20	29	–109.18	–27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	–99.20	29	–58.66	–23.32	1.45	1.04	76	1	87.4	
PRUAND02	–115.20	29	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	–101.20	29	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	–110.20	29	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
SCN00001	–79.70	29	–62.46	17.44	0.60	0.60	90	1	87.4	
SPMFRAN3	–53.20	29	–67.24	47.51	3.16	0.79	7	1	87.4	2 7
SURINAM2	–84.70	29	–55.69	4.35	1.00	0.69	86	1	87.4	
URG00001	–71.70	29	–56.22	–32.52	1.02	0.89	11	1	87.4	
USAEH001	–61.70	29	–87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	–101.20	29	–93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	–110.20	29	–95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	–119.20	29	–96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	–166.20	29	–109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	–175.20	29	–116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	–148.20	29	–111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	–157.20	29	–113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	–115.20	29	–71.37	–4.69	6.49	2.57	87	1	87.4	9/GR5

17 746.82 MHz (30)

1	2	3	4		5		6	7	8	9
ALS00002	–165.80	30	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	–174.80	30	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	–93.80	30	–63.96	–30.01	3.86	1.99	48	2	87.4	
ARGNORT5	–54.80	30	–62.85	–29.80	3.24	2.89	47	2	87.4	
ATNBEAM1	–52.80	30	–66.44	14.87	1.83	0.68	39	2	87.4	
B CE311	–63.80	30	–40.60	–6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	–44.80	30	–40.26	–6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	–63.80	30	–50.97	–15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	–44.80	30	–50.71	–15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	–63.80	30	–53.11	–2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	–73.80	30	–59.60	–11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	–73.80	30	–60.70	–1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	–73.80	30	–68.75	–4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	–101.80	30	–45.99	–19.09	2.22	0.79	62	2	87.4	8
B SU111	–80.80	30	–51.10	–25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	–44.80	30	–50.76	–25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	–80.80	30	–44.51	–16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	–44.80	30	–43.99	–16.97	3.27	1.92	59	2	87.4	8 9/GR9
BLZ00001	–115.80	30	–88.68	17.27	0.62	0.62	90	2	87.4	
CAN01101	–137.80	30	–125.60	57.24	3.45	1.27	157	2	87.4	9/GR10
CAN01201	–137.80	30	–111.92	55.89	3.33	0.98	151	2	87.4	9/GR10
CAN01202	–72.30	30	–107.64	55.62	2.75	1.11	32	2	87.4	
CAN01203	–128.80	30	–111.43	55.56	3.07	1.15	151	2	87.4	9/GR12
CAN01303	–128.80	30	–102.39	57.12	3.54	0.92	154	2	87.4	9/GR12
CAN01304	–90.80	30	–99.00	57.33	1.96	1.73	1	2	87.4	9/GR13
CAN01403	–128.80	30	–89.70	52.02	4.67	0.79	148	2	87.4	9/GR12
CAN01404	–90.80	30	–84.78	52.41	3.09	2.06	153	2	87.4	9/GR13
CAN01405	–81.80	30	–84.02	52.34	2.82	2.30	172	2	87.4	9/GR14
CAN01504	–90.80	30	–72.68	53.78	3.57	1.67	157	2	87.4	9/GR13
CAN01505	–81.80	30	–71.76	53.76	3.30	1.89	162	2	87.4	9/GR14
CAN01605	–81.80	30	–61.54	49.50	2.66	1.39	144	2	87.4	9/GR14
CAN01606	–70.30	30	–61.32	49.51	2.41	1.65	148	2	87.4	
CHLCONT4	–105.80	30	–69.59	–23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	–105.80	30	–73.52	–55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	–92.30	30	–76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	–92.30	30	–64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	–92.30	30	–88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	–92.30	30	–60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	–92.30	30	–79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
CTR00201	–130.80	30	–84.33	9.67	0.82	0.68	119	2	87.4	
DMAIFRB1	–79.30	30	–61.30	15.35	0.60	0.60	90	2	87.4	
EQAC0001	–94.80	30	–78.31	–1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	–94.80	30	–90.36	–0.57	0.94	0.89	99	1	87.4	9/GR19
HWA00002	–165.80	30	–165.79	23.32	4.20	0.68	160	2	87.4	9/GR1
HWA00003	–174.80	30	–166.10	23.42	4.25	0.68	159	2	87.4	9/GR2
MEX01NTE	–77.80	30	–105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	–135.80	30	–107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	–126.80	30	–96.39	19.88	3.19	1.87	158	2	87.4	1
NCG00003	–107.30	30	–84.99	12.90	1.05	1.01	176	1	87.4	
PRU00004	–85.80	30	–74.19	–8.39	3.74	2.45	112	2	87.4	
PTRVIR01	–100.80	30	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	–109.80	30	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH001	–61.30	30	–87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	–100.80	30	–93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	–109.80	30	–95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	–118.80	30	–96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	–165.80	30	–109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	–174.80	30	–116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	–147.80	30	–111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	–156.80	30	–113.01	40.71	3.74	1.79	149	2	87.4	
VEN11VEN	–103.80	30	–66.79	6.90	2.50	1.77	122	2	87.4	

17 761.40 MHz (31)

1	2	3	4		5		6	7	8	9
ALS00002	−166.20	31	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
ALS00003	−175.20	31	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
ARGINSU4	−94.20	31	−52.98	−59.81	3.40	0.68	19	1	87.4	9/GR3
ARGINSU5	−55.20	31	−44.17	−59.91	3.77	0.70	13	1	87.4	9/GR4
ARGSUR04	−94.20	31	−65.04	−43.33	3.32	1.50	40	1	87.4	9/GR3
ARGSUR05	−55.20	31	−63.68	−43.01	2.54	2.38	152	1	87.4	9/GR4
B CE311	−64.20	31	−40.60	−6.07	3.04	2.06	174	1	87.4	8 9/GR7
B CE312	−45.20	31	−40.27	−6.06	3.44	2.09	174	1	87.4	8 9/GR9
B CE411	−64.20	31	−50.97	−15.27	3.86	1.38	49	1	87.4	8 9/GR7
B CE412	−45.20	31	−50.71	−15.30	3.57	1.56	52	1	87.4	8 9/GR9
B CE511	−64.20	31	−53.10	−2.90	2.44	2.13	104	1	87.4	8 9/GR7
B NO611	−74.20	31	−59.60	−11.62	2.85	1.69	165	2	87.4	8 9/GR8
B NO711	−74.20	31	−60.70	−1.78	3.54	1.78	126	2	87.4	8 9/GR8
B NO811	−74.20	31	−68.76	−4.71	2.37	1.65	73	2	87.4	8 9/GR8
B SU111	−81.20	31	−51.12	−25.63	2.76	1.05	50	1	87.4	8 9/GR6
B SU112	−45.20	31	−50.75	−25.62	2.47	1.48	56	1	87.4	8 9/GR9
B SU211	−81.20	31	−44.51	−16.95	3.22	1.36	60	1	87.4	8 9/GR6
B SU212	−45.20	31	−44.00	−16.87	3.20	1.96	58	1	87.4	8 9/GR9
BERBERMU	−96.20	31	−64.77	32.32	0.60	0.60	90	2	87.4	
BOLAND01	−115.20	31	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
BOL00001	−87.20	31	−64.61	−16.71	2.52	2.19	85	1	87.4	
BRB00001	−92.70	31	−59.85	12.93	0.60	0.60	90	2	87.4	
CAN01101	−138.20	31	−125.63	57.24	3.45	1.27	157	1	87.4	9/GR10
CAN01201	−138.20	31	−112.04	55.95	3.35	0.97	151	1	87.4	9/GR10
CAN01202	−72.70	31	−107.70	55.63	2.74	1.12	32	1	87.4	
CAN01203	−129.20	31	−111.48	55.61	3.08	1.15	151	1	87.4	9/GR12
CAN01303	−129.20	31	−102.42	57.12	3.54	0.91	154	1	87.4	9/GR12
CAN01304	−91.20	31	−99.12	57.36	1.98	1.72	2	1	87.4	9/GR13
CAN01403	−129.20	31	−89.75	52.02	4.68	0.78	148	1	87.4	9/GR12
CAN01404	−91.20	31	−84.82	52.42	3.10	2.05	152	1	87.4	9/GR13
CAN01405	−82.20	31	−84.00	52.39	2.84	2.29	172	1	87.4	9/GR14
CAN01504	−91.20	31	−72.66	53.77	3.57	1.67	156	1	87.4	9/GR13
CAN01505	−82.20	31	−71.77	53.79	3.30	1.89	162	1	87.4	9/GR14
CAN01605	−82.20	31	−61.50	49.55	2.65	1.40	143	1	87.4	9/GR14
CAN01606	−70.70	31	−61.30	49.55	2.40	1.65	148	1	87.4	
CHLCONT5	−106.20	31	−72.23	−35.57	2.60	0.68	55	1	87.4	9/GR17
CHLPAC02	−106.20	31	−80.06	−30.06	1.36	0.68	69	1	87.4	9/GR17
CLMAND01	−115.20	31	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
CLM00001	−103.20	31	−74.50	5.87	3.98	1.96	118	1	87.4	
CUB00001	−89.20	31	−79.81	21.62	2.24	0.68	168	1	87.4	
EQACAND1	−115.20	31	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
EQAGAND1	−115.20	31	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
GRD00059	−57.20	31	−61.58	12.29	0.60	0.60	90	1	87.4	
GRLDNK01	−53.20	31	−44.89	66.56	2.70	0.82	173	1	87.4	2
GUY00201	−84.70	31	−59.19	4.78	1.44	0.85	95	1	87.4	
HWA00002	−166.20	31	−165.79	23.42	4.20	0.68	160	1	87.4	9/GR1
HWA00003	−175.20	31	−166.10	23.42	4.25	0.68	159	1	87.4	9/GR2
MEX01NTE	−78.20	31	−105.81	26.01	2.89	2.08	155	1	87.4	1
MEX01SUR	−69.20	31	−94.84	19.82	3.05	2.09	4	1	87.4	1
MEX02NTE	−136.20	31	−107.21	26.31	3.84	1.55	148	1	87.4	1
MEX02SUR	−127.20	31	−96.39	19.88	3.18	1.87	157	1	87.4	1
MSR00001	−79.70	31	−61.73	16.75	0.60	0.60	90	1	87.4	4
PAQPAC01	−106.20	31	−109.18	−27.53	0.60	0.60	90	1	87.4	9/GR17
PRG00002	−99.20	31	−58.66	−23.32	1.45	1.04	76	1	87.4	
PRUAND02	−115.20	31	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5
PTRVIR01	−101.20	31	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
PTRVIR02	−110.20	31	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
URG00001	−71.70	31	−56.22	−32.52	1.02	0.89	11	1	87.4	
USAEH001	−61.70	31	−87.57	36.17	6.42	3.49	12	1	87.4	1 5 6
USAEH002	−101.20	31	−93.94	36.32	8.24	3.56	171	1	87.4	1 6 9/GR20
USAEH003	−110.20	31	−95.23	36.29	8.27	3.37	168	1	87.4	1 6 9/GR21
USAEH004	−119.20	31	−96.45	36.21	8.20	3.12	165	1	87.4	1 5 6
USAPSA02	−166.20	31	−109.94	36.86	6.04	1.11	137	1	87.4	9/GR1
USAPSA03	−175.20	31	−116.23	37.50	5.60	0.75	132	1	87.4	9/GR2
USAWH101	−148.20	31	−111.02	40.68	4.36	2.15	162	1	87.4	
USAWH102	−157.20	31	−113.07	40.74	3.72	1.78	149	1	87.4	
VENAND03	−115.20	31	−71.37	−4.69	6.49	2.57	87	1	87.4	9/GR5

17 775.98 MHz (32)

1	2	3	4		5		6	7	8	9
ALS00002	−165.80	32	−109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
ALS00003	−174.80	32	−116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
ARGNORT4	−93.80	32	−63.96	−30.01	3.86	1.99	48	2	87.4	
ARGNORT5	−54.80	32	−62.85	−29.80	3.24	2.89	47	2	87.4	
B CE311	−63.80	32	−40.60	−6.07	3.04	2.06	174	2	87.4	8 9/GR7
B CE312	−44.80	32	−40.26	−6.06	3.44	2.09	174	2	87.4	8 9/GR9
B CE411	−63.80	32	−50.97	−15.26	3.86	1.38	49	2	87.4	8 9/GR7
B CE412	−44.80	32	−50.71	−15.30	3.57	1.56	52	2	87.4	8 9/GR9
B CE511	−63.80	32	−53.11	−2.98	2.42	2.15	107	2	87.4	8 9/GR7
B NO611	−73.80	32	−59.60	−11.62	2.86	1.69	165	1	87.4	8 9/GR8
B NO711	−73.80	32	−60.70	−1.78	3.54	1.78	126	1	87.4	8 9/GR8
B NO811	−73.80	32	−68.75	−4.71	2.37	1.65	73	1	87.4	8 9/GR8
B SE911	−101.80	32	−45.99	−19.09	2.22	0.79	62	2	87.4	8
B SU111	−80.80	32	−51.10	−25.64	2.76	1.06	50	2	87.4	8 9/GR6
B SU112	−44.80	32	−50.76	−25.62	2.47	1.48	56	2	87.4	8 9/GR9
B SU211	−80.80	32	−44.51	−16.94	3.22	1.37	60	2	87.4	8 9/GR6
B SU212	−44.80	32	−43.99	−16.97	3.27	1.92	59	2	87.4	8 9/GR9
CAN01101	−137.80	32	−125.60	57.24	3.45	1.27	157	2	87.4	9/GR10
CAN01201	−137.80	32	−111.92	55.89	3.33	0.98	151	2	87.4	9/GR10
CAN01202	−72.30	32	−107.64	55.62	2.75	1.11	32	2	87.4	
CAN01203	−128.80	32	−111.43	55.56	3.07	1.15	151	2	87.4	9/GR12
CAN01303	−128.80	32	−102.39	57.12	3.54	0.92	154	2	87.4	9/GR12
CAN01304	−90.80	32	−99.00	57.33	1.96	1.73	1	2	87.4	9/GR13
CAN01403	−128.80	32	−89.70	52.02	4.67	0.79	148	2	87.4	9/GR12
CAN01404	−90.80	32	−84.78	52.41	3.09	2.06	153	2	87.4	9/GR13
CAN01405	−81.80	32	−84.02	52.34	2.82	2.30	172	2	87.4	9/GR14
CAN01504	−90.80	32	−72.68	53.78	3.57	1.67	157	2	87.4	9/GR13
CAN01505	−81.80	32	−71.76	53.76	3.30	1.89	162	2	87.4	9/GR14
CAN01605	−81.80	32	−61.54	49.50	2.66	1.39	144	2	87.4	9/GR14
CAN01606	−70.30	32	−61.32	49.51	2.41	1.65	148	2	87.4	
CHLCONT4	−105.80	32	−69.59	−23.20	2.21	0.69	68	2	87.4	9/GR16
CHLCONT6	−105.80	32	−73.52	−55.52	3.65	1.31	39	2	87.4	9/GR16
CRBBAH01	−92.30	32	−76.09	24.13	1.83	0.68	141	1	87.4	9/GR18
CRBBER01	−92.30	32	−64.76	32.13	0.60	0.60	90	1	87.4	9/GR18
CRBBLZ01	−92.30	32	−88.61	17.26	0.64	0.64	90	1	87.4	9/GR18
CRBEC001	−92.30	32	−60.07	8.26	4.20	0.86	115	1	87.4	9/GR18
CRBJMC01	−92.30	32	−79.45	17.97	0.99	0.68	151	1	87.4	9/GR18
EQAC0001	−94.80	32	−78.31	−1.52	1.48	1.15	65	1	87.4	9/GR19
EQAG0001	−94.80	32	−90.36	−0.57	0.94	0.89	99	1	87.4	9/GR19
GRD00003	−79.30	32	−61.62	12.34	0.60	0.60	90	2	87.4	
GTMIFRB2	−107.30	32	−90.50	15.64	1.03	0.74	84	1	87.4	
GUFMGG02	−52.80	32	−56.42	8.47	4.16	0.81	123	2	87.4	2 7
HWA00002	−165.80	32	−165.79	23.32	4.20	0.68	160	2	87.4	9/GR1
HWA00003	−174.80	32	−166.10	23.42	4.25	0.68	159	2	87.4	9/GR2
MEX01NTE	−77.80	32	−105.80	25.99	2.88	2.07	155	2	87.4	1
MEX02NTE	−135.80	32	−107.36	26.32	3.80	1.57	149	2	87.4	1
MEX02SUR	−126.80	32	−96.39	19.88	3.19	1.87	158	2	87.4	1
PNRIFRB2	−121.00	32	−80.15	8.46	1.01	0.73	170	1	87.4	
PRU00004	−85.80	32	−74.19	−8.39	3.74	2.45	112	2	87.4	
PTRVIR01	−100.80	32	−93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
PTRVIR02	−109.80	32	−95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH001	−61.30	32	−87.53	36.18	6.41	3.49	12	2	87.4	1 5 6
USAEH002	−100.80	32	−93.85	36.31	8.26	3.55	171	2	87.4	1 6 9/GR20
USAEH003	−109.80	32	−95.47	36.38	8.10	3.45	168	2	87.4	1 6 9/GR21
USAEH004	−118.80	32	−96.42	36.21	8.20	3.12	165	2	87.4	1 5 6
USAPSA02	−165.80	32	−109.83	36.82	6.03	1.12	137	2	87.4	9/GR1
USAPSA03	−174.80	32	−116.10	37.47	5.60	0.76	132	2	87.4	9/GR2
USAWH101	−147.80	32	−111.01	40.67	4.38	2.15	162	2	87.4	
USAWH102	−156.80	32	−113.01	40.71	3.74	1.79	149	2	87.4	
VEN02VEN	−103.80	32	−66.79	6.90	2.50	1.77	122	2	87.4	9/GR22
VEN11VEN	−103.80	32	−66.79	6.90	2.50	1.77	122	2	87.4	9/GR22

ARTICLE 9A

Plan for feeder-links for the broadcasting-satellite service in the fixed-satellite service in the frequency bands 14.5-14.8 GHz and 17.3-18.1 GHz in Regions 1 and 3

9A.1 COLUMN HEADINGS OF THE PLAN

Col. 1 *Notifying administration symbol*.

Col. 2 *Beam identification* (column 2, normally, contains the symbol designating the country or the geographical area taken from Table B1 of the Preface to the International Frequency List, followed by the symbol designating the service area).

Col. 3 *Nominal orbital position*, in degrees and hundredths of a degree from the Greenwich meridian (negative values indicate longitudes which are west of the Greenwich meridian; positive values indicate longitudes which are east of the Greenwich meridian).

Col. 4 *Channel number*.

Col. 5 *Assigned frequency*, in MHz.

Col. 6 *Nominal intersection of the beam axis with the Earth* (boresight or aim point in the case of a non-elliptical beam), longitude and latitude, in degrees and hundredths of a degree.

Col. 7 *Space station receiving antenna characteristics* (elliptical beams). This column contains three numerical values corresponding to the major axis, the minor axis and the major axis orientation respectively of the elliptical cross-section half-power beam, in degrees and hundredths of a degree. Orientation of the ellipse determined as follows: in a plane normal to the beam axis, the direction of a major axis of the ellipse is specified as the angle measured anticlockwise from a line parallel to the equatorial plane to the major axis of the ellipse, to the nearest degree.

The codes used for the antenna pattern of the receiving space station (feeder link) antenna are defined as follows:

R13RSS	Figure B and § 3.7.3 in Annex 3
R123FR	Figure C and § 3.7.3 in Annex 3
MODRSS	Recommendation ITU-R BO.1296

In cases where the “Space station receiving antenna pattern code” field is blank, the necessary antenna pattern data are provided by shaped beam data submitted by the administration. These data are stored in column 8. A particular shaped beam is identified by the combination of column 1, column 9 and column 16. In such cases the maximum cross-polar gain is given in column 10, “Cross-polar gain” field.

Col. 8 S*pace station receiving antenna pattern code*.

Col. 9 *Space station receiving antenna shaped (non-elliptical) beam identification.*

Col. 10 *Maximum space station receiving antenna co-polar and cross-polar (in the case of shaped beam) isotropic gain,* in dBi.

Col. 11 *Earth station transmitting antenna pattern code*.

The codes used for transmitting earth station (feeder-link) antenna patterns are defined as follows:

R13TES	Figure A and § 3.5.3 in Annex 3
MODTES	Recommendation ITU-R BO.1295

Col. 12 *Polarization* (CL – circular left, CR – circular right, LE – linear referenced to the equatorial plane) and polarization angle in degrees and hundredths of a degree (in the case of linear polarization only).

Col. 13 *e.i.r.p*. in the direction of maximum radiation, in dBW.

Col. 14 *Permitted increase in earth station e.i.r.p.* in dB for the purpose of power control (see Section 3.11 of Annex 3)[8].

Col. 15 *Designation of emission*.

Col. 16 *Identity of the space station*.

Col. 17 *Group code* (An identification code which indicates that all assignments with the same group identification code will be treated as a group.)

Group code: if an assignment is part of the group:

a) the equivalent protection margin to be used for the application of Article 4 of this Appendix shall be calculated on the following basis:

– for the calculation of interference to assignments that are part of a group, only the interference contributions from assignments that are not part of the same group are to be included; *and*

[8] Because the applicable versions of ITU-R Recommendations relating to propagation loss due to rain and depolarization have not been defined, the power-control values will be calculated after WRC-97.

– for the calculation of interference from assignments belonging to a group of assignments that are not part of that same group, only the worst interference contribution from that group shall be used on a test point to test point basis.

b) If an administration notifies the same frequency in more than one beam of a group for use at the same time, the aggregate *C/I* ratio produced by all emissions from that group shall not exceed the *C/I* ratio calculated on the basis of § *a)* above.

Col. 18 *Assignment status*.

The assignment status codes used for beams are defined as follows:

P	Assignment in the Plan for which § 4.2.5 of Article 4 (in terms of 8 years lapsing period) does not apply.
PE	Assignment in the Plan for which § 4.2.5 of Article 4 (in terms of 8 years lapsing period) does not apply. These assignments have been notified and brought into use and the date of bringing into use has been confirmed to the Bureau. For this category of assignments, the parameters in force before WRC-97 are applied.
A	Assignment in the Plan for which § 4.2.5 of Article 4 (in terms of 8 years lapsing period) applies.
AE	Assignment in the Plan for which § 4.2.5 of Article 4 (in terms of 8 years lapsing period) applies. These assignments have been notified and brought into use and the date of bringing into use has been confirmed to the Bureau. For this category of assignments, parameters in force before WRC-97 are applied.

Col. 19 *Remarks*.

9A.2 TEXT FOR NOTES IN REMARKS COLUMN OF THE PLAN

1 India may also locate feeder-link earth stations near the point 29° N, 77.3° E, on condition that this does not affect the equivalent protection margins of other administrations.

2 Germany and Switzerland have agreed that their feeder-link channels can be interchanged for a limited period of time ending in the year 2001, as follows:

2 with 22, 6 with 26, 10 with 30, 14 with 34, 18 with 38.

3 Before an administration notifies to the Bureau or brings into use this frequency assignment to a transmitting feeder-link earth station in the band 17.7-18.1 GHz, it shall effect

coordination of this assignment, using the method described in Annex 4, in respect of a specific earth station in the fixed-satellite service (space-to-Earth) in the band 17.7-18.1 GHz:

a) either recorded in the Master Register prior to 27 October 1997 with a favourable finding; or

b) for which a notice is received by the Bureau prior to 27 October 1997 for recording in the Master Register and which subsequently receives a favourable finding based on the Plan as it existed on 27 October 1997.

4 Before an administration notifies to the Bureau or brings into use this frequency assignment to a transmitting feeder-link earth station in the bands 14.5-14.8 GHz and 17.7-18.1 GHz, it shall effect coordination of this assignment with each administration whose territory lies wholly or partly within the coordination area of the feeder-link earth station, using the method described in Appendix **S7**, in respect of stations of the fixed and mobile services in the bands 14.5-14.8 GHz and 17.7-18.1 GHz:

a) either recorded in the Master Register prior to 27 October 1997 with a favourable finding; or

b) for which a notice is received by the Bureau prior to 27 October 1997 for recording in the Master Register and which subsequently receives a favourable finding based on the Plan as it existed on 27 October 1997.

5 This assignment shall be brought into use only when the limits given in § 5 of Annex 1 are not exceeded, or with the agreement of administrations identified in Table 1A with respect to assignments which are in conformity with the Region 2 Plan on 27 October 1997.

These administrations shall be informed by the notifying administration of changes in characteristics before these beams are brought into use.

6 This assignment shall not claim protection from the assignments of the administrations indicated in Table 1B which are in conformity with the Region 2 Plan on 27 October 1997.

7 This assignment shall not claim protection from the assignments of the administrations indicated in Table 1B which are recorded in the Master Register with a favourable finding prior to 27 October 1997 to which No. **S5.487/838** and No. **S5.43/435** do not apply.

8 Provisional beam. This assignment has been included in the Plan by WRC-97. This assignment is for exclusive use by Palestine, subject to the Israeli-Palestinian Interim Agreement of 28 September 1995, Resolution 741 of the Council notwithstanding.

9 Pending clarification of bringing into service of the satellite network.

TABLE 1A

Beam name	Channels	Affected administrations*
G 02700	4, 8, 12	GUY JMC
IRL21100	2, 10	GUY JMC
	6	JMC
LBR24400	3	JMC
	7, 11	GUY JMC

* Administrations whose assignment(s) may receive interference from the beam shown in the left-hand column.

TABLE 1B

Beam name	Channels	Affecting administrations*
AZR13400	28, 36, 40	USA
BFA10700	29, 37	USA
CNR13000	27, 39	USA
CTI23700	26, 38	USA
D2-21600	21, 25, 29, 33, 37	USA/IT
G 02700	4, 8, 12	GUY JMC
HISPASA2	27, 29, 37, 39	USA
IRL21100	2, 10	GUY JMC
	6	JMC
KAZ06600	24, 32	F/EUT
	28, 36, 40	F/EUT USA
KGZ07000	22, 30, 34	F/EUT
	26, 38	F/EUT USA
LBR24400	3	JMC
	7, 11	GUY JMC
MDA06300	20	G PAK
MLT1470A	20	F/EUT USA
NPL1220A	23	IND
RUS00400	39	USA
TKM06800	23, 27, 31, 35	F/EUT
	39	F/EUT USA

* Administrations whose assignment(s) may cause interference to the beam shown in the left-hand column.

TABLE 2A

Table showing correspondence between channel numbers and assigned frequencies for the feeder-links in the frequency band 14.5-14.8 GHz

Channel No.	Assigned feeder-link frequency (MHz)
1	14 525.30
2	14 544.48
3	14 563.66
4	14 582.84
5	14 602.02
6	14 621.20
7	14 640.38
8	14 659.56
9	14 678.74
10	14 697.92
11	14 717.10
12	14 736.28
13	14 755.46
14	14 774.64

TABLE 2B

Table showing correspondence between channel numbers and assigned frequencies for the feeder-links in the frequency band 17.3 GHz-18.1 GHz

Channel No.	Assigned feeder-link frequency (MHz)	Channel No.	Assigned feeder-link frequency (MHz)
1	17 327.48	21	17 711.08
2	17 346.66	22	17 730.26
3	17 365.84	23	17 749.44
4	17 385.02	24	17 768.62
5	17 404.20	25	17 787.80
6	17 423.38	26	17 806.98
7	17 442.56	27	17 826.16
8	17 461.74	28	17 845.34
9	17 480.92	29	17 864.52
10	17 500.10	30	17 883.70
11	17 519.28	31	17 902.88
12	17 538.46	32	17 922.06
13	17 557.64	33	17 941.24
14	17 576.82	34	17 960.42
15	17 596.00	35	17 979.60
16	17 615.18	36	17 998.78
17	17 634.36	37	18 017.96
18	17 653.54	38	18 037.14
19	17 672.72	39	18 056.32
20	17 691.90	40	18 075.50

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
AFS	AFS02100	5.00	1	14525.30	24.50	–28.00	3.13	1.68	27.00	MODRSS		37.24		MODTES	CR		82.00		27M0F8W			P	
ARS	ARS34001	17.00	1	14525.30	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CR		82.00		27M0F8W			P	
IND	IND04301	56.00	1	14525.30	77.80	11.10	1.36	1.28	172.00	MODRSS		42.04		MODTES	CL		82.00		27M0F8W			P	1
IND	IND04401	68.00	1	14525.30	79.50	22.30	2.19	1.42	146.00	MODRSS		39.52		MODTES	CL		82.00		27M0F8W			P	1
ISR	ISR11000	–13.00	1	14525.30	34.90	31.40	0.94	0.60	117.00	MODRSS		46.93		MODTES	CL		82.00		27M0F8W			P	
MRC	MRC20900	–25.00	1	14525.30	–8.90	28.90	3.96	1.55	50.00	MODRSS		36.57		MODTES	CR		82.00		27M0F8W			P	
NMB	NMB02500	–19.00	1	14525.30	17.50	–21.60	2.66	1.90	48.00	MODRSS		37.41		MODTES	CR		82.00		27M0F8W			P	
YEM	YEM26700	11.00	1	14525.30	48.61	14.42	1.68	1.44	157.35	MODRSS		40.61		MODTES	CR		82.00		27M0F8W			P	4
CPV	CPV30100	–30.00	2	14544.48	–24.00	16.00	0.86	0.70	144.00	MODRSS		46.65		MODTES	CR		82.00		27M0F8W			P	4
ETH	ETH09200	23.00	2	14544.48	40.35	9.19	2.66	2.23	166.11	MODRSS		36.72		MODTES	CR		82.00		27M0F8W			P	4
IND	IND04501	56.00	2	14544.48	76.20	19.50	1.58	1.58	21.00	MODRSS		40.47		MODTES	CR		82.00		27M0F8W			P	1
IND	IND04801	68.00	2	14544.48	86.20	25.00	1.56	0.90	120.00	MODRSS		42.97		MODTES	CR		82.00		27M0F8W			P	1
KOR	KO11201D	116.00	2	14544.48	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0G7W	KOREASAT-1	20	AE	4
KOR	KOR11201	116.00	2	14544.48	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0F8W	KOREASAT-1	20	AE	4
MOZ	MOZ30700	–1.00	2	14544.48	34.00	–18.00	3.57	1.38	55.00	MODRSS		37.52		MODTES	CR		82.00		27M0F8W			P	
NIG	NIG11900	–19.00	2	14544.48	7.80	9.40	2.16	2.02	45.00	MODRSS		38.05		MODTES	CL		82.00		27M0F8W			P	
PAK	PAK12701	38.00	2	14544.48	69.60	29.50	2.30	2.16	14.00	MODRSS		37.49		MODTES	CL		82.00		27M0F8W			P	
PNG	PNG13100	110.00	2	14544.48	147.70	–6.30	2.50	2.18	169.00	MODRSS		37.08		MODTES	CL		89.00		27M0F8W			P	
SNG	SNG15100	74.00	2	14544.48	103.80	1.30	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		82.00		27M0F8W			P	
STP	STP24100	–13.00	2	14544.48	7.00	0.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		82.00		27M0F8W			P	
TGO	TGO22600	–25.00	2	14544.48	0.80	8.60	1.52	0.60	105.00	MODRSS		44.85		MODTES	CR		82.00		27M0F8W			P	
UGA	UGA05100	11.00	2	14544.48	32.30	1.20	1.46	1.12	60.00	MODRSS		42.31		MODTES	CL		82.00		27M0F8W			P	
IND	IND03801	56.00	3	14563.66	75.90	33.40	1.52	1.08	33.00	MODRSS		42.29		MODTES	CL		82.00		27M0F8W			P	1
IND	IND04701	68.00	3	14563.66	93.30	11.10	1.92	0.60	96.00	MODRSS		43.83		MODTES	CL		82.00		27M0F8W			P	1
IRN	IRN10901	34.00	3	14563.66	54.20	32.40	3.82	1.82	149.00	MODRSS		36.03		MODTES	CR		82.00		27M0F8W			P	
YEM	YEM26700	11.00	3	14563.66	48.61	14.42	1.68	1.44	157.35	MODRSS		40.61		MODTES	CR		82.00		27M0F8W			P	4
ZMB	ZMB31400	–1.00	3	14563.66	27.50	–13.10	2.38	1.48	39.00	MODRSS		38.98		MODTES	CL		82.00		27M0F8W			P	
ARS	ARS00301	17.00	4	14582.84	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CL		82.00		27M0F8W			P	
CPV	CPV30100	–30.00	4	14582.84	–24.00	16.00	0.86	0.70	144.00	MODRSS		46.65		MODTES	CR		82.00		27M0F8W			P	4
IND	IND04001	56.00	4	14582.84	73.00	25.00	1.82	1.48	58.00	MODRSS		40.14		MODTES	CR		82.00		27M0F8W			P	1
IND	IND04201	68.00	4	14582.84	79.30	27.70	2.14	1.16	147.00	MODRSS		40.50		MODTES	CR		82.00		27M0F8W			P	1
KOR	KO11201D	116.00	4	14582.84	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0G7W	KOREASAT-1	20	AE	4
KOR	KOR11201	116.00	4	14582.84	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0F8W	KOREASAT-1	20	AE	4
MOZ	MOZ30700	–1.00	4	14582.84	34.00	–18.00	3.57	1.38	55.00	MODRSS		37.52		MODTES	CR		82.00		27M0F8W			P	
NIG	NIG11900	–19.00	4	14582.84	7.80	9.40	2.16	2.02	45.00	MODRSS		38.05		MODTES	CL		82.00		27M0F8W			P	
PAK	PAK28301	38.00	4	14582.84	74.70	33.90	1.34	1.13	160.00	MODRSS		42.65		MODTES	CL		82.00		27M0F8W			P	
PNG	PNG27100	128.00	4	14582.84	148.00	–6.70	2.80	2.05	155.00	MODRSS		36.86		MODTES	CL		89.00		27M0F8W			P	
STP	STP24100	–13.00	4	14582.84	7.00	0.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		82.00		27M0F8W			P	
TGO	TGO22600	–25.00	4	14582.84	0.80	8.60	1.52	0.60	105.00	MODRSS		44.85		MODTES	CR		82.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
UGA	UGA05100	11.00	4	14582.84	32.30	1.20	1.46	1.12	60.00	MODRSS		42.31		MODTES	CL		82.00		27M0F8W			P	
AFS	AFS02100	5.00	5	14602.02	24.50	–28.00	3.13	1.68	27.00	MODRSS		37.24		MODTES	CR		82.00		27M0F8W			P	
IND	IND03901	56.00	5	14602.02	72.70	11.20	1.26	0.60	107.00	MODRSS		45.66		MODTES	CL		82.00		27M0F8W			P	1
IND	IND04601	68.00	5	14602.02	84.70	20.50	1.60	0.86	30.00	MODRSS		43.06		MODTES	CL		82.00		27M0F8W			P	1
ISR	ISR11000	–13.00	5	14602.02	34.90	31.40	0.94	0.60	117.00	MODRSS		46.93		MODTES	CL		82.00		27M0F8W			P	
MRC	MRC20900	–25.00	5	14602.02	–8.90	28.90	3.96	1.55	50.00	MODRSS		36.57		MODTES	CR		82.00		27M0F8W			P	
NMB	NMB02500	–19.00	5	14602.02	17.50	–21.60	2.66	1.90	48.00	MODRSS		37.41		MODTES	CR		82.00		27M0F8W			P	
YEM	YEM26700	11.00	5	14602.02	48.61	14.42	1.68	1.44	157.35	MODRSS		40.61		MODTES	CR		82.00		27M0F8W			P	4
ZMB	ZMB31400	–1.00	5	14602.02	27.50	–13.10	2.38	1.48	39.00	MODRSS		38.98		MODTES	CL		82.00		27M0F8W			P	
CPV	CPV30100	–30.00	6	14621.20	–24.00	16.00	0.86	0.70	144.00	MODRSS		46.65		MODTES	CR		82.00		27M0F8W			P	4
ETH	ETH09200	23.00	6	14621.20	40.35	9.19	2.66	2.23	166.11	MODRSS		36.72		MODTES	CR		82.00		27M0F8W			P	4
IND	IND03701	68.00	6	14621.20	93.00	25.50	1.46	1.13	40.00	MODRSS		42.27		MODTES	CR		82.00		27M0F8W			P	1
IND	IND04101	56.00	6	14621.20	78.40	16.00	2.08	1.38	35.00	MODRSS		39.87		MODTES	CR		82.00		27M0F8W			P	1
KOR	KO11201D	116.00	6	14621.20	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0G7W	KOREASAT-1	20	AE	4
KOR	KOR11201	116.00	6	14621.20	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0F8W	KOREASAT-1	20	AE	4
MOZ	MOZ30700	–1.00	6	14621.20	34.00	–18.00	3.57	1.38	55.00	MODRSS		37.52		MODTES	CR		82.00		27M0F8W			P	
NIG	NIG11900	–19.00	6	14621.20	7.80	9.40	2.16	2.02	45.00	MODRSS		38.05		MODTES	CL		82.00		27M0F8W			P	
PAK	PAK12701	38.00	6	14621.20	69.60	29.50	2.30	2.16	14.00	MODRSS		37.49		MODTES	CL		82.00		27M0F8W			P	
PNG	PNG13100	110.00	6	14621.20	147.70	–6.30	2.50	2.18	169.00	MODRSS		37.08		MODTES	CL		89.00		27M0F8W			P	
SNG	SNG15100	74.00	6	14621.20	103.80	1.30	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		82.00		27M0F8W			P	
STP	STP24100	–13.00	6	14621.20	7.00	0.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		82.00		27M0F8W			P	
TGO	TGO22600	–25.00	6	14621.20	0.80	8.60	1.52	0.60	105.00	MODRSS		44.85		MODTES	CR		82.00		27M0F8W			P	
UGA	UGA05100	11.00	6	14621.20	32.30	1.20	1.46	1.12	60.00	MODRSS		42.31		MODTES	CL		82.00		27M0F8W			P	
AFS	AFS02100	5.00	7	14640.38	24.50	–28.00	3.13	1.68	27.00	MODRSS		37.24		MODTES	CR		82.00		27M0F8W			P	
IND	IND04301	56.00	7	14640.38	77.80	11.10	1.36	1.28	172.00	MODRSS		42.04		MODTES	CL		82.00		27M0F8W			P	1
IND	IND04601	68.00	7	14640.38	84.70	20.50	1.60	0.86	30.00	MODRSS		43.06		MODTES	CL		82.00		27M0F8W			P	1
IRN	IRN10901	34.00	7	14640.38	54.20	32.40	3.82	1.82	149.00	MODRSS		36.03		MODTES	CR		82.00		27M0F8W			P	
ISR	ISR1100A	–13.00	7	14640.38	34.90	31.40	0.94	0.60	117.00	MODRSS		46.93		MODTES	CL		82.00		27M0F8W			P	4
MRC	MRC20900	–25.00	7	14640.38	–8.90	28.90	3.96	1.55	50.00	MODRSS		36.57		MODTES	CR		82.00		27M0F8W			P	
SEN	SEN22201	–37.00	7	14640.38	–14.40	13.80	1.46	1.04	139.00	MODRSS		42.63		MODTES	CR		82.00		27M0F8W			P	
YEM	YEM26700	11.00	7	14640.38	48.61	14.42	1.68	1.44	157.35	MODRSS		40.61		MODTES	CR		82.00		27M0F8W			P	4
ZMB	ZMB31400	–1.00	7	14640.38	27.50	–13.10	2.38	1.48	39.00	MODRSS		38.98		MODTES	CL		82.00		27M0F8W			P	
CPV	CPV30100	–30.00	8	14659.56	–24.00	16.00	0.86	0.70	144.00	MODRSS		46.65		MODTES	CR		82.00		27M0F8W			P	4
ETH	ETH09200	23.00	8	14659.56	40.35	9.19	2.66	2.23	166.11	MODRSS		36.72		MODTES	CR		82.00		27M0F8W			P	4
IND	IND04101	56.00	8	14659.56	78.40	16.00	2.08	1.38	35.00	MODRSS		39.87		MODTES	CR		82.00		27M0F8W			P	1
IND	IND04801	68.00	8	14659.56	86.20	25.00	1.56	0.90	120.00	MODRSS		42.97		MODTES	CR		82.00		27M0F8W			P	1
KOR	KO11201D	116.00	8	14659.56	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0G7W	KOREASAT-1	20	AE	4
KOR	KOR11201	116.00	8	14659.56	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0F8W	KOREASAT-1	20	AE	4
MOZ	MOZ30700	–1.00	8	14659.56	34.00	–18.00	3.57	1.38	55.00	MODRSS		37.52		MODTES	CR		82.00		27M0F8W			P	
NIG	NIG11900	–19.00	8	14659.56	7.80	9.40	2.16	2.02	45.00	MODRSS		38.05		MODTES	CL		82.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight Long.°	Boresight Lat.°	Space antenna character. Major°	Minor°	Orient.°	Space antenna	Shaped beam	Space ant. gain Co-polar	X-polar	Earth antenna	Polarization Type	Angle°	e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
PAK	PAK28301	38.00	8	14659.56	74.70	33.90	1.34	1.13	160.00	MODRSS		42.65		MODTES	CL		82.00		27M0F8W			P	
PNG	PNG27100	128.00	8	14659.56	148.00	–6.70	2.80	2.05	155.00	MODRSS		36.86		MODTES	CL		89.00		27M0F8W			P	
STP	STP24100	–13.00	8	14659.56	7.00	0.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		82.00		27M0F8W			P	
UGA	UGA05100	11.00	8	14659.56	32.30	1.20	1.46	1.12	60.00	MODRSS		42.31		MODTES	CL		82.00		27M0F8W			P	
AFS	AFS02100	5.00	9	14678.74	24.50	–28.00	3.13	1.68	27.00	MODRSS		37.24		MODTES	CR		82.00		27M0F8W			P	
IND	IND03801	56.00	9	14678.74	75.90	33.40	1.52	1.08	33.00	MODRSS		42.29		MODTES	CL		82.00		27M0F8W			P	1
IND	IND04401	68.00	9	14678.74	79.50	22.30	2.19	1.42	146.00	MODRSS		39.52		MODTES	CL		82.00		27M0F8W			P	1
ISR	ISR11000	–13.00	9	14678.74	34.90	31.40	0.94	0.60	117.00	MODRSS		46.93		MODTES	CL		82.00		27M0F8W			P	
MRC	MRC20900	–25.00	9	14678.74	–8.90	28.90	3.96	1.55	50.00	MODRSS		36.57		MODTES	CR		82.00		27M0F8W			P	
NMB	NMB02500	–19.00	9	14678.74	17.50	–21.60	2.66	1.90	48.00	MODRSS		37.41		MODTES	CR		82.00		27M0F8W			P	
YEM	YEM26700	11.00	9	14678.74	48.61	14.42	1.68	1.44	157.35	MODRSS		40.61		MODTES	CR		82.00		27M0F8W			P	4
ZMB	ZMB31400	–1.00	9	14678.74	27.50	–13.10	2.38	1.48	39.00	MODRSS		38.98		MODTES	CL		82.00		27M0F8W			P	
ETH	ETH09200	23.00	10	14697.92	40.35	9.19	2.66	2.23	166.11	MODRSS		36.72		MODTES	CR		82.00		27M0F8W			P	4
IND	IND04201	68.00	10	14697.92	79.30	27.70	2.14	1.16	147.00	MODRSS		40.50		MODTES	CR		82.00		27M0F8W			P	1
IND	IND04501	56.00	10	14697.92	76.20	19.50	1.58	1.58	21.00	MODRSS		40.47		MODTES	CR		82.00		27M0F8W			P	1
KOR	KO11201D	116.00	10	14697.92	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0G7W	KOREASAT-1	20	AE	4
KOR	KOR11201	116.00	10	14697.92	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0F8W	KOREASAT-1	20	AE	4
NIG	NIG11900	–19.00	10	14697.92	7.80	9.40	2.16	2.02	45.00	MODRSS		38.05		MODTES	CL		82.00		27M0F8W			P	
PNG	PNG13100	110.00	10	14697.92	147.70	–6.30	2.50	2.18	169.00	MODRSS		37.08		MODTES	CL		89.00		27M0F8W			P	
SNG	SNG15100	74.00	10	14697.92	103.80	1.30	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		82.00		27M0F8W			P	
TGO	TGO22600	–25.00	10	14697.92	0.80	8.60	1.52	0.60	105.00	MODRSS		44.85		MODTES	CR		82.00		27M0F8W			P	
UGA	UGA05100	11.00	10	14697.92	32.30	1.20	1.46	1.12	60.00	MODRSS		42.31		MODTES	CL		82.00		27M0F8W			P	
AFS	AFS02100	5.00	11	14717.10	24.50	–28.00	3.13	1.68	27.00	MODRSS		37.24		MODTES	CR		82.00		27M0F8W			P	
IND	IND04701	68.00	11	14717.10	93.30	11.10	1.92	0.60	96.00	MODRSS		43.83		MODTES	CL		82.00		27M0F8W			P	1
IRN	IRN10901	34.00	11	14717.10	54.20	32.40	3.82	1.82	149.00	MODRSS		36.03		MODTES	CR		82.00		27M0F8W			P	
ISR	ISR11000	–13.00	11	14717.10	34.90	31.40	0.94	0.60	117.00	MODRSS		46.93		MODTES	CL		82.00		27M0F8W			P	
MRC	MRC20900	–25.00	11	14717.10	–8.90	28.90	3.96	1.55	50.00	MODRSS		36.57		MODTES	CR		82.00		27M0F8W			P	
NMB	NMB0250A	–19.00	11	14717.10	17.50	–21.60	2.66	1.90	48.00	MODRSS		37.41		MODTES	CR		82.00		27M0F8W			P	4
SEN	SEN22201	–37.00	11	14717.10	–14.40	13.80	1.46	1.04	139.00	MODRSS		42.63		MODTES	CR		82.00		27M0F8W			P	
ZMB	ZMB31400	–1.00	11	14717.10	27.50	–13.10	2.38	1.48	39.00	MODRSS		38.98		MODTES	CL		82.00		27M0F8W			P	
CPV	CPV30100	–30.00	12	14736.28	–24.00	16.00	0.86	0.70	144.00	MODRSS		46.65		MODTES	CR		82.00		27M0F8W			P	4
ETH	ETH09200	23.00	12	14736.28	40.35	9.19	2.66	2.23	166.11	MODRSS		36.72		MODTES	CR		82.00		27M0F8W			P	4
IND	IND04001	56.00	12	14736.28	73.00	25.00	1.82	1.48	58.00	MODRSS		40.14		MODTES	CR		82.00		27M0F8W			P	1
KOR	KO11201D	116.00	12	14736.28	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0G7W	KOREASAT-1	20	AE	4
KOR	KOR11201	116.00	12	14736.28	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	CL		82.00		27M0F8W	KOREASAT-1	20	AE	4
MOZ	MOZ30700	–1.00	12	14736.28	34.00	–18.00	3.57	1.38	55.00	MODRSS		37.52		MODTES	CR		82.00		27M0F8W			P	
PAK	PAK21001	38.00	12	14736.28	72.10	30.80	1.16	0.72	90.00	MODRSS		45.23		MODTES	CL		82.00		27M0F8W			P	
PNG	PNG27100	128.00	12	14736.28	148.00	–6.70	2.80	2.05	155.00	MODRSS		36.86		MODTES	CL		89.00		27M0F8W			P	
STP	STP24100	–13.00	12	14736.28	7.00	0.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		82.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
IND	IND03901	56.00	13	14755.46	72.70	11.20	1.26	0.60	107.00	MODRSS		45.66		MODTES	CL		82.00		27M0F8W			P	1
NMB	NMB02500	–19.00	13	14755.46	17.50	–21.60	2.66	1.90	48.00	MODRSS		37.41		MODTES	CR		82.00		27M0F8W			P	
IND	IND03701	68.00	14	14774.64	93.00	25.50	1.46	1.13	40.00	MODRSS		42.27		MODTES	CR		82.00		27M0F8W			P	1
PNG	PNG13100	110.00	14	14774.64	147.70	–6.30	2.50	2.18	169.00	MODRSS		37.08		MODTES	CL		89.00		27M0F8W			P	
SNG	SNG15100	74.00	14	14774.64	103.80	1.30	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		82.00		27M0F8W			P	
TGO	TGO22600	–25.00	14	14774.64	0.80	8.60	1.52	0.60	105.00	MODRSS		44.85		MODTES	CR		82.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
AFG	AFG24600	50.00	1	17327.48	67.00	34.30	1.89	1.19	18.00	MODRSS		40.93		MODTES	CL		84.00		27M0F8W			P	
BLR	BLR06200	38.00	1	17327.48	28.04	53.18	1.17	0.60	9.68	MODRSS		45.96		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN15500	62.00	1	17327.48	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN16200	92.00	1	17327.48	108.10	33.70	5.00	4.00	148.00	MODRSS		31.44		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN16300	79.80	1	17327.48	116.00	39.20	1.20	0.80	132.00	MODRSS		44.62		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN19000	122.00	1	17327.48	114.17	23.32	0.91	0.60	2.88	MODRSS		47.08		MODTES	CL		84.00		27M0F8W			P	
CME	CME30000	–13.00	1	17327.48	12.70	6.20	2.54	1.68	87.00	MODRSS		38.15		MODTES	CL		84.00		27M0F8W			P	
E	E 12900	–30.00	1	17327.48	–3.10	39.90	2.10	1.14	154.00	MODRSS		40.66		MODTES	CR		84.00		27M0F8W		17	P	
E	HISPASA4	–30.00	1	17327.48	–3.10	39.90					ECO	43.00	18.70	R13TES	CR		82.50		27M0F8W	HISPASAT-1	17	AE	
E	HISPASA6	–30.00	1	17327.48	–3.10	39.90					ECO	43.00	18.70	R13TES	CR		83.50		27M0F8W	HISPASAT-1	17	AE	
EST	EST06100	23.00	1	17327.48	25.36	59.31	0.68	0.60	2.17	MODRSS		48.37		MODTES	CR		84.00		27M0F8W			P	
F	F 09300	–19.00	1	17327.48	2.60	45.90	2.50	0.98	160.00	R13RSS		40.56		R13TES	CL		84.00		27M0F8W		19	PE	
F /EUT	E2WA7DA1	29.00	1	17327.48	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	1	17327.48	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	1	17327.48	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	1	17327.48	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	1	17327.48	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	1	17327.48	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	1	17327.48	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FJI	FJI19300	152.00	1	17327.48	179.40	–17.90	1.04	0.98	67.00	MODRSS		44.36		MODTES	CL		84.00		27M0F8W			P	
GUI	GUI19200	–37.00	1	17327.48	–11.00	10.20	1.58	1.04	147.00	MODRSS		42.29		MODTES	CR		85.00		27M0F8W			P	
HRV	HRV14800	34.00	1	17327.48	16.74	44.54	0.88	0.69	5.30	MODRSS		46.57		MODTES	CR		84.00		27M0F8W			P	
IND	IND03900	56.00	1	17327.48	72.70	11.20	1.26	0.60	107.00	MODRSS		45.66		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03500	104.00	1	17327.48	115.20	–1.70	9.14	3.43	170.00	MODRSS		29.48		MODTES	CL		84.00		27M0F8W			P	
J	000BS-3N	109.85	1	17327.48	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	1	17327.48	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W		33	PE	
LBY	LBY28000	–25.00	1	17327.48	17.50	26.30	3.68	1.84	130.00	MODRSS		36.14		MODTES	CR		84.00		27M0F8W			P	
MDG	MDG23600	29.00	1	17327.48	46.20	–18.60	2.57	0.80	67.00	MODRSS		41.32		MODTES	CR		84.00		27M0F8W			P	
NZL	NZL05500	158.00	1	17327.48	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CL		84.00		27M0F8W			P	
POL	POL13200	–1.00	1	17327.48	17.20	51.80	2.00	2.00	0.00	MODRSS		38.43		MODTES	CR		87.00		27M0F8W			P	
QAT	QAT24700	17.00	1	17327.48	51.10	25.30	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
SLM	SLM00000	146.00	1	17327.48	159.32	–8.40	1.50	1.18	140.48	MODRSS		41.98		MODTES	CR		84.00		27M0F8W			P	
SMR	SMR31100	–37.00	1	17327.48	12.50	43.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		83.00		27M0F8W			P	
SWZ	SWZ31300	–1.00	1	17327.48	31.50	–26.50	0.62	0.60	66.00	MODRSS		48.74		MODTES	CL		82.00		27M0F8W			P	
THA	THA14200	74.00	1	17327.48	100.70	13.20	2.82	1.54	106.00	MODRSS		38.07		MODTES	CL		84.00		27M0F8W			P	
TJK	TJK06900	44.00	1	17327.48	71.14	38.37	1.25	0.76	159.15	MODRSS		44.65		MODTES	CR		84.00		27M0F8W			P	
TUR	TUR14500	5.00	1	17327.48	34.30	39.00	3.13	1.38	168.00	MODRSS		38.09		MODTES	CL		84.00		27M0F8W			P	
TZA	TZA22500	11.00	1	17327.48	34.60	–6.20	2.41	1.72	129.00	MODRSS		38.27		MODTES	CL		84.00		27M0F8W			P	
USA	PLM33700	170.00	1	17327.48	–166.30	–0.20	7.97	1.04	72.00	MODRSS		35.26		MODTES	CL		87.00		27M0F8W		9	P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight Long.°	Boresight Lat.°	Space antenna character. Major°	Minor°	Orient.°	Space antenna	Shaped beam	Space ant. gain Co-polar	X-polar	Earth antenna	Polarization Type	Angle°	e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
USA	PLM33701	170.00	1	17327.48	–124.80	39.10	4.43	0.73	132.00	MODRSS		39.35		MODTES	CL		87.00		27M0F8W		9	P	
USA	WAK33400	140.00	1	17327.48	152.50	11.70	7.89	3.52	0.00	MODRSS		30.01		MODTES	CR		87.00		27M0F8W		11	P	
USA	WAK33401	140.00	1	17327.48	–157.50	21.00	1.63	0.67	131.00	MODRSS		44.06		MODTES	CL		87.00		27M0F8W		11	P	
YUG	YUG14800	–7.00	1	17327.48	20.50	43.98	0.91	0.60	145.16	MODRSS		47.07		MODTES	CL		84.00		27M0F8W			P	
	YYY00001	11.00	1	17327.48	34.99	31.86	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	8
ALG	ALG25100	–25.00	2	17346.66	1.50	27.60	3.65	2.94	135.00	MODRSS		34.14		MODTES	CL		84.00		27M0F8W			P	
ARS	ARS27500	17.00	2	17346.66	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CR		84.00		27M0F8W			P	
AUS	AUS00800	164.00	2	17346.66	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CL		87.00		27M0F8W			P	
BIH	BIH14800	34.00	2	17346.66	17.77	44.32	0.62	0.60	166.84	MODRSS		48.71		MODTES	CL		84.00		27M0F8W			P	
BOT	BOT29700	–1.00	2	17346.66	23.30	–22.20	2.13	1.50	36.00	MODRSS		39.40		MODTES	CR		85.00		27M0F8W			P	
CHN	CHN15400	62.00	2	17346.66	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN16100	92.00	2	17346.66	108.10	33.70	5.00	4.00	148.00	MODRSS		31.44		MODTES	CL		84.00		27M0F8W			P	
CLN	CLN21900	50.00	2	17346.66	80.60	7.70	1.18	0.60	106.00	MODRSS		45.95		MODTES	CL		84.00		27M0F8W			P	
COD	ZAI32300	–19.00	2	17346.66	21.30	–6.80	2.80	1.52	149.00	MODRSS		38.16		MODTES	CL		84.00		27M0F8W			P	
D	D 08700	–19.00	2	17346.66	9.60	49.90	1.62	0.72	147.00	MODRSS		43.78		MODTES	CR		84.00		27M0F8W			P	2
F	F2_A2722	–7.00	2	17346.66	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2722	–7.00	2	17346.66	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2728	–7.00	2	17346.66	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2722	–7.00	2	17346.66	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A2728	–7.00	2	17346.66	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3322	–7.00	2	17346.66	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_A3328	–7.00	2	17346.66	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2722	–7.00	2	17346.66	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D2728	–7.00	2	17346.66	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3322	–7.00	2	17346.66	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3328	–7.00	2	17346.66	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	NCL10000	140.00	2	17346.66	166.00	–21.00	1.14	0.72	146.00	MODRSS		45.30		MODTES	CL		84.00		27M0F8W		6	P	
F	NCL10001	140.00	2	17346.66	–177.10	–13.60	1.22	0.60	46.00	MODRSS		45.80		MODTES	CL		84.00		27M0F8W		6	P	
F	WAL10200	140.00	2	17346.66	–176.80	–14.00	0.74	0.60	29.00	MODRSS		47.97		MODTES	CL		84.00		27M0F8W		6	P	
F	WAL10201	140.00	2	17346.66	166.10	–21.30	1.31	0.82	133.00	MODRSS		44.16		MODTES	CL		84.00		27M0F8W		6	P	
F /EUT	E2WA7DA2	29.00	2	17346.66	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	2	17346.66	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	2	17346.66	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	2	17346.66	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	2	17346.66	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	2	17346.66	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	2	17346.66	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FIN	FIN10300	5.00	2	17346.66	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
GNB	GNB30400	–30.00	2	17346.66	–15.00	12.00	0.90	0.60	172.00	MODRSS		47.12		MODTES	CR		84.00		27M0F8W			P	
IND	IND03700	68.00	2	17346.66	93.00	25.50	1.46	1.13	40.00	MODRSS		42.27		MODTES	CR		84.00		27M0F8W			P	1

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
INS	INS02800	80.20	2	17346.66	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CR		84.00		27M0F8W			P	
IRL	IRL21100	–33.50	2	17346.66	–8.20	53.20	0.84	0.60	162.00	MODRSS		47.42		MODTES	CL		84.00		27M0F8W			P	5, 6
KOR	KOR11200	110.00	2	17346.66	127.50	36.00	1.24	1.02	168.00	MODRSS		43.43		MODTES	CL		89.00		27M0F8W			P	
LAO	LAO28400	74.00	2	17346.66	103.70	18.10	2.16	0.78	133.00	MODRSS		42.18		MODTES	CR		84.00		27M0F8W			P	
MAU	MAU24200	29.00	2	17346.66	59.80	–18.90	1.62	1.24	55.00	MODRSS		41.42		MODTES	CL		84.00		27M0F8W			P	
MHL	MHL00000	146.00	2	17346.66	167.64	9.83	2.07	0.90	157.42	MODRSS		41.75		MODTES	CL		84.00		27M0F8W			P	
MKD	MKD14800	23.00	2	17346.66	21.53	41.50	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
MLA	MLA22800	86.00	2	17346.66	114.10	3.90	2.34	1.12	45.00	MODRSS		40.26		MODTES	CL		84.00		27M0F8W			P	
MLI	MLI32700	–37.00	2	17346.66	–2.00	19.00	2.66	1.26	127.00	MODRSS		39.19		MODTES	CL		87.00		27M0F8W			P	
NOR	BIFROS22	–0.80	2	17346.66	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CL		84.00		27M0FXF	BIFROST-2		A	
NZL	CKH05200	158.00	2	17346.66	–161.00	–19.80	1.02	0.64	132.00	MODRSS		46.30		MODTES	CR		84.00		27M0F8W		3	P	
NZL	CKH05201	158.00	2	17346.66	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CR		84.00		27M0F8W		3	P	
PAK	PAK12700	38.00	2	17346.66	69.60	29.50	2.30	2.16	14.00	MODRSS		37.49		MODTES	CL		84.00		27M0F8W			P	
SOM	SOM31200	23.00	2	17346.66	45.00	6.40	3.26	1.54	71.00	MODRSS		37.44		MODTES	CL		84.00		27M0F8W			P	
TCD	TCD14300	–13.00	2	17346.66	18.10	15.50	3.40	1.72	107.00	MODRSS		36.78		MODTES	CR		84.00		27M0F8W			P	
TUV	TUV00000	176.00	2	17346.66	177.61	–7.11	0.94	0.60	137.58	MODRSS		46.93		MODTES	CR		84.00		27M0F8W			P	
YEM	YEM26600	11.00	2	17346.66	44.36	15.70	0.77	0.60	104.23	MODRSS		47.78		MODTES	CL		84.00		27M0F8W			P	
AFG	AFG24500	50.00	3	17365.84	67.00	34.30	1.89	1.19	18.00	MODRSS		40.93		MODTES	CL		84.00		27M0F8W			P	
AUS	AUS00400	152.00	3	17365.84	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040A	152.00	3	17365.84	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040B	152.00	3	17365.84	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040C	152.00	3	17365.84	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS00700	164.00	3	17365.84	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		77	P	
AUS	AUS0070A	164.00	3	17365.84	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		77	P	
BEN	BEN23300	–19.00	3	17365.84	2.20	9.50	1.44	0.68	97.00	MODRSS		44.54		MODTES	CR		84.00		27M0F8W			P	
BRU	BRU3300A	74.00	3	17365.84	114.70	4.40	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15700	62.00	3	17365.84	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN16000	92.00	3	17365.84	108.10	33.70	5.00	4.00	148.00	MODRSS		31.44		MODTES	CR		84.00		27M0F8W			P	
COM	COM20700	29.00	3	17365.84	44.10	–12.10	0.76	0.60	149.00	MODRSS		47.86		MODTES	CR		84.00		27M0F8W			P	
F	F2_A2733	–7.00	3	17365.84	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		84.00		27M0F9W	RADIOSAT-2	19	A	
F /EUT	E2WA7DA1	29.00	3	17365.84	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	3	17365.84	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	3	17365.84	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	3	17365.84	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	3	17365.84	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	3	17365.84	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	3	17365.84	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FSM	FSM00000	146.00	3	17365.84	151.67	5.42	5.34	1.51	166.52	MODRSS		35.37		MODTES	CR		84.00		27M0F8W			P	
GAB	GAB26000	–13.00	3	17365.84	11.80	–0.60	1.43	1.12	64.00	MODRSS		42.40		MODTES	CL		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
GMB	GMB30200	–37.00	3	17365.84	–15.10	13.40	0.79	0.60	4.00	MODRSS		47.69		MODTES	CR		83.00		27M0F8W			P	
GRC	GRC10500	5.00	3	17365.84	24.50	38.00	2.03	1.29	159.00	MODRSS		40.27		MODTES	CL		84.00		27M0F8W			P	
IND	IND04300	56.00	3	17365.84	77.80	11.10	1.36	1.28	172.00	MODRSS		42.04		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03600	104.00	3	17365.84	115.20	–1.70	9.14	3.43	170.00	MODRSS		29.48		MODTES	CL		84.00		27M0F8W			P	
IRN	IRN10900	34.00	3	17365.84	54.20	32.40	3.82	1.82	149.00	MODRSS		36.03		MODTES	CR		84.00		27M0F8W			P	
J	000BS-3N	109.85	3	17365.84	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	3	17365.84	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W		33	PE	
KIR	KIR00001	176.00	3	17365.84	177.16	–0.79	4.47	1.27	163.00	MODRSS		36.91		MODTES	CL		84.00		27M0F8W			P	
LBN	LBN27900	11.00	3	17365.84	35.90	33.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
LBR	LBR24400	–33.50	3	17365.84	–9.30	6.60	1.22	0.70	133.00	MODRSS		45.13		MODTES	CL		84.00		27M0F8W			P	5, 6
LBY	LBY32100	–25.00	3	17365.84	17.50	26.30	3.68	1.84	130.00	MODRSS		36.14		MODTES	CR		84.00		27M0F8W			P	
LIE	LIE25300	–37.00	3	17365.84	9.50	47.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
LTU	LTU06100	23.00	3	17365.84	24.02	55.46	0.72	0.60	173.90	MODRSS		48.11		MODTES	CR		84.00		27M0F8W			P	
LUX	LUX11400	–19.00	3	17365.84	6.00	49.80	0.68	0.68	0.00	MODRSS		47.80		MODTES	CL		84.00		27M0F8W			P	
NRU	NRU30900	134.00	3	17365.84	167.00	–0.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
POR	POR13300	–30.00	3	17365.84	–8.00	39.60	0.92	0.60	112.00	MODRSS		47.03		MODTES	CR		84.00		27M0F8W			P	
ROU	ROU13600	–1.00	3	17365.84	25.00	45.70	1.38	0.66	155.00	MODRSS		44.85		MODTES	CR		86.00		27M0F8W			P	
SMO	SMO05700	158.00	3	17365.84	–172.30	–13.70	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
SVK	SVK14400	17.00	3	17365.84	19.65	48.69	0.82	0.60	5.20	MODRSS		47.53		MODTES	CL		84.00		27M0F8W			P	
UKR	UKR06300	38.00	3	17365.84	31.82	48.19	2.32	0.95	177.32	MODRSS		41.01		MODTES	CR		84.00		27M0F8W			P	
USA	MRA33200	122.00	3	17365.84	151.10	11.60	6.48	3.49	179.00	MODRSS		30.90		MODTES	CL		87.00		27M0F8W		14	P	
USA	MRA33201	122.00	3	17365.84	–157.50	21.00	2.02	0.60	115.00	MODRSS		43.61		MODTES	CL		87.00		27M0F8W		14	P	
USA	SMA33500	170.00	3	17365.84	–166.30	–0.20	7.97	1.04	72.00	MODRSS		35.26		MODTES	CR		87.00		27M0F8W		13	P	
USA	SMA33501	170.00	3	17365.84	–124.80	39.20	4.43	0.73	132.00	MODRSS		39.35		MODTES	CR		87.00		27M0F8W		13	P	
UZB	UZB07100	44.00	3	17365.84	64.01	41.21	2.67	0.96	163.32	MODRSS		40.37		MODTES	CR		84.00		27M0F8W			P	
VTN	VTN32500	86.00	3	17365.84	108.00	14.80	3.80	1.90	126.00	MODRSS		35.86		MODTES	CR		84.00		27M0F8W			P	
VUT	VUT12800	140.00	3	17365.84	168.00	–16.40	1.52	0.68	87.00	MODRSS		44.30		MODTES	CR		84.00		27M0F8W			P	
ALG	ALG25200	–25.00	4	17385.02	1.50	27.60	3.65	2.94	135.00	MODRSS		34.14		MODTES	CL		84.00		27M0F8W			P	
AND	AND34100	–37.00	4	17385.02	1.60	42.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
ARS	ARS00300	17.00	4	17385.02	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CR		84.00		27M0F8W			P	
AUS	AUS00500	152.00	4	17385.02	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
AUT	AUT01600	–19.00	4	17385.02	12.20	47.50	1.14	0.63	166.00	MODRSS		45.88		MODTES	CR		84.00		27M0F8W			P	
AZE	AZE06400	23.00	4	17385.02	47.47	40.14	0.93	0.60	158.14	MODRSS		46.98		MODTES	CL		84.00		27M0F8W			P	
BUL	BUL02000	–1.00	4	17385.02	25.00	43.00	2.00	2.00	0.00	MODRSS		38.43		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15600	62.00	4	17385.02	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN16100	92.00	4	17385.02	108.10	33.70	5.00	4.00	148.00	MODRSS		31.44		MODTES	CL		84.00		27M0F8W			P	
COD	ZAI32200	–19.00	4	17385.02	22.40	0.00	2.16	1.88	48.00	MODRSS		38.36		MODTES	CL		84.00		27M0F8W			P	
EGY	EGY02600	–7.00	4	17385.02	29.70	26.80	2.33	1.72	136.00	MODRSS		38.42		MODTES	CR		86.00		27M0F8W			P	
F	F2_A2744	–7.00	4	17385.02	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	OCE10100	–160.00	4	17385.02	–145.00	–16.30	4.34	3.54	4.00	MODRSS		32.58		MODTES	CR		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
F /EUT	E2WA7DA2	29.00	4	17385.02	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	4	17385.02	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	4	17385.02	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	4	17385.02	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	4	17385.02	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	4	17385.02	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	4	17385.02	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
G	G 02700	–33.50	4	17385.02	–3.50	53.80	1.84	0.72	142.00	MODRSS		43.23		MODTES	CL		84.00		27M0F8W			P	5, 6
IND	IND04800	68.00	4	17385.02	86.20	25.00	1.56	0.90	120.00	MODRSS		42.97		MODTES	CR		86.00		27M0F8W			P	1
INS	INS02800	80.20	4	17385.02	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CR		84.00		27M0F8W			P	
KOR	KOR11200	110.00	4	17385.02	127.50	36.00	1.24	1.02	168.00	MODRSS		43.43		MODTES	CL		89.00		27M0F8W			P	
LAO	LAO28400	74.00	4	17385.02	103.70	18.10	2.16	0.78	133.00	MODRSS		42.18		MODTES	CR		84.00		27M0F8W			P	
MAU	MAU24300	29.00	4	17385.02	56.80	–13.90	1.56	1.38	65.00	MODRSS		41.12		MODTES	CL		84.00		27M0F8W			P	
MDA	MDA06300	38.00	4	17385.02	28.41	46.99	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
MLA	MLA22800	86.00	4	17385.02	114.10	3.90	2.34	1.12	45.00	MODRSS		40.26		MODTES	CL		84.00		27M0F8W			P	
MLD	MLD3060A	44.00	4	17385.02	73.10	6.00	0.96	0.60	90.00	MODRSS		46.84		MODTES	CR		84.00		27M0F8W			P	
MLI	MLI32800	–37.00	4	17385.02	–7.60	13.20	1.74	1.24	171.00	MODRSS		41.11		MODTES	CL		87.00		27M0F8W			P	
MLT	MLT14700	–13.00	4	17385.02	14.30	35.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
NZL	CKH05300	158.00	4	17385.02	–161.00	–19.80	1.00	0.60	132.00	MODRSS		46.67		MODTES	CR		84.00		27M0F8W		4	P	
NZL	CKH05301	158.00	4	17385.02	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CR		84.00		27M0F8W		4	P	
PAK	PAK28300	38.00	4	17385.02	74.70	33.90	1.34	1.13	160.00	MODRSS		42.65		MODTES	CL		84.00		27M0F8W			P	
PLW	PLW00000	146.00	4	17385.02	132.99	5.52	1.29	0.60	55.84	MODRSS		45.55		MODTES	CL		84.00		27M0F8W			P	
RRW	RRW31000	11.00	4	17385.02	30.00	–2.10	0.66	0.60	42.00	MODRSS		48.47		MODTES	CR		84.00		27M0F8W			P	
S	S 13800	5.00	4	17385.02	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W		27	P	
S	SIRIUS01	5.20	4	17385.02	14.00	63.00	1.30	0.70	142.00	R13RSS		43.00		R13TES	CL		84.00		27M0F8W	SIRIUS	27	AE	
SVN	SVN14800	34.00	4	17385.02	15.01	46.18	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
AFG	AFG24600	50.00	5	17404.20	67.00	34.30	1.89	1.19	18.00	MODRSS		40.93		MODTES	CL		84.00		27M0F8W			P	
BLR	BLR06200	38.00	5	17404.20	28.04	53.18	1.17	0.60	9.68	MODRSS		45.96		MODTES	CR		84.00		27M0F8W			P	
BTN	BTN03100	86.00	5	17404.20	90.44	27.05	0.72	0.60	175.47	MODRSS		48.11		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15500	62.00	5	17404.20	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN16200	92.00	5	17404.20	108.10	33.70	5.00	4.00	148.00	MODRSS		31.44		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN16400	79.80	5	17404.20	112.20	37.40	1.06	0.76	111.00	MODRSS		45.39		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN19000	122.00	5	17404.20	114.17	23.32	0.91	0.60	2.88	MODRSS		47.08		MODTES	CL		84.00		27M0F8W			P	
CME	CME30000	–13.00	5	17404.20	12.70	6.20	2.54	1.68	87.00	MODRSS		38.15		MODTES	CL		84.00		27M0F8W			P	
E	E 12900	–30.00	5	17404.20	–3.10	39.90	2.10	1.14	154.00	MODRSS		40.66		MODTES	CR		84.00		27M0F8W		17	P	
E	HISPASA4	–30.00	5	17404.20	–3.10	39.90					ECO	43.00	18.70	R13TES	CR		82.50		27M0F8W	HISPASAT-1	17	AE	
E	HISPASA6	–30.00	5	17404.20	–3.10	39.90					ECO	43.00	18.70	R13TES	CR		83.50		27M0F8W	HISPASAT-1	17	AE	
EST	EST06100	23.00	5	17404.20	25.36	59.31	0.68	0.60	2.17	MODRSS		48.37		MODTES	CR		84.00		27M0F8W			P	
F	F 09300	–19.00	5	17404.20	2.60	45.90	2.50	0.98	160.00	R13RSS		40.56		R13TES	CL		84.00		27M0F8W		19	PE	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight Long.°	Boresight Lat.°	Space antenna character. Major°	Minor°	Orient.°	Space antenna	Shaped beam	Space ant. gain Co-polar	X-polar	Earth antenna	Polarization Type	Angle°	e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
F /EUT	E2WA7DA1	29.00	5	17404.20	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	5	17404.20	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	5	17404.20	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	5	17404.20	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	5	17404.20	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	5	17404.20	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	5	17404.20	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FJI	FJI19300	152.00	5	17404.20	179.40	–17.90	1.04	0.98	67.00	MODRSS		44.36		MODTES	CL		84.00		27M0F8W			P	
GUI	GUI19200	–37.00	5	17404.20	–11.00	10.20	1.58	1.04	147.00	MODRSS		42.29		MODTES	CR		85.00		27M0F8W			P	
HRV	HRV14800	34.00	5	17404.20	16.74	44.54	0.88	0.69	5.30	MODRSS		46.57		MODTES	CR		84.00		27M0F8W			P	
IND	IND04400	68.00	5	17404.20	79.50	22.30	2.19	1.42	146.00	MODRSS		39.52		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03500	104.00	5	17404.20	115.20	–1.70	9.14	3.43	170.00	MODRSS		29.48		MODTES	CL		84.00		27M0F8W			P	
J	000BS-3N	109.85	5	17404.20	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	5	17404.20	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W		33	PE	
LBY	LBY28000	–25.00	5	17404.20	17.50	26.30	3.68	1.84	130.00	MODRSS		36.14		MODTES	CR		84.00		27M0F8W			P	
MDG	MDG23600	29.00	5	17404.20	46.20	–18.60	2.57	0.80	67.00	MODRSS		41.32		MODTES	CR		84.00		27M0F8W			P	
NZL	NZL05500	158.00	5	17404.20	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CL		84.00		27M0F8W			P	
POL	POL13200	–1.00	5	17404.20	17.20	51.80	2.00	2.00	0.00	MODRSS		38.43		MODTES	CR		87.00		27M0F8W			P	
QAT	QAT24700	17.00	5	17404.20	51.10	25.30	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
SLM	SLM00000	146.00	5	17404.20	159.32	–8.40	1.50	1.18	140.48	MODRSS		41.98		MODTES	CR		84.00		27M0F8W			P	
SMR	SMR31100	–37.00	5	17404.20	12.50	43.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		83.00		27M0F8W			P	
SWZ	SWZ31300	–1.00	5	17404.20	31.50	–26.50	0.62	0.60	66.00	MODRSS		48.74		MODTES	CL		82.00		27M0F8W			P	
THA	THA14200	74.00	5	17404.20	100.70	13.20	2.82	1.54	106.00	MODRSS		38.07		MODTES	CL		84.00		27M0F8W			P	
TJK	TJK06900	44.00	5	17404.20	71.14	38.37	1.25	0.76	159.15	MODRSS		44.65		MODTES	CR		84.00		27M0F8W			P	
TUR	TUR14500	5.00	5	17404.20	34.30	39.00	3.13	1.38	168.00	MODRSS		38.09		MODTES	CL		84.00		27M0F8W			P	
TZA	TZA22500	11.00	5	17404.20	34.60	–6.20	2.41	1.72	129.00	MODRSS		38.27		MODTES	CL		84.00		27M0F8W			P	
USA	PLM33700	170.00	5	17404.20	–166.30	–0.20	7.97	1.04	72.00	MODRSS		35.26		MODTES	CL		87.00		27M0F8W		9	P	
USA	PLM33701	170.00	5	17404.20	–124.80	39.10	4.43	0.73	132.00	MODRSS		39.35		MODTES	CL		87.00		27M0F8W		9	P	
USA	WAK33400	140.00	5	17404.20	152.50	11.70	7.89	3.52	0.00	MODRSS		30.01		MODTES	CR		87.00		27M0F8W		11	P	
USA	WAK33401	140.00	5	17404.20	–157.50	21.00	1.63	0.67	131.00	MODRSS		44.06		MODTES	CL		87.00		27M0F8W		11	P	
YUG	YUG14800	–7.00	5	17404.20	20.50	43.98	0.91	0.60	145.16	MODRSS		47.07		MODTES	CL		84.00		27M0F8W			P	
	YYY00001	11.00	5	17404.20	34.99	31.86	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	8
ALG	ALG25100	–25.00	6	17423.38	1.50	27.60	3.65	2.94	135.00	MODRSS		34.14		MODTES	CL		84.00		27M0F8W			P	
ARS	ARS27500	17.00	6	17423.38	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CR		84.00		27M0F8W			P	
AUS	AUS00800	164.00	6	17423.38	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CL		87.00		27M0F8W			P	
BIH	BIH14800	34.00	6	17423.38	17.77	44.32	0.62	0.60	166.84	MODRSS		48.71		MODTES	CL		84.00		27M0F8W			P	
BOT	BOT29700	–1.00	6	17423.38	23.30	–22.20	2.13	1.50	36.00	MODRSS		39.40		MODTES	CR		85.00		27M0F8W			P	
CHN	CHN15400	62.00	6	17423.38	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN16100	92.00	6	17423.38	108.10	33.70	5.00	4.00	148.00	MODRSS		31.44		MODTES	CL		84.00		27M0F8W			P	
CLN	CLN21900	50.00	6	17423.38	80.60	7.70	1.18	0.60	106.00	MODRSS		45.95		MODTES	CL		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
COD	ZAI32300	–19.00	6	17423.38	21.30	–6.80	2.80	1.52	149.00	MODRSS		38.16		MODTES	CL		84.00		27M0F8W			P	
D	D 08700	–19.00	6	17423.38	9.60	49.90	1.62	0.72	147.00	MODRSS		43.78		MODTES	CR		84.00		27M0F8W			P	2
F	F2_A2722	–7.00	6	17423.38	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2722	–7.00	6	17423.38	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2728	–7.00	6	17423.38	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2722	–7.00	6	17423.38	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A2728	–7.00	6	17423.38	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3322	–7.00	6	17423.38	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_A3328	–7.00	6	17423.38	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2722	–7.00	6	17423.38	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D2728	–7.00	6	17423.38	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3322	–7.00	6	17423.38	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3328	–7.00	6	17423.38	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	NCL10000	140.00	6	17423.38	166.00	–21.00	1.14	0.72	146.00	MODRSS		45.30		MODTES	CL		84.00		27M0F8W		6	P	
F	NCL10001	140.00	6	17423.38	–177.10	–13.60	1.22	0.60	46.00	MODRSS		45.80		MODTES	CL		84.00		27M0F8W		6	P	
F	WAL10200	140.00	6	17423.38	–176.80	–14.00	0.74	0.60	29.00	MODRSS		47.97		MODTES	CL		84.00		27M0F8W		6	P	
F	WAL10201	140.00	6	17423.38	166.10	–21.30	1.31	0.82	133.00	MODRSS		44.16		MODTES	CL		84.00		27M0F8W		6	P	
F /EUT	E2WA7DA2	29.00	6	17423.38	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	6	17423.38	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	6	17423.38	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	6	17423.38	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	6	17423.38	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	6	17423.38	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	6	17423.38	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FIN	FIN10300	5.00	6	17423.38	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
GNB	GNB30400	–30.00	6	17423.38	–15.00	12.00	0.90	0.60	172.00	MODRSS		47.12		MODTES	CR		84.00		27M0F8W			P	
IND	IND04500	56.00	6	17423.38	76.20	19.50	1.58	1.58	21.00	MODRSS		40.47		MODTES	CR		84.00		27M0F8W			P	1
INS	INS02800	80.20	6	17423.38	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CR		84.00		27M0F8W			P	
IRL	IRL21100	–33.50	6	17423.38	–8.20	53.20	0.84	0.60	162.00	MODRSS		47.42		MODTES	CL		84.00		27M0F8W			P	5, 6
KOR	KOR11200	110.00	6	17423.38	127.50	36.00	1.24	1.02	168.00	MODRSS		43.43		MODTES	CL		89.00		27M0F8W			P	
LAO	LAO28400	74.00	6	17423.38	103.70	18.10	2.16	0.78	133.00	MODRSS		42.18		MODTES	CR		84.00		27M0F8W			P	
MAU	MAU24200	29.00	6	17423.38	59.80	–18.90	1.62	1.24	55.00	MODRSS		41.42		MODTES	CL		84.00		27M0F8W			P	
MHL	MHL00000	146.00	6	17423.38	167.64	9.83	2.07	0.90	157.42	MODRSS		41.75		MODTES	CL		84.00		27M0F8W			P	
MKD	MKD14800	23.00	6	17423.38	21.53	41.50	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
MLA	MLA22800	86.00	6	17423.38	114.10	3.90	2.34	1.12	45.00	MODRSS		40.26		MODTES	CL		84.00		27M0F8W			P	
MLI	MLI32700	–37.00	6	17423.38	–2.00	19.00	2.66	1.26	127.00	MODRSS		39.19		MODTES	CL		87.00		27M0F8W			P	
NOR	BIFROS22	–0.80	6	17423.38	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CL		84.00		27M0FXF	BIFROST-2		A	
NZL	CKH05200	158.00	6	17423.38	–161.00	–19.80	1.02	0.64	132.00	MODRSS		46.30		MODTES	CR		84.00		27M0F8W		3	P	
NZL	CKH05201	158.00	6	17423.38	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CR		84.00		27M0F8W		3	P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
PAK	PAK12700	38.00	6	17423.38	69.60	29.50	2.30	2.16	14.00	MODRSS		37.49		MODTES	CL		84.00		27M0F8W			P	
SOM	SOM31200	23.00	6	17423.38	45.00	6.40	3.26	1.54	71.00	MODRSS		37.44		MODTES	CL		84.00		27M0F8W			P	
TCD	TCD14300	–13.00	6	17423.38	18.10	15.50	3.40	1.72	107.00	MODRSS		36.78		MODTES	CR		84.00		27M0F8W			P	
TUV	TUV00000	176.00	6	17423.38	177.61	–7.11	0.94	0.60	137.58	MODRSS		46.93		MODTES	CR		84.00		27M0F8W			P	
YEM	YEM26600	11.00	6	17423.38	44.36	15.70	0.77	0.60	104.23	MODRSS		47.78		MODTES	CL		84.00		27M0F8W			P	
AFG	AFG24500	50.00	7	17442.56	67.00	34.30	1.89	1.19	18.00	MODRSS		40.93		MODTES	CL		84.00		27M0F8W			P	
AUS	AUS00400	152.00	7	17442.56	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040A	152.00	7	17442.56	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040B	152.00	7	17442.56	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040C	152.00	7	17442.56	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS00700	164.00	7	17442.56	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		77	P	
AUS	AUS0070A	164.00	7	17442.56	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		77	P	
BEN	BEN23300	–19.00	7	17442.56	2.20	9.50	1.44	0.68	97.00	MODRSS		44.54		MODTES	CR		84.00		27M0F8W			P	
BRU	BRU3300A	74.00	7	17442.56	114.70	4.40	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15700	62.00	7	17442.56	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN16000	92.00	7	17442.56	108.10	33.70	5.00	4.00	148.00	MODRSS		31.44		MODTES	CR		84.00		27M0F8W			P	
COM	COM20700	29.00	7	17442.56	44.10	–12.10	0.76	0.60	149.00	MODRSS		47.86		MODTES	CR		84.00		27M0F8W			P	
F	F2_A2733	–7.00	7	17442.56	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		84.00		27M0F9W	RADIOSAT-2	19	A	
F /EUT	E2WA7DA1	29.00	7	17442.56	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	7	17442.56	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	7	17442.56	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	7	17442.56	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	7	17442.56	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	7	17442.56	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	7	17442.56	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FSM	FSM00000	146.00	7	17442.56	151.67	5.42	5.34	1.51	166.52	MODRSS		35.37		MODTES	CR		84.00		27M0F8W			P	
GAB	GAB26000	–13.00	7	17442.56	11.80	–0.60	1.43	1.12	64.00	MODRSS		42.40		MODTES	CL		84.00		27M0F8W			P	
GMB	GMB30200	–37.00	7	17442.56	–15.10	13.40	0.79	0.60	4.00	MODRSS		47.69		MODTES	CR		83.00		27M0F8W			P	
GRC	GRC10500	5.00	7	17442.56	24.50	38.00	2.03	1.29	159.00	MODRSS		40.27		MODTES	CL		84.00		27M0F8W			P	
IND	IND04700	68.00	7	17442.56	93.30	11.10	1.92	0.60	96.00	MODRSS		43.83		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03600	104.00	7	17442.56	115.20	–1.70	9.14	3.43	170.00	MODRSS		29.48		MODTES	CL		84.00		27M0F8W			P	
IRN	IRN10900	34.00	7	17442.56	54.20	32.40	3.82	1.82	149.00	MODRSS		36.03		MODTES	CR		84.00		27M0F8W			P	
J	000BS-3N	109.85	7	17442.56	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	7	17442.56	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W		33	PE	
KIR	KIR00001	176.00	7	17442.56	177.16	–0.79	4.47	1.27	163.00	MODRSS		36.91		MODTES	CL		84.00		27M0F8W			P	
LBN	LBN27900	11.00	7	17442.56	35.90	33.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
LBR	LBR24400	–33.50	7	17442.56	–9.30	6.60	1.22	0.70	133.00	MODRSS		45.13		MODTES	CL		84.00		27M0F8W			P	5, 6
LBY	LBY32100	–25.00	7	17442.56	17.50	26.30	3.68	1.84	130.00	MODRSS		36.14		MODTES	CR		84.00		27M0F8W			P	
LIE	LIE25300	–37.00	7	17442.56	9.50	47.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
LTU	LTU06100	23.00	7	17442.56	24.02	55.46	0.72	0.60	173.90	MODRSS		48.11		MODTES	CR		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
LUX	LUX11400	–19.00	7	17442.56	6.00	49.80	0.68	0.68	0.00	MODRSS		47.80		MODTES	CL		84.00		27M0F8W			P	
NRU	NRU30900	134.00	7	17442.56	167.00	–0.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
POR	POR13300	–30.00	7	17442.56	–8.00	39.60	0.92	0.60	112.00	MODRSS		47.03		MODTES	CR		84.00		27M0F8W			P	
ROU	ROU13600	–1.00	7	17442.56	25.00	45.70	1.38	0.66	155.00	MODRSS		44.85		MODTES	CR		86.00		27M0F8W			P	
SMO	SMO05700	158.00	7	17442.56	–172.30	–13.70	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
SVK	SVK14400	17.00	7	17442.56	19.65	48.69	0.82	0.60	5.20	MODRSS		47.53		MODTES	CL		84.00		27M0F8W			P	
UKR	UKR06300	38.00	7	17442.56	31.82	48.19	2.32	0.95	177.32	MODRSS		41.01		MODTES	CR		84.00		27M0F8W			P	
USA	MRA33200	122.00	7	17442.56	151.10	11.60	6.48	3.49	179.00	MODRSS		30.90		MODTES	CL		87.00		27M0F8W		14	P	
USA	MRA33201	122.00	7	17442.56	–157.50	21.00	2.02	0.60	115.00	MODRSS		43.61		MODTES	CL		87.00		27M0F8W		14	P	
USA	SMA33500	170.00	7	17442.56	–166.30	–0.20	7.97	1.04	72.00	MODRSS		35.26		MODTES	CR		87.00		27M0F8W		13	P	
USA	SMA33501	170.00	7	17442.56	–124.80	39.20	4.43	0.73	132.00	MODRSS		39.35		MODTES	CR		87.00		27M0F8W		13	P	
UZB	UZB07100	44.00	7	17442.56	64.01	41.21	2.67	0.96	163.32	MODRSS		40.37		MODTES	CR		84.00		27M0F8W			P	
VTN	VTN32500	86.00	7	17442.56	108.00	14.80	3.80	1.90	126.00	MODRSS		35.86		MODTES	CR		84.00		27M0F8W			P	
VUT	VUT12800	140.00	7	17442.56	168.00	–16.40	1.52	0.68	87.00	MODRSS		44.30		MODTES	CR		84.00		27M0F8W			P	
ALG	ALG25200	–25.00	8	17461.74	1.50	27.60	3.65	2.94	135.00	MODRSS		34.14		MODTES	CL		84.00		27M0F8W			P	
AND	AND34100	–37.00	8	17461.74	1.60	42.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
ARS	ARS00300	17.00	8	17461.74	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CR		84.00		27M0F8W			P	
AUS	AUS00500	152.00	8	17461.74	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
AUT	AUT01600	–19.00	8	17461.74	12.20	47.50	1.14	0.63	166.00	MODRSS		45.88		MODTES	CR		84.00		27M0F8W			P	
AZE	AZE06400	23.00	8	17461.74	47.47	40.14	0.93	0.60	158.14	MODRSS		46.98		MODTES	CL		84.00		27M0F8W			P	
BUL	BUL02000	–1.00	8	17461.74	25.00	43.00	2.00	2.00	0.00	MODRSS		38.43		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15600	62.00	8	17461.74	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN17300	92.00	8	17461.74	115.70	27.40	1.14	0.94	99.00	MODRSS		44.15		MODTES	CL		84.00		27M0F8W			P	
COD	ZAI32200	–19.00	8	17461.74	22.40	0.00	2.16	1.88	48.00	MODRSS		38.36		MODTES	CL		84.00		27M0F8W			P	
EGY	EGY02600	–7.00	8	17461.74	29.70	26.80	2.33	1.72	136.00	MODRSS		38.42		MODTES	CR		86.00		27M0F8W			P	
F	F2_A2744	–7.00	8	17461.74	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	OCE10100	–160.00	8	17461.74	–145.00	–16.30	4.34	3.54	4.00	MODRSS		32.58		MODTES	CR		84.00		27M0F8W			P	
F /EUT	E2WA7DA2	29.00	8	17461.74	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	8	17461.74	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	8	17461.74	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	8	17461.74	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	8	17461.74	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	8	17461.74	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	8	17461.74	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
G	G 02700	–33.50	8	17461.74	–3.50	53.80	1.84	0.72	142.00	MODRSS		43.23		MODTES	CL		84.00		27M0F8W			P	5, 6
IND	IND04000	56.00	8	17461.74	73.00	25.00	1.82	1.48	58.00	MODRSS		40.14		MODTES	CR		84.00		27M0F8W			P	1
INS	INS02800	80.20	8	17461.74	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CR		84.00		27M0F8W			P	
KOR	KOR11200	110.00	8	17461.74	127.50	36.00	1.24	1.02	168.00	MODRSS		43.43		MODTES	CL		89.00		27M0F8W			P	
LAO	LAO28400	74.00	8	17461.74	103.70	18.10	2.16	0.78	133.00	MODRSS		42.18		MODTES	CR		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
MAU	MAU24300	29.00	8	17461.74	56.80	–13.90	1.56	1.38	65.00	MODRSS		41.12		MODTES	CL		84.00		27M0F8W			P	
MDA	MDA06300	38.00	8	17461.74	28.41	46.99	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
MLA	MLA22800	86.00	8	17461.74	114.10	3.90	2.34	1.12	45.00	MODRSS		40.26		MODTES	CL		84.00		27M0F8W			P	
MLD	MLD3060A	44.00	8	17461.74	73.10	6.00	0.96	0.60	90.00	MODRSS		46.84		MODTES	CR		84.00		27M0F8W			P	
MLI	MLI32800	–37.00	8	17461.74	–7.60	13.20	1.74	1.24	171.00	MODRSS		41.11		MODTES	CL		87.00		27M0F8W			P	
MLT	MLT14700	–13.00	8	17461.74	14.30	35.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
NZL	CKH05300	158.00	8	17461.74	–161.00	–19.80	1.00	0.60	132.00	MODRSS		46.67		MODTES	CR		84.00		27M0F8W		4	P	
NZL	CKH05301	158.00	8	17461.74	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CR		84.00		27M0F8W		4	P	
PAK	PAK28300	38.00	8	17461.74	74.70	33.90	1.34	1.13	160.00	MODRSS		42.65		MODTES	CL		84.00		27M0F8W			P	
PLW	PLW00000	146.00	8	17461.74	132.99	5.52	1.29	0.60	55.84	MODRSS		45.55		MODTES	CL		84.00		27M0F8W			P	
RRW	RRW31000	11.00	8	17461.74	30.00	–2.10	0.66	0.60	42.00	MODRSS		48.47		MODTES	CR		84.00		27M0F8W			P	
S	S 13800	5.00	8	17461.74	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W		27	P	
S	SIRIUS01	5.20	8	17461.74	14.00	63.00	1.30	0.70	142.00	R13RSS		43.00		R13TES	CL		84.00		27M0F8W	SIRIUS	27	AE	
SVN	SVN14800	34.00	8	17461.74	15.01	46.18	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
AFG	AFG24600	50.00	9	17480.92	67.00	34.30	1.89	1.19	18.00	MODRSS		40.93		MODTES	CL		84.00		27M0F8W			P	
BLR	BLR06200	38.00	9	17480.92	28.04	53.18	1.17	0.60	9.68	MODRSS		45.96		MODTES	CR		84.00		27M0F8W			P	
BTN	BTN03100	86.00	9	17480.92	90.44	27.05	0.72	0.60	175.47	MODRSS		48.11		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15500	62.00	9	17480.92	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN16200	92.00	9	17480.92	108.10	33.70	5.00	4.00	148.00	MODRSS		31.44		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN16500	79.80	9	17480.92	111.40	41.80	1.58	1.20	15.00	MODRSS		41.67		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN19000	122.00	9	17480.92	114.17	23.32	0.91	0.60	2.88	MODRSS		47.08		MODTES	CL		84.00		27M0F8W			P	
CME	CME30000	–13.00	9	17480.92	12.70	6.20	2.54	1.68	87.00	MODRSS		38.15		MODTES	CL		84.00		27M0F8W			P	
E	E 12900	–30.00	9	17480.92	–3.10	39.90	2.10	1.14	154.00	MODRSS		40.66		MODTES	CR		84.00		27M0F8W		17	P	
E	HISPASA4	–30.00	9	17480.92	–3.10	39.90					ECO	43.00	18.70	R13TES	CR		82.50		27M0F8W	HISPASAT-1	17	AE	
E	HISPASA6	–30.00	9	17480.92	–3.10	39.90					ECO	43.00	18.70	R13TES	CR		83.50		27M0F8W	HISPASAT-1	17	AE	
EST	EST06100	23.00	9	17480.92	25.36	59.31	0.68	0.60	2.17	MODRSS		48.37		MODTES	CR		84.00		27M0F8W			P	
F	F 09300	–19.00	9	17480.92	2.60	45.90	2.50	0.98	160.00	R13RSS		40.56		R13TES	CL		84.00		27M0F8W		19	PE	
F /EUT	E2WA7DA1	29.00	9	17480.92	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	9	17480.92	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	9	17480.92	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	9	17480.92	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	9	17480.92	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	9	17480.92	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	9	17480.92	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FJI	FJI19300	152.00	9	17480.92	179.40	–17.90	1.04	0.98	67.00	MODRSS		44.36		MODTES	CL		84.00		27M0F8W			P	
GUI	GUI19200	–37.00	9	17480.92	–11.00	10.20	1.58	1.04	147.00	MODRSS		42.29		MODTES	CR		85.00		27M0F8W			P	
HRV	HRV14800	34.00	9	17480.92	16.74	44.54	0.88	0.69	5.30	MODRSS		46.57		MODTES	CR		84.00		27M0F8W			P	
IND	IND03900	56.00	9	17480.92	72.70	11.20	1.26	0.60	107.00	MODRSS		45.66		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03500	104.00	9	17480.92	115.20	–1.70	9.14	3.43	170.00	MODRSS		29.48		MODTES	CL		84.00		27M0F8W			P	
J	000BS-3N	109.85	9	17480.92	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W	BS-3N	33	AE	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
J	J 11100	110.00	9	17480.92	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W		33	PE	
LBY	LBY28000	–25.00	9	17480.92	17.50	26.30	3.68	1.84	130.00	MODRSS		36.14		MODTES	CR		84.00		27M0F8W			P	
MDG	MDG23600	29.00	9	17480.92	46.20	–18.60	2.57	0.80	67.00	MODRSS		41.32		MODTES	CR		84.00		27M0F8W			P	
NZL	NZL05500	158.00	9	17480.92	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CL		84.00		27M0F8W			P	
POL	POL13200	–1.00	9	17480.92	17.20	51.80	2.00	2.00	0.00	MODRSS		38.43		MODTES	CR		87.00		27M0F8W			P	
QAT	QAT24700	17.00	9	17480.92	51.10	25.30	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
SLM	SLM00000	146.00	9	17480.92	159.32	–8.40	1.50	1.18	140.48	MODRSS		41.98		MODTES	CR		84.00		27M0F8W			P	
SMR	SMR31100	–37.00	9	17480.92	12.50	43.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		83.00		27M0F8W			P	
SWZ	SWZ31300	–1.00	9	17480.92	31.50	–26.50	0.62	0.60	66.00	MODRSS		48.74		MODTES	CL		82.00		27M0F8W			P	
THA	THA14200	74.00	9	17480.92	100.70	13.20	2.82	1.54	106.00	MODRSS		38.07		MODTES	CL		84.00		27M0F8W			P	
TJK	TJK06900	44.00	9	17480.92	71.14	38.37	1.25	0.76	159.15	MODRSS		44.65		MODTES	CR		84.00		27M0F8W			P	
TUR	TUR14500	5.00	9	17480.92	34.30	39.00	3.13	1.38	168.00	MODRSS		38.09		MODTES	CL		84.00		27M0F8W			P	
TZA	TZA22500	11.00	9	17480.92	34.60	–6.20	2.41	1.72	129.00	MODRSS		38.27		MODTES	CL		84.00		27M0F8W			P	
USA	PLM33700	170.00	9	17480.92	–166.30	–0.20	7.97	1.04	72.00	MODRSS		35.26		MODTES	CL		87.00		27M0F8W		9	P	
USA	PLM33701	170.00	9	17480.92	–124.80	39.10	4.43	0.73	132.00	MODRSS		39.35		MODTES	CL		87.00		27M0F8W		9	P	
USA	WAK33400	140.00	9	17480.92	152.50	11.70	7.89	3.52	0.00	MODRSS		30.01		MODTES	CR		87.00		27M0F8W		11	P	
USA	WAK33401	140.00	9	17480.92	–157.50	21.00	1.63	0.67	131.00	MODRSS		44.06		MODTES	CL		87.00		27M0F8W		11	P	
YUG	YUG14800	–7.00	9	17480.92	20.50	43.98	0.91	0.60	145.16	MODRSS		47.07		MODTES	CL		84.00		27M0F8W			P	
	YYY00001	11.00	9	17480.92	34.99	31.86	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	8
ALG	ALG25100	–25.00	10	17500.10	1.50	27.60	3.65	2.94	135.00	MODRSS		34.14		MODTES	CL		84.00		27M0F8W			P	
ARS	ARS27500	17.00	10	17500.10	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CR		84.00		27M0F8W			P	
AUS	AUS00800	164.00	10	17500.10	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CL		87.00		27M0F8W			P	
BIH	BIH14800	34.00	10	17500.10	17.77	44.32	0.62	0.60	166.84	MODRSS		48.71		MODTES	CL		84.00		27M0F8W			P	
BOT	BOT29700	–1.00	10	17500.10	23.30	–22.20	2.13	1.50	36.00	MODRSS		39.40		MODTES	CR		85.00		27M0F8W			P	
CHN	CHN15400	62.00	10	17500.10	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN17100	92.00	10	17500.10	117.20	32.00	1.20	0.74	126.00	MODRSS		44.96		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN18700	79.80	10	17500.10	106.60	26.70	1.14	0.94	179.00	MODRSS		44.15		MODTES	CR		84.00		27M0F8W			P	
CLN	CLN21900	50.00	10	17500.10	80.60	7.70	1.18	0.60	106.00	MODRSS		45.95		MODTES	CL		84.00		27M0F8W			P	
COD	ZAI32300	–19.00	10	17500.10	21.30	–6.80	2.80	1.52	149.00	MODRSS		38.16		MODTES	CL		84.00		27M0F8W			P	
D	D 08700	–19.00	10	17500.10	9.60	49.90	1.62	0.72	147.00	MODRSS		43.78		MODTES	CR		84.00		27M0F8W			P	2
F	F2_A2722	–7.00	10	17500.10	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2722	–7.00	10	17500.10	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2728	–7.00	10	17500.10	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2722	–7.00	10	17500.10	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A2728	–7.00	10	17500.10	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3322	–7.00	10	17500.10	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_A3328	–7.00	10	17500.10	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2722	–7.00	10	17500.10	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D2728	–7.00	10	17500.10	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight Long.°	Boresight Lat.°	Space antenna character. Major°	Minor°	Orient.°	Space antenna	Shaped beam	Space ant. gain Co-polar	X-polar	Earth antenna	Polarization Type	Angle°	e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
F	F3_D3322	–7.00	10	17500.10	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3328	–7.00	10	17500.10	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	NCL10000	140.00	10	17500.10	166.00	–21.00	1.14	0.72	146.00	MODRSS		45.30		MODTES	CL		84.00		27M0F8W		6	P	
F	NCL10001	140.00	10	17500.10	–177.10	–13.60	1.22	0.60	46.00	MODRSS		45.80		MODTES	CL		84.00		27M0F8W		6	P	
F	WAL10200	140.00	10	17500.10	–176.80	–14.00	0.74	0.60	29.00	MODRSS		47.97		MODTES	CL		84.00		27M0F8W		6	P	
F	WAL10201	140.00	10	17500.10	166.10	–21.30	1.31	0.82	133.00	MODRSS		44.16		MODTES	CL		84.00		27M0F8W		6	P	
F /EUT	E2WA7DA2	29.00	10	17500.10	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	10	17500.10	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	10	17500.10	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	10	17500.10	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	10	17500.10	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	10	17500.10	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	10	17500.10	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FIN	FIN10300	5.00	10	17500.10	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
GNB	GNB30400	–30.00	10	17500.10	–15.00	12.00	0.90	0.60	172.00	MODRSS		47.12		MODTES	CR		84.00		27M0F8W			P	
IND	IND03700	68.00	10	17500.10	93.00	25.50	1.46	1.13	40.00	MODRSS		42.27		MODTES	CR		84.00		27M0F8W			P	1
IRL	IRL21100	–33.50	10	17500.10	–8.20	53.20	0.84	0.60	162.00	MODRSS		47.42		MODTES	CL		84.00		27M0F8W			P	5, 6
KOR	KOR11200	110.00	10	17500.10	127.50	36.00	1.24	1.02	168.00	MODRSS		43.43		MODTES	CL		89.00		27M0F8W			P	
LAO	LAO28400	74.00	10	17500.10	103.70	18.10	2.16	0.78	133.00	MODRSS		42.18		MODTES	CR		84.00		27M0F8W			P	
MAU	MAU24200	29.00	10	17500.10	59.80	–18.90	1.62	1.24	55.00	MODRSS		41.42		MODTES	CL		84.00		27M0F8W			P	
MHL	MHL00000	146.00	10	17500.10	167.64	9.83	2.07	0.90	157.42	MODRSS		41.75		MODTES	CL		84.00		27M0F8W			P	
MKD	MKD14800	23.00	10	17500.10	21.53	41.50	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
MLA	MLA2280A	86.00	10	17500.10	114.10	3.90	2.34	1.12	45.00	MODRSS		40.26		MODTES	CL		84.00		27M0F8W			P	
MLI	MLI32700	–37.00	10	17500.10	–2.00	19.00	2.66	1.26	127.00	MODRSS		39.19		MODTES	CL		87.00		27M0F8W			P	
NOR	BIFROS22	–0.80	10	17500.10	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CL		84.00		27M0FXF	BIFROST-2		A	
NZL	CKH05200	158.00	10	17500.10	–161.00	–19.80	1.02	0.64	132.00	MODRSS		46.30		MODTES	CR		84.00		27M0F8W		3	P	
NZL	CKH05201	158.00	10	17500.10	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CR		84.00		27M0F8W		3	P	
PAK	PAK12700	38.00	10	17500.10	69.60	29.50	2.30	2.16	14.00	MODRSS		37.49		MODTES	CL		84.00		27M0F8W			P	
SOM	SOM31200	23.00	10	17500.10	45.00	6.40	3.26	1.54	71.00	MODRSS		37.44		MODTES	CL		84.00		27M0F8W			P	
TCD	TCD14300	–13.00	10	17500.10	18.10	15.50	3.40	1.72	107.00	MODRSS		36.78		MODTES	CR		84.00		27M0F8W			P	
TUV	TUV00000	176.00	10	17500.10	177.61	–7.11	0.94	0.60	137.58	MODRSS		46.93		MODTES	CR		84.00		27M0F8W			P	
YEM	YEM26600	11.00	10	17500.10	44.36	15.70	0.77	0.60	104.23	MODRSS		47.78		MODTES	CL		84.00		27M0F8W			P	
AFG	AFG24500	50.00	11	17519.28	67.00	34.30	1.89	1.19	18.00	MODRSS		40.93		MODTES	CL		84.00		27M0F8W			P	
AUS	AUS00400	152.00	11	17519.28	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040A	152.00	11	17519.28	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040B	152.00	11	17519.28	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040C	152.00	11	17519.28	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS00700	164.00	11	17519.28	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		77	P	
AUS	AUS0070A	164.00	11	17519.28	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		77	P	
BEN	BEN23300	–19.00	11	17519.28	2.20	9.50	1.44	0.68	97.00	MODRSS		44.54		MODTES	CR		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
BRU	BRU3300A	74.00	11	17519.28	114.70	4.40	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15700	62.00	11	17519.28	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN16000	92.00	11	17519.28	108.10	33.70	5.00	4.00	148.00	MODRSS		31.44		MODTES	CR		84.00		27M0F8W			P	
COM	COM20700	29.00	11	17519.28	44.10	–12.10	0.76	0.60	149.00	MODRSS		47.86		MODTES	CR		84.00		27M0F8W			P	
F	F2_A2733	–7.00	11	17519.28	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		84.00		27M0F9W	RADIOSAT-2	19	A	
F /EUT	E2WA7DA1	29.00	11	17519.28	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	11	17519.28	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	11	17519.28	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	11	17519.28	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	11	17519.28	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	11	17519.28	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	11	17519.28	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FSM	FSM00000	146.00	11	17519.28	151.67	5.42	5.34	1.51	166.52	MODRSS		35.37		MODTES	CR		84.00		27M0F8W			P	
GAB	GAB26000	–13.00	11	17519.28	11.80	–0.60	1.43	1.12	64.00	MODRSS		42.40		MODTES	CL		84.00		27M0F8W			P	
GMB	GMB30200	–37.00	11	17519.28	–15.10	13.40	0.79	0.60	4.00	MODRSS		47.69		MODTES	CR		83.00		27M0F8W			P	
GRC	GRC10500	5.00	11	17519.28	24.50	38.00	2.03	1.29	159.00	MODRSS		40.27		MODTES	CL		84.00		27M0F8W			P	
IND	IND04300	56.00	11	17519.28	77.80	11.10	1.36	1.28	172.00	MODRSS		42.04		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03600	104.00	11	17519.28	115.20	–1.70	9.14	3.43	170.00	MODRSS		29.48		MODTES	CL		84.00		27M0F8W			P	
IRN	IRN10900	34.00	11	17519.28	54.20	32.40	3.82	1.82	149.00	MODRSS		36.03		MODTES	CR		84.00		27M0F8W			P	
J	000BS-3N	109.85	11	17519.28	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	11	17519.28	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W		33	PE	
KIR	KIR00001	176.00	11	17519.28	177.16	–0.79	4.47	1.27	163.00	MODRSS		36.91		MODTES	CL		84.00		27M0F8W			P	
LBN	LBN27900	11.00	11	17519.28	35.90	33.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
LBR	LBR24400	–33.50	11	17519.28	–9.30	6.60	1.22	0.70	133.00	MODRSS		45.13		MODTES	CL		84.00		27M0F8W			P	5, 6
LBY	LBY32100	–25.00	11	17519.28	17.50	26.30	3.68	1.84	130.00	MODRSS		36.14		MODTES	CR		84.00		27M0F8W			P	
LIE	LIE25300	–37.00	11	17519.28	9.50	47.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
LTU	LTU06100	23.00	11	17519.28	24.02	55.46	0.72	0.60	173.90	MODRSS		48.11		MODTES	CR		84.00		27M0F8W			P	
LUX	LUX11400	–19.00	11	17519.28	6.00	49.80	0.68	0.68	0.00	MODRSS		47.80		MODTES	CL		84.00		27M0F8W			P	
NRU	NRU30900	134.00	11	17519.28	167.00	–0.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
POR	POR13300	–30.00	11	17519.28	–8.00	39.60	0.92	0.60	112.00	MODRSS		47.03		MODTES	CR		84.00		27M0F8W			P	
ROU	ROU13600	–1.00	11	17519.28	25.00	45.70	1.38	0.66	155.00	MODRSS		44.85		MODTES	CR		86.00		27M0F8W			P	
SMO	SMO05700	158.00	11	17519.28	–172.30	–13.70	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
SVK	SVK14400	17.00	11	17519.28	19.65	48.69	0.82	0.60	5.20	MODRSS		47.53		MODTES	CL		84.00		27M0F8W			P	
UKR	UKR06300	38.00	11	17519.28	31.82	48.19	2.32	0.95	177.32	MODRSS		41.01		MODTES	CR		84.00		27M0F8W			P	
USA	MRA33200	122.00	11	17519.28	151.10	11.60	6.48	3.49	179.00	MODRSS		30.90		MODTES	CL		87.00		27M0F8W		14	P	
USA	MRA33201	122.00	11	17519.28	–157.50	21.00	2.02	0.60	115.00	MODRSS		43.61		MODTES	CL		87.00		27M0F8W		14	P	
USA	SMA33500	170.00	11	17519.28	–166.30	–0.20	7.97	1.04	72.00	MODRSS		35.26		MODTES	CR		87.00		27M0F8W		13	P	
USA	SMA33501	170.00	11	17519.28	–124.80	39.20	4.43	0.73	132.00	MODRSS		39.35		MODTES	CR		87.00		27M0F8W		13	P	
UZB	UZB07100	44.00	11	17519.28	64.01	41.21	2.67	0.96	163.32	MODRSS		40.37		MODTES	CR		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight Long.°	Boresight Lat.°	Space antenna character. Major°	Minor°	Orient.°	Space antenna	Shaped beam	Space ant. gain Co-polar	X-polar	Earth antenna	Polarization Type	Angle°	e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
VTN	VTN32500	86.00	11	17519.28	108.00	14.80	3.80	1.90	126.00	MODRSS		35.86		MODTES	CR		84.00		27M0F8W			P	
VUT	VUT12800	140.00	11	17519.28	168.00	–16.40	1.52	0.68	87.00	MODRSS		44.30		MODTES	CR		84.00		27M0F8W			P	
ALG	ALG25200	–25.00	12	17538.46	1.50	27.60	3.65	2.94	135.00	MODRSS		34.14		MODTES	CL		84.00		27M0F8W			P	
AND	AND34100	–37.00	12	17538.46	1.60	42.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
ARS	ARS00300	17.00	12	17538.46	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CR		84.00		27M0F8W			P	
AUS	AUS00500	152.00	12	17538.46	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
AUT	AUT01600	–19.00	12	17538.46	12.20	47.50	1.14	0.63	166.00	MODRSS		45.88		MODTES	CR		84.00		27M0F8W			P	
AZE	AZE06400	23.00	12	17538.46	47.47	40.14	0.93	0.60	158.14	MODRSS		46.98		MODTES	CL		84.00		27M0F8W			P	
BGD	BGD22000	74.00	12	17538.46	90.30	23.60	1.46	0.84	135.00	MODRSS		43.56		MODTES	CR		84.00		27M0F8W			P	
BUL	BUL02000	–1.00	12	17538.46	25.00	43.00	2.00	2.00	0.00	MODRSS		38.43		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15600	62.00	12	17538.46	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN17000	92.00	12	17538.46	119.50	33.00	1.34	0.64	155.00	MODRSS		45.11		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN17800	79.80	12	17538.46	111.50	27.40	1.22	0.86	130.00	MODRSS		44.24		MODTES	CR		84.00		27M0F8W			P	
COD	ZAI32200	–19.00	12	17538.46	22.40	0.00	2.16	1.88	48.00	MODRSS		38.36		MODTES	CL		84.00		27M0F8W			P	
DNK	DNK08900	5.00	12	17538.46	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W		28	P	
EGY	EGY02600	–7.00	12	17538.46	29.70	26.80	2.33	1.72	136.00	MODRSS		38.42		MODTES	CR		86.00		27M0F8W			P	
F	F2_A2744	–7.00	12	17538.46	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	OCE10100	–160.00	12	17538.46	–145.00	–16.30	4.34	3.54	4.00	MODRSS		32.58		MODTES	CR		84.00		27M0F8W			P	
F /EUT	E2WA7DA2	29.00	12	17538.46	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	12	17538.46	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	12	17538.46	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	12	17538.46	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	12	17538.46	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	12	17538.46	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	12	17538.46	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
G	G 02700	–33.50	12	17538.46	–3.50	53.80	1.84	0.72	142.00	MODRSS		43.23		MODTES	CL		84.00		27M0F8W			P	5, 6
IND	IND04800	68.00	12	17538.46	86.20	25.00	1.56	0.90	120.00	MODRSS		42.97		MODTES	CR		86.00		27M0F8W			P	1
KOR	KOR11200	110.00	12	17538.46	127.50	36.00	1.24	1.02	168.00	MODRSS		43.43		MODTES	CL		89.00		27M0F8W			P	
MAU	MAU24300	29.00	12	17538.46	56.80	–13.90	1.56	1.38	65.00	MODRSS		41.12		MODTES	CL		84.00		27M0F8W			P	
MDA	MDA06300	38.00	12	17538.46	28.41	46.99	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
MLD	MLD30600	44.00	12	17538.46	73.10	6.00	0.96	0.60	90.00	MODRSS		46.84		MODTES	CR		84.00		27M0F8W			P	
MLI	MLI32800	–37.00	12	17538.46	–7.60	13.20	1.74	1.24	171.00	MODRSS		41.11		MODTES	CL		87.00		27M0F8W			P	
MLT	MLT14700	–13.00	12	17538.46	14.30	35.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
NZL	CKH05300	158.00	12	17538.46	–161.00	–19.80	1.00	0.60	132.00	MODRSS		46.67		MODTES	CR		84.00		27M0F8W		4	P	
NZL	CKH05301	158.00	12	17538.46	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CR		84.00		27M0F8W		4	P	
PAK	PAK21000	38.00	12	17538.46	72.10	30.80	1.16	0.72	90.00	MODRSS		45.23		MODTES	CL		84.00		27M0F8W			P	
PLW	PLW00000	146.00	12	17538.46	132.99	5.52	1.29	0.60	55.84	MODRSS		45.55		MODTES	CL		84.00		27M0F8W			P	
RRW	RRW31000	11.00	12	17538.46	30.00	–2.10	0.66	0.60	42.00	MODRSS		48.47		MODTES	CR		84.00		27M0F8W			P	
S	SIRIUS02	5.20	12	17538.46	14.00	63.00	1.30	0.70	142.00	R13RSS		43.00		R13TES	CL		84.00		27M0F8W	SIRIUS	28	AE	
SVN	SVN14800	34.00	12	17538.46	15.01	46.18	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
AFG	AFG24600	50.00	13	17557.64	67.00	34.30	1.89	1.19	18.00	MODRSS		40.93		MODTES	CL		84.00		27M0F8W			P	
BLR	BLR06200	38.00	13	17557.64	28.04	53.18	1.17	0.60	9.68	MODRSS		45.96		MODTES	CR		84.00		27M0F8W			P	
BTN	BTN03100	86.00	13	17557.64	90.44	27.05	0.72	0.60	175.47	MODRSS		48.11		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15501	62.00	13	17557.64	88.30	31.50	3.38	1.45	162.00	MODRSS		37.54		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN18000	92.00	13	17557.64	113.10	23.10	4.70	3.50	96.00	MODRSS		32.29		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN19000	122.00	13	17557.64	114.17	23.32	0.91	0.60	2.88	MODRSS		47.08		MODTES	CL		84.00		27M0F8W			P	
CME	CME30000	–13.00	13	17557.64	12.70	6.20	2.54	1.68	87.00	MODRSS		38.15		MODTES	CL		84.00		27M0F8W			P	
E	E 12900	–30.00	13	17557.64	–3.10	39.90	2.10	1.14	154.00	MODRSS		40.66		MODTES	CR		84.00		27M0F8W		17	P	
E	HISPASA4	–30.00	13	17557.64	–3.10	39.90					ECO	43.00	18.70	R13TES	CR		82.50		27M0F8W	HISPASAT-1	17	AE	
E	HISPASA6	–30.00	13	17557.64	–3.10	39.90					ECO	43.00	18.70	R13TES	CR		83.50		27M0F8W	HISPASAT-1	17	AE	
EST	EST06100	23.00	13	17557.64	25.36	59.31	0.68	0.60	2.17	MODRSS		48.37		MODTES	CR		84.00		27M0F8W			P	
F	F 09300	–19.00	13	17557.64	2.60	45.90	2.50	0.98	160.00	R13RSS		40.56		R13TES	CL		84.00		27M0F8W		19	PE	
F /EUT	E2WA7DA1	29.00	13	17557.64	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	13	17557.64	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	13	17557.64	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	13	17557.64	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	13	17557.64	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	13	17557.64	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	13	17557.64	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FJI	FJI1930A	152.00	13	17557.64	179.40	–17.90	1.04	0.98	67.00	MODRSS		44.36		MODTES	CL		84.00		27M0F8W			P	
GUI	GUI19200	–37.00	13	17557.64	–11.00	10.20	1.58	1.04	147.00	MODRSS		42.29		MODTES	CR		85.00		27M0F8W			P	
HRV	HRV14800	34.00	13	17557.64	16.74	44.54	0.88	0.69	5.30	MODRSS		46.57		MODTES	CR		84.00		27M0F8W			P	
IND	IND04400	68.00	13	17557.64	79.50	22.30	2.19	1.42	146.00	MODRSS		39.52		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03500	104.00	13	17557.64	115.20	–1.70	9.14	3.43	170.00	MODRSS		29.48		MODTES	CL		84.00		27M0F8W			P	
J	000BS-3N	109.85	13	17557.64	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	13	17557.64	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W		33	PE	
LBY	LBY28000	–25.00	13	17557.64	17.50	26.30	3.68	1.84	130.00	MODRSS		36.14		MODTES	CR		84.00		27M0F8W			P	
MDG	MDG23600	29.00	13	17557.64	46.20	–18.60	2.57	0.80	67.00	MODRSS		41.32		MODTES	CR		84.00		27M0F8W			P	
NZL	NZL05500	158.00	13	17557.64	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CL		84.00		27M0F8W			P	
NZL	NZL28700	128.00	13	17557.64	173.00	–41.00	3.30	1.28	48.00	MODRSS		38.19		MODTES	CL		84.00		27M0F8W			P	
POL	POL13200	–1.00	13	17557.64	17.20	51.80	2.00	2.00	0.00	MODRSS		38.43		MODTES	CR		87.00		27M0F8W			P	
QAT	QAT24700	17.00	13	17557.64	51.10	25.30	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
SLM	SLM00000	146.00	13	17557.64	159.32	–8.40	1.50	1.18	140.48	MODRSS		41.98		MODTES	CR		84.00		27M0F8W			P	
SMR	SMR31100	–37.00	13	17557.64	12.50	43.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		83.00		27M0F8W			P	
SWZ	SWZ31300	–1.00	13	17557.64	31.50	–26.50	0.62	0.60	66.00	MODRSS		48.74		MODTES	CL		82.00		27M0F8W			P	
THA	THA14200	74.00	13	17557.64	100.70	13.20	2.82	1.54	106.00	MODRSS		38.07		MODTES	CL		84.00		27M0F8W			P	
TJK	TJK06900	44.00	13	17557.64	71.14	38.37	1.25	0.76	159.15	MODRSS		44.65		MODTES	CR		84.00		27M0F8W			P	
TUR	TUR14500	5.00	13	17557.64	34.30	39.00	3.13	1.38	168.00	MODRSS		38.09		MODTES	CL		84.00		27M0F8W			P	
TZA	TZA22500	11.00	13	17557.64	34.60	–6.20	2.41	1.72	129.00	MODRSS		38.27		MODTES	CL		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight Long.°	Boresight Lat.°	Space antenna character. Major°	Minor°	Orient.°	Space antenna	Shaped beam	Space ant. gain Co-polar	X-polar	Earth antenna	Polarization Type	Angle°	e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
USA	PLM33700	170.00	13	17557.64	–166.30	–0.20	7.97	1.04	72.00	MODRSS		35.26		MODTES	CL		87.00		27M0F8W		9	P	
USA	PLM33701	170.00	13	17557.64	–124.80	39.10	4.43	0.73	132.00	MODRSS		39.35		MODTES	CL		87.00		27M0F8W		9	P	
USA	WAK33400	140.00	13	17557.64	152.50	11.70	7.89	3.52	0.00	MODRSS		30.01		MODTES	CR		87.00		27M0F8W		11	P	
USA	WAK33401	140.00	13	17557.64	–157.50	21.00	1.63	0.67	131.00	MODRSS		44.06		MODTES	CL		87.00		27M0F8W		11	P	
YUG	YUG14800	–7.00	13	17557.64	20.50	43.98	0.91	0.60	145.16	MODRSS		47.07		MODTES	CL		84.00		27M0F8W			P	
	YYY00001	11.00	13	17557.64	34.99	31.86	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	8
ALG	ALG25100	–25.00	14	17576.82	1.50	27.60	3.65	2.94	135.00	MODRSS		34.14		MODTES	CL		84.00		27M0F8W			P	
ARS	ARS27500	17.00	14	17576.82	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CR		84.00		27M0F8W			P	
AUS	AUS00800	164.00	14	17576.82	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CL		87.00		27M0F8W			P	
BGD	BGD22000	74.00	14	17576.82	90.30	23.60	1.46	0.84	135.00	MODRSS		43.56		MODTES	CR		84.00		27M0F8W			P	
BIH	BIH14800	34.00	14	17576.82	17.77	44.32	0.62	0.60	166.84	MODRSS		48.71		MODTES	CL		84.00		27M0F8W			P	
BOT	BOT29700	–1.00	14	17576.82	23.30	–22.20	2.13	1.50	36.00	MODRSS		39.40		MODTES	CR		85.00		27M0F8W			P	
CHN	CHN15401	62.00	14	17576.82	83.90	40.50	2.75	2.05	177.00	MODRSS		36.94		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN17200	92.00	14	17576.82	120.40	29.10	0.96	0.84	123.00	MODRSS		45.38		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN18100	79.80	14	17576.82	108.50	23.80	1.41	1.08	153.00	MODRSS		42.62		MODTES	CR		84.00		27M0F8W			P	
CLN	CLN21900	50.00	14	17576.82	80.60	7.70	1.18	0.60	106.00	MODRSS		45.95		MODTES	CL		84.00		27M0F8W			P	
COD	ZAI32300	–19.00	14	17576.82	21.30	–6.80	2.80	1.52	149.00	MODRSS		38.16		MODTES	CL		84.00		27M0F8W			P	
D	D 08700	–19.00	14	17576.82	9.60	49.90	1.62	0.72	147.00	MODRSS		43.78		MODTES	CR		84.00		27M0F8W			P	2
F	F2_A2722	–7.00	14	17576.82	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2722	–7.00	14	17576.82	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2728	–7.00	14	17576.82	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2722	–7.00	14	17576.82	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A2728	–7.00	14	17576.82	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3322	–7.00	14	17576.82	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_A3328	–7.00	14	17576.82	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2722	–7.00	14	17576.82	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D2728	–7.00	14	17576.82	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3322	–7.00	14	17576.82	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3328	–7.00	14	17576.82	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	NCL10000	140.00	14	17576.82	166.00	–21.00	1.14	0.72	146.00	MODRSS		45.30		MODTES	CL		84.00		27M0F8W		6	P	
F	NCL10001	140.00	14	17576.82	–177.10	–13.60	1.22	0.60	46.00	MODRSS		45.80		MODTES	CL		84.00		27M0F8W		6	P	
F	WAL10200	140.00	14	17576.82	–176.80	–14.00	0.74	0.60	29.00	MODRSS		47.97		MODTES	CL		84.00		27M0F8W		6	P	
F	WAL10201	140.00	14	17576.82	166.10	–21.30	1.31	0.82	133.00	MODRSS		44.16		MODTES	CL		84.00		27M0F8W		6	P	
F /EUT	E2WA7DA2	29.00	14	17576.82	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	14	17576.82	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	14	17576.82	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	14	17576.82	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	14	17576.82	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	14	17576.82	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	14	17576.82	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
GNB	GNB30400	–30.00	14	17576.82	–15.00	12.00	0.90	0.60	172.00	MODRSS		47.12		MODTES	CR		84.00		27M0F8W			P	
IND	IND04500	56.00	14	17576.82	76.20	19.50	1.58	1.58	21.00	MODRSS		40.47		MODTES	CR		84.00		27M0F8W			P	1
IRL	IRL21100	–33.50	14	17576.82	–8.20	53.20	0.84	0.60	162.00	MODRSS		47.42		MODTES	CL		84.00		27M0F8W			P	
KRE	KRE28600	110.00	14	17576.82	127.00	39.10	1.30	1.10	31.00	MODRSS		42.89		MODTES	CL		87.00		27M0F8W			P	
MAU	MAU24200	29.00	14	17576.82	59.80	–18.90	1.62	1.24	55.00	MODRSS		41.42		MODTES	CL		84.00		27M0F8W			P	
MHL	MHL00000	146.00	14	17576.82	167.64	9.83	2.07	0.90	157.42	MODRSS		41.75		MODTES	CL		84.00		27M0F8W			P	
MKD	MKD14800	23.00	14	17576.82	21.53	41.50	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
MLI	MLI32700	–37.00	14	17576.82	–2.00	19.00	2.66	1.26	127.00	MODRSS		39.19		MODTES	CL		87.00		27M0F8W			P	
NOR	BIFROS22	–0.80	14	17576.82	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CL		84.00		27M0FXF	BIFROST-2		A	
NOR	NOR12000	5.00	14	17576.82	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
NZL	CKH05200	158.00	14	17576.82	–161.00	–19.80	1.02	0.64	132.00	MODRSS		46.30		MODTES	CR		84.00		27M0F8W		3	P	
NZL	CKH05201	158.00	14	17576.82	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CR		84.00		27M0F8W		3	P	
PAK	PAK21000	38.00	14	17576.82	72.10	30.80	1.16	0.72	90.00	MODRSS		45.23		MODTES	CL		84.00		27M0F8W			P	
SOM	SOM31200	23.00	14	17576.82	45.00	6.40	3.26	1.54	71.00	MODRSS		37.44		MODTES	CL		84.00		27M0F8W			P	
TCD	TCD14300	–13.00	14	17576.82	18.10	15.50	3.40	1.72	107.00	MODRSS		36.78		MODTES	CR		84.00		27M0F8W			P	
TUV	TUV00000	176.00	14	17576.82	177.61	–7.11	0.94	0.60	137.58	MODRSS		46.93		MODTES	CR		84.00		27M0F8W			P	
YEM	YEM26600	11.00	14	17576.82	44.36	15.70	0.77	0.60	104.23	MODRSS		47.78		MODTES	CL		84.00		27M0F8W			P	
AFG	AFG24500	50.00	15	17596.00	67.00	34.30	1.89	1.19	18.00	MODRSS		40.93		MODTES	CL		84.00		27M0F8W			P	
AUS	AUS00400	152.00	15	17596.00	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040A	152.00	15	17596.00	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040B	152.00	15	17596.00	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040C	152.00	15	17596.00	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS00700	164.00	15	17596.00	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		77	P	
AUS	AUS0070A	164.00	15	17596.00	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		77	P	
BEN	BEN23300	–19.00	15	17596.00	2.20	9.50	1.44	0.68	97.00	MODRSS		44.54		MODTES	CR		84.00		27M0F8W			P	
BRU	BRU3300A	74.00	15	17596.00	114.70	4.40	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15800	79.80	15	17596.00	106.00	32.50	5.00	3.70	150.00	MODRSS		31.78		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN17400	92.00	15	17596.00	118.10	25.90	1.02	0.84	82.00	MODRSS		45.12		MODTES	CR		84.00		27M0F8W			P	
COM	COM20700	29.00	15	17596.00	44.10	–12.10	0.76	0.60	149.00	MODRSS		47.86		MODTES	CR		84.00		27M0F8W			P	
F	F2_A2733	–7.00	15	17596.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		84.00		27M0F9W	RADIOSAT-2	19	A	
F /EUT	E2WA7DA1	29.00	15	17596.00	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	15	17596.00	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	15	17596.00	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	15	17596.00	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	15	17596.00	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	15	17596.00	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	15	17596.00	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FSM	FSM00000	146.00	15	17596.00	151.67	5.42	5.34	1.51	166.52	MODRSS		35.37		MODTES	CR		84.00		27M0F8W			P	
GAB	GAB26000	–13.00	15	17596.00	11.80	–0.60	1.43	1.12	64.00	MODRSS		42.40		MODTES	CL		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
GMB	GMB30200	–37.00	15	17596.00	–15.10	13.40	0.79	0.60	4.00	MODRSS		47.69		MODTES	CR		83.00		27M0F8W			P	
GRC	GRC10500	5.00	15	17596.00	24.50	38.00	2.03	1.29	159.00	MODRSS		40.27		MODTES	CL		84.00		27M0F8W			P	
IND	IND04700	68.00	15	17596.00	93.30	11.10	1.92	0.60	96.00	MODRSS		43.83		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03600	104.00	15	17596.00	115.20	–1.70	9.14	3.43	170.00	MODRSS		29.48		MODTES	CL		84.00		27M0F8W			P	
IRN	IRN10900	34.00	15	17596.00	54.20	32.40	3.82	1.82	149.00	MODRSS		36.03		MODTES	CR		84.00		27M0F8W			P	
J	000BS-3N	109.85	15	17596.00	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W	BS-3N	33	AE	
J	J 11100	110.00	15	17596.00	134.50	31.50	3.52	3.30	68.00	R13RSS		33.80		R13TES	CR		87.00		27M0F8W		33	PE	
KIR	KIR00002	176.00	15	17596.00	–157.78	–0.33	2.40	0.64	110.62	MODRSS		42.60		MODTES	CL		84.00		27M0F8W			P	
LBN	LBN27900	11.00	15	17596.00	35.90	33.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
LBR	LBR24400	–33.50	15	17596.00	–9.30	6.60	1.22	0.70	133.00	MODRSS		45.13		MODTES	CL		84.00		27M0F8W			P	
LBY	LBY32100	–25.00	15	17596.00	17.50	26.30	3.68	1.84	130.00	MODRSS		36.14		MODTES	CR		84.00		27M0F8W			P	
LIE	LIE25300	–37.00	15	17596.00	9.50	47.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
LTU	LTU06100	23.00	15	17596.00	24.02	55.46	0.72	0.60	173.90	MODRSS		48.11		MODTES	CR		84.00		27M0F8W			P	
LUX	LUX11400	–19.00	15	17596.00	6.00	49.80	0.68	0.68	0.00	MODRSS		47.80		MODTES	CL		84.00		27M0F8W			P	
NRU	NRU30900	134.00	15	17596.00	167.00	–0.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
POR	POR13300	–30.00	15	17596.00	–8.00	39.60	0.92	0.60	112.00	MODRSS		47.03		MODTES	CR		84.00		27M0F8W			P	
ROU	ROU13600	–1.00	15	17596.00	25.00	45.70	1.38	0.66	155.00	MODRSS		44.85		MODTES	CR		86.00		27M0F8W			P	
SMO	SMO05700	158.00	15	17596.00	–172.30	–13.70	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
SVK	SVK14400	17.00	15	17596.00	19.65	48.69	0.82	0.60	5.20	MODRSS		47.53		MODTES	CL		84.00		27M0F8W			P	
UKR	UKR06300	38.00	15	17596.00	31.82	48.19	2.32	0.95	177.32	MODRSS		41.01		MODTES	CR		84.00		27M0F8W			P	
USA	MRA33200	122.00	15	17596.00	151.10	11.60	6.48	3.49	179.00	MODRSS		30.90		MODTES	CL		87.00		27M0F8W		14	P	
USA	MRA33201	122.00	15	17596.00	–157.50	21.00	2.02	0.60	115.00	MODRSS		43.61		MODTES	CL		87.00		27M0F8W		14	P	
USA	SMA33500	170.00	15	17596.00	–166.30	–0.20	7.97	1.04	72.00	MODRSS		35.26		MODTES	CR		87.00		27M0F8W		13	P	
USA	SMA33501	170.00	15	17596.00	–124.80	39.20	4.43	0.73	132.00	MODRSS		39.35		MODTES	CR		87.00		27M0F8W		13	P	
UZB	UZB07100	44.00	15	17596.00	64.01	41.21	2.67	0.96	163.32	MODRSS		40.37		MODTES	CR		84.00		27M0F8W			P	
VTN	VTN32500	86.00	15	17596.00	108.00	14.80	3.80	1.90	126.00	MODRSS		35.86		MODTES	CR		84.00		27M0F8W			P	
VUT	VUT12800	140.00	15	17596.00	168.00	–16.40	1.52	0.68	87.00	MODRSS		44.30		MODTES	CR		84.00		27M0F8W			P	
ALG	ALG25200	–25.00	16	17615.18	1.50	27.60	3.65	2.94	135.00	MODRSS		34.14		MODTES	CL		84.00		27M0F8W			P	
AND	AND34100	–37.00	16	17615.18	1.60	42.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
ARS	ARS00300	17.00	16	17615.18	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CR		84.00		27M0F8W			P	
AUS	AUS00500	152.00	16	17615.18	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
AUT	AUT01600	–19.00	16	17615.18	12.20	47.50	1.14	0.63	166.00	MODRSS		45.88		MODTES	CR		84.00		27M0F8W			P	
AZE	AZE06400	23.00	16	17615.18	47.47	40.14	0.93	0.60	158.14	MODRSS		46.98		MODTES	CL		84.00		27M0F8W			P	
BUL	BUL02000	–1.00	16	17615.18	25.00	43.00	2.00	2.00	0.00	MODRSS		38.43		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN16900	92.00	16	17615.18	118.50	36.40	1.16	0.76	11.00	MODRSS		44.99		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN18600	62.00	16	17615.18	102.50	30.20	1.91	1.23	147.00	MODRSS		40.74		MODTES	CR		84.00		27M0F8W			P	
COD	ZAI32200	–19.00	16	17615.18	22.40	0.00	2.16	1.88	48.00	MODRSS		38.36		MODTES	CL		84.00		27M0F8W			P	
DNK	DNK08900	5.00	16	17615.18	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W		28	P	
EGY	EGY02600	–7.00	16	17615.18	29.70	26.80	2.33	1.72	136.00	MODRSS		38.42		MODTES	CR		86.00		27M0F8W			P	
F	F2_A2744	–7.00	16	17615.18	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
F	OCE10100	–160.00	16	17615.18	–145.00	–16.30	4.34	3.54	4.00	MODRSS		32.58		MODTES	CR		84.00		27M0F8W			P	
F /EUT	E2WA7DA2	29.00	16	17615.18	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	16	17615.18	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	16	17615.18	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	16	17615.18	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	16	17615.18	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	16	17615.18	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	16	17615.18	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
G	G 02700	–33.50	16	17615.18	–3.50	53.80	1.84	0.72	142.00	MODRSS		43.23		MODTES	CL		84.00		27M0F8W			P	
IND	IND04000	56.00	16	17615.18	73.00	25.00	1.82	1.48	58.00	MODRSS		40.14		MODTES	CR		84.00		27M0F8W			P	1
KRE	KRE28600	110.00	16	17615.18	127.00	39.10	1.30	1.10	31.00	MODRSS		42.89		MODTES	CL		87.00		27M0F8W			P	
MAU	MAU24300	29.00	16	17615.18	56.80	–13.90	1.56	1.38	65.00	MODRSS		41.12		MODTES	CL		84.00		27M0F8W			P	
MDA	MDA06300	38.00	16	17615.18	28.41	46.99	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
MLA	MLA22700	86.00	16	17615.18	102.10	4.10	1.62	0.82	135.00	MODRSS		43.21		MODTES	CL		84.00		27M0F8W			P	
MLD	MLD30600	44.00	16	17615.18	73.10	6.00	0.96	0.60	90.00	MODRSS		46.84		MODTES	CR		84.00		27M0F8W			P	
MLI	MLI32800	–37.00	16	17615.18	–7.60	13.20	1.74	1.24	171.00	MODRSS		41.11		MODTES	CL		87.00		27M0F8W			P	
MLT	MLT14700	–13.00	16	17615.18	14.30	35.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
NZL	CKH05300	158.00	16	17615.18	–161.00	–19.80	1.00	0.60	132.00	MODRSS		46.67		MODTES	CR		84.00		27M0F8W		4	P	
NZL	CKH05301	158.00	16	17615.18	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CR		84.00		27M0F8W		4	P	
PHL	PHL28500	98.00	16	17615.18	121.30	11.10	3.46	1.76	99.00	MODRSS		36.60		MODTES	CL		84.00		27M0F8W			P	
PLW	PLW00000	146.00	16	17615.18	132.99	5.52	1.29	0.60	55.84	MODRSS		45.55		MODTES	CL		84.00		27M0F8W			P	
RRW	RRW31000	11.00	16	17615.18	30.00	–2.10	0.66	0.60	42.00	MODRSS		48.47		MODTES	CR		84.00		27M0F8W			P	
S	SIRIUS02	5.20	16	17615.18	14.00	63.00	1.30	0.70	142.00	R13RSS		43.00		R13TES	CL		84.00		27M0F8W	SIRIUS	28	AE	
SVN	SVN14800	34.00	16	17615.18	15.01	46.18	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
BLR	BLR06200	38.00	17	17634.36	28.04	53.18	1.17	0.60	9.68	MODRSS		45.96		MODTES	CR		84.00		27M0F8W			P	
BRM	BRM29800	74.00	17	17634.36	97.10	19.10	3.58	1.48	104.00	MODRSS		37.21		MODTES	CL		84.00		27M0F8W			P	
BTN	BTN03100	86.00	17	17634.36	90.44	27.05	0.72	0.60	175.47	MODRSS		48.11		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN16700	92.00	17	17634.36	124.30	43.70	1.98	0.72	156.00	MODRSS		42.91		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN18200	79.80	17	17634.36	108.70	35.10	1.42	0.88	109.00	MODRSS		43.48		MODTES	CL		84.00		27M0F8W			P	
CME	CME30000	–13.00	17	17634.36	12.70	6.20	2.54	1.68	87.00	MODRSS		38.15		MODTES	CL		84.00		27M0F8W			P	
E	E 12900	–30.00	17	17634.36	–3.10	39.90	2.10	1.14	154.00	MODRSS		40.66		MODTES	CR		84.00		27M0F8W		17	P	
E	HISPASA4	–30.00	17	17634.36	–3.10	39.90					ECO	43.00	18.70	R13TES	CR		82.50		27M0F8W	HISPASAT-1	17	AE	
E	HISPASA6	–30.00	17	17634.36	–3.10	39.90					ECO	43.00	18.70	R13TES	CR		83.50		27M0F8W	HISPASAT-1	17	AE	
EST	EST06100	23.00	17	17634.36	25.36	59.31	0.68	0.60	2.17	MODRSS		48.37		MODTES	CR		84.00		27M0F8W			P	
F	F 09300	–19.00	17	17634.36	2.60	45.90	2.50	0.98	160.00	R13RSS		40.56		R13TES	CL		84.00		27M0F8W		19	PE	
F /EUT	E2WA7DA1	29.00	17	17634.36	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	17	17634.36	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	17	17634.36	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	17	17634.36	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
F /EUT	E2WA7DE1	29.00	17	17634.36	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	17	17634.36	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	17	17634.36	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
GUI	GUI19200	–37.00	17	17634.36	–11.00	10.20	1.58	1.04	147.00	MODRSS		42.29		MODTES	CR		85.00		27M0F8W			P	
HRV	HRV14800	34.00	17	17634.36	16.74	44.54	0.88	0.69	5.30	MODRSS		46.57		MODTES	CR		84.00		27M0F8W			P	
IND	IND04600	68.00	17	17634.36	84.70	20.50	1.60	0.86	30.00	MODRSS		43.06		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03200	80.20	17	17634.36	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CR		84.00		27M0F8W			P	
LBY	LBY28000	–25.00	17	17634.36	17.50	26.30	3.68	1.84	130.00	MODRSS		36.14		MODTES	CR		84.00		27M0F8W			P	
MDG	MDG23600	29.00	17	17634.36	46.20	–18.60	2.57	0.80	67.00	MODRSS		41.32		MODTES	CR		84.00		27M0F8W			P	
NPL	NPL12200	50.00	17	17634.36	83.70	28.30	1.72	0.60	163.00	MODRSS		44.31		MODTES	CR		84.00		27M0F8W			P	
NZL	NZL28700	128.00	17	17634.36	173.00	–41.00	3.30	1.28	48.00	MODRSS		38.19		MODTES	CL		84.00		27M0F8W			P	
POL	POL13200	–1.00	17	17634.36	17.20	51.80	2.00	2.00	0.00	MODRSS		38.43		MODTES	CR		87.00		27M0F8W			P	
QAT	QAT24700	17.00	17	17634.36	51.10	25.30	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
SMR	SMR31100	–37.00	17	17634.36	12.50	43.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		83.00		27M0F8W			P	
SWZ	SWZ31300	–1.00	17	17634.36	31.50	–26.50	0.62	0.60	66.00	MODRSS		48.74		MODTES	CL		82.00		27M0F8W			P	
TJK	TJK06900	44.00	17	17634.36	71.14	38.37	1.25	0.76	159.15	MODRSS		44.65		MODTES	CR		84.00		27M0F8W			P	
TUR	TUR14500	5.00	17	17634.36	34.30	39.00	3.13	1.38	168.00	MODRSS		38.09		MODTES	CL		84.00		27M0F8W			P	
TZA	TZA22500	11.00	17	17634.36	34.60	–6.20	2.41	1.72	129.00	MODRSS		38.27		MODTES	CL		84.00		27M0F8W			P	
USA	PLM33700	170.00	17	17634.36	–166.30	–0.20	7.97	1.04	72.00	MODRSS		35.26		MODTES	CL		87.00		27M0F8W		9	P	
USA	PLM33701	170.00	17	17634.36	–124.80	39.10	4.43	0.73	132.00	MODRSS		39.35		MODTES	CL		87.00		27M0F8W		9	P	
USA	WAK33400	140.00	17	17634.36	152.50	11.70	7.89	3.52	0.00	MODRSS		30.01		MODTES	CR		87.00		27M0F8W		11	P	
USA	WAK33401	140.00	17	17634.36	–157.50	21.00	1.63	0.67	131.00	MODRSS		44.06		MODTES	CL		87.00		27M0F8W		11	P	
YUG	YUG14800	–7.00	17	17634.36	20.50	43.98	0.91	0.60	145.16	MODRSS		47.07		MODTES	CL		84.00		27M0F8W			P	
	YYY00001	11.00	17	17634.36	34.99	31.86	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	8
ALG	ALG25100	–25.00	18	17653.54	1.50	27.60	3.65	2.94	135.00	MODRSS		34.14		MODTES	CL		84.00		27M0F8W			P	
ARS	ARS27500	17.00	18	17653.54	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CR		84.00		27M0F8W			P	
AUS	AUS00800	164.00	18	17653.54	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CL		87.00		27M0F8W			P	
BGD	BGD22000	74.00	18	17653.54	90.30	23.60	1.46	0.84	135.00	MODRSS		43.56		MODTES	CR		84.00		27M0F8W			P	
BIH	BIH14800	34.00	18	17653.54	17.77	44.32	0.62	0.60	166.84	MODRSS		48.71		MODTES	CL		84.00		27M0F8W			P	
BOT	BOT29700	–1.00	18	17653.54	23.30	–22.20	2.13	1.50	36.00	MODRSS		39.40		MODTES	CR		85.00		27M0F8W			P	
CBG	CBG29900	68.00	18	17653.54	105.00	12.70	1.01	0.90	110.00	MODRSS		44.86		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15900	79.80	18	17653.54	106.00	32.50	5.00	3.70	150.00	MODRSS		31.78		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN18500	62.00	18	17653.54	95.70	35.40	2.10	1.14	156.00	MODRSS		40.66		MODTES	CL		84.00		27M0F8W			P	
COD	ZAI32300	–19.00	18	17653.54	21.30	–6.80	2.80	1.52	149.00	MODRSS		38.16		MODTES	CL		84.00		27M0F8W			P	
D	D 08700	–19.00	18	17653.54	9.60	49.90	1.62	0.72	147.00	MODRSS		43.78		MODTES	CR		84.00		27M0F8W			P	2
F	F2_A2722	–7.00	18	17653.54	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2722	–7.00	18	17653.54	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2728	–7.00	18	17653.54	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2722	–7.00	18	17653.54	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A2728	–7.00	18	17653.54	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
F	F3_A3322	–7.00	18	17653.54	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_A3328	–7.00	18	17653.54	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2722	–7.00	18	17653.54	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D2728	–7.00	18	17653.54	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3322	–7.00	18	17653.54	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3328	–7.00	18	17653.54	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA2	29.00	18	17653.54	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	18	17653.54	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	18	17653.54	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	18	17653.54	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	18	17653.54	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	18	17653.54	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	18	17653.54	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
GNB	GNB30400	–30.00	18	17653.54	–15.00	12.00	0.90	0.60	172.00	MODRSS		47.12		MODTES	CR		84.00		27M0F8W			P	
IND	IND04100	56.00	18	17653.54	78.40	16.00	2.08	1.38	35.00	MODRSS		39.87		MODTES	CR		84.00		27M0F8W			P	1
INS	INS03000	80.20	18	17653.54	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CL		84.00		27M0F8W			P	
IRL	IRL21100	–33.50	18	17653.54	–8.20	53.20	0.84	0.60	162.00	MODRSS		47.42		MODTES	CL		84.00		27M0F8W			P	
KRE	KRE28600	110.00	18	17653.54	127.00	39.10	1.30	1.10	31.00	MODRSS		42.89		MODTES	CL		87.00		27M0F8W			P	
MAU	MAU24200	29.00	18	17653.54	59.80	–18.90	1.62	1.24	55.00	MODRSS		41.42		MODTES	CL		84.00		27M0F8W			P	
MHL	MHL00000	146.00	18	17653.54	167.64	9.83	2.07	0.90	157.42	MODRSS		41.75		MODTES	CL		84.00		27M0F8W			P	
MKD	MKD14800	23.00	18	17653.54	21.53	41.50	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
MLA	MLA22700	86.00	18	17653.54	102.10	4.10	1.62	0.82	135.00	MODRSS		43.21		MODTES	CL		84.00		27M0F8W			P	
MLI	MLI32700	–37.00	18	17653.54	–2.00	19.00	2.66	1.26	127.00	MODRSS		39.19		MODTES	CL		87.00		27M0F8W			P	
NOR	BIFROS22	–0.80	18	17653.54	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CL		84.00		27M0FXF	BIFROST-2		A	
NOR	NOR12000	5.00	18	17653.54	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
PAK	PAK28100	38.00	18	17653.54	65.20	27.90	1.52	1.42	28.00	MODRSS		41.11		MODTES	CL		84.00		27M0F8W			P	
PHL	PHL28500	98.00	18	17653.54	121.30	11.10	3.46	1.76	99.00	MODRSS		36.60		MODTES	CL		84.00		27M0F8W			P	
SOM	SOM31200	23.00	18	17653.54	45.00	6.40	3.26	1.54	71.00	MODRSS		37.44		MODTES	CL		84.00		27M0F8W			P	
TCD	TCD14300	–13.00	18	17653.54	18.10	15.50	3.40	1.72	107.00	MODRSS		36.78		MODTES	CR		84.00		27M0F8W			P	
YEM	YEM26600	11.00	18	17653.54	44.36	15.70	0.77	0.60	104.23	MODRSS		47.78		MODTES	CL		84.00		27M0F8W			P	
AUS	AUS00400	152.00	19	17672.72	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040A	152.00	19	17672.72	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040B	152.00	19	17672.72	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040C	152.00	19	17672.72	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS00700	164.00	19	17672.72	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		77	P	
AUS	AUS0070A	164.00	19	17672.72	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		77	P	
BEN	BEN23300	–19.00	19	17672.72	2.20	9.50	1.44	0.68	97.00	MODRSS		44.54		MODTES	CR		84.00		27M0F8W			P	
BRM	BRM29800	74.00	19	17672.72	97.10	19.10	3.58	1.48	104.00	MODRSS		37.21		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15800	79.80	19	17672.72	106.00	32.50	5.00	3.70	150.00	MODRSS		31.78		MODTES	CL		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight Long.°	Boresight Lat.°	Space antenna character. Major°	Minor°	Orient.°	Space antenna	Shaped beam	Space ant. gain Co-polar	X-polar	Earth antenna	Polarization Type	Angle°	e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
CHN	CHN17900	92.00	19	17672.72	112.20	21.90	1.84	1.22	37.00	MODRSS		40.94		MODTES	CR		84.00		27M0F8W			P	
COM	COM2070A	29.00	19	17672.72	44.10	–12.10	0.76	0.60	149.00	MODRSS		47.86		MODTES	CR		84.00		27M0F8W			P	
F	F2_A2733	–7.00	19	17672.72	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		84.00		27M0F9W	RADIOSAT-2	19	A	
F /EUT	E2WA7DA1	29.00	19	17672.72	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	19	17672.72	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	19	17672.72	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	19	17672.72	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	19	17672.72	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	19	17672.72	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	19	17672.72	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FSM	FSM00000	146.00	19	17672.72	151.67	5.42	5.34	1.51	166.52	MODRSS		35.37		MODTES	CR		84.00		27M0F8W			P	
GAB	GAB26000	–13.00	19	17672.72	11.80	–0.60	1.43	1.12	64.00	MODRSS		42.40		MODTES	CL		84.00		27M0F8W			P	
GMB	GMB30200	–37.00	19	17672.72	–15.10	13.40	0.79	0.60	4.00	MODRSS		47.69		MODTES	CR		83.00		27M0F8W			P	
GRC	GRC10500	5.00	19	17672.72	24.50	38.00	2.03	1.29	159.00	MODRSS		40.27		MODTES	CL		84.00		27M0F8W			P	
IND	IND03800	56.00	19	17672.72	75.90	33.40	1.52	1.08	33.00	MODRSS		42.29		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03200	80.20	19	17672.72	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CR		84.00		27M0F8W			P	
INS	INS03600	104.00	19	17672.72	115.20	–1.70	9.14	3.43	170.00	MODRSS		29.48		MODTES	CL		84.00		27M0F8W			P	
IRN	IRN10900	34.00	19	17672.72	54.20	32.40	3.82	1.82	149.00	MODRSS		36.03		MODTES	CR		84.00		27M0F8W			P	
KIR	KIR00002	176.00	19	17672.72	–157.78	–0.33	2.40	0.64	110.62	MODRSS		42.60		MODTES	CL		84.00		27M0F8W			P	
LBN	LBN27900	11.00	19	17672.72	35.90	33.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
LBR	LBR2440A	–33.50	19	17672.72	–9.30	6.60	1.22	0.70	133.00	MODRSS		45.13		MODTES	CL		84.00		27M0F8W			P	
LBY	LBY32100	–25.00	19	17672.72	17.50	26.30	3.68	1.84	130.00	MODRSS		36.14		MODTES	CR		84.00		27M0F8W			P	
LIE	LIE25300	–37.00	19	17672.72	9.50	47.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
LTU	LTU06100	23.00	19	17672.72	24.02	55.46	0.72	0.60	173.90	MODRSS		48.11		MODTES	CR		84.00		27M0F8W			P	
LUX	LUX11400	–19.00	19	17672.72	6.00	49.80	0.68	0.68	0.00	MODRSS		47.80		MODTES	CL		84.00		27M0F8W			P	
NPL	NPL12200	50.00	19	17672.72	83.70	28.30	1.72	0.60	163.00	MODRSS		44.31		MODTES	CR		84.00		27M0F8W			P	
NZL	NIU05400	158.00	19	17672.72	–169.80	–19.00	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W		2	P	
NZL	NIU05401	158.00	19	17672.72	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CR		84.00		27M0F8W		2	P	
POR	POR13300	–30.00	19	17672.72	–8.00	39.60	0.92	0.60	112.00	MODRSS		47.03		MODTES	CR		84.00		27M0F8W			P	
ROU	ROU13600	–1.00	19	17672.72	25.00	45.70	1.38	0.66	155.00	MODRSS		44.85		MODTES	CR		86.00		27M0F8W			P	
SVK	SVK14400	17.00	19	17672.72	19.65	48.69	0.82	0.60	5.20	MODRSS		47.53		MODTES	CL		84.00		27M0F8W			P	
UKR	UKR06300	38.00	19	17672.72	31.82	48.19	2.32	0.95	177.32	MODRSS		41.01		MODTES	CR		84.00		27M0F8W			P	
USA	MRA33200	122.00	19	17672.72	151.10	11.60	6.48	3.49	179.00	MODRSS		30.90		MODTES	CL		87.00		27M0F8W		14	P	
USA	MRA33201	122.00	19	17672.72	–157.50	21.00	2.02	0.60	115.00	MODRSS		43.61		MODTES	CL		87.00		27M0F8W		14	P	
USA	SMA33500	170.00	19	17672.72	–166.30	–0.20	7.97	1.04	72.00	MODRSS		35.26		MODTES	CR		87.00		27M0F8W		13	P	
USA	SMA33501	170.00	19	17672.72	–124.80	39.20	4.43	0.73	132.00	MODRSS		39.35		MODTES	CR		87.00		27M0F8W		13	P	
UZB	UZB07100	44.00	19	17672.72	64.01	41.21	2.67	0.96	163.32	MODRSS		40.37		MODTES	CR		84.00		27M0F8W			P	
ALG	ALG25200	–25.00	20	17691.90	1.50	27.60	3.65	2.94	135.00	MODRSS		34.14		MODTES	CL		84.00		27M0F8W			P	
AND	AND34100	–37.00	20	17691.90	1.60	42.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
ARS	ARS00300	17.00	20	17691.90	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	CR		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
AUS	AUS00500	152.00	20	17691.90	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
AUT	AUT01600	–19.00	20	17691.90	12.20	47.50	1.14	0.63	166.00	MODRSS		45.88		MODTES	CR		84.00		27M0F8W			P	
AZE	AZE06400	23.00	20	17691.90	47.47	40.14	0.93	0.60	158.14	MODRSS		46.98		MODTES	CL		84.00		27M0F8W			P	4
BGD	BGD22000	74.00	20	17691.90	90.30	23.60	1.46	0.84	135.00	MODRSS		43.56		MODTES	CR		84.00		27M0F8W			P	
BUL	BUL02000	–1.00	20	17691.90	25.00	43.00	2.00	2.00	0.00	MODRSS		38.43		MODTES	CL		84.00		27M0F8W			P	
CBG	CBG29900	68.00	20	17691.90	105.00	12.70	1.01	0.90	110.00	MODRSS		44.86		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15900	79.80	20	17691.90	106.00	32.50	5.00	3.70	150.00	MODRSS		31.78		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN18400	62.00	20	17691.90	101.00	37.90	2.78	0.82	144.00	MODRSS		40.87		MODTES	CL		84.00		27M0F8W			P	
COD	ZAI32200	–19.00	20	17691.90	22.40	0.00	2.16	1.88	48.00	MODRSS		38.36		MODTES	CL		84.00		27M0F8W			P	
DNK	DNK08901	5.00	20	17691.90	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W		29	P	
EGY	EGY02600	–7.00	20	17691.90	29.70	26.80	2.33	1.72	136.00	MODRSS		38.42		MODTES	CR		86.00		27M0F8W			P	
F	F2_A2744	–7.00	20	17691.90	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F /EUT	E2WA7DA2	29.00	20	17691.90	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	20	17691.90	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	20	17691.90	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	20	17691.90	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	20	17691.90	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	20	17691.90	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	20	17691.90	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
G	G 02700	–33.50	20	17691.90	–3.50	53.80	1.84	0.72	142.00	MODRSS		43.23		MODTES	CL		84.00		27M0F8W			P	4
IND	IND04200	68.00	20	17691.90	79.30	27.70	2.14	1.16	147.00	MODRSS		40.50		MODTES	CR		89.00		27M0F8W			P	1
INS	INS03000	80.20	20	17691.90	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CL		84.00		27M0F8W			P	
KRE	KRE28600	110.00	20	17691.90	127.00	39.10	1.30	1.10	31.00	MODRSS		42.89		MODTES	CL		87.00		27M0F8W			P	3, 4
MDA	MDA06300	38.00	20	17691.90	28.41	46.99	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	4, 7
MLA	MLA22700	86.00	20	17691.90	102.10	4.10	1.62	0.82	135.00	MODRSS		43.21		MODTES	CL		84.00		27M0F8W			P	
MLI	MLI32800	–37.00	20	17691.90	–7.60	13.20	1.74	1.24	171.00	MODRSS		41.11		MODTES	CL		87.00		27M0F8W			P	
MLT	MLT1470A	–13.00	20	17691.90	14.30	35.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	4, 7
NZL	TKL05800	158.00	20	17691.90	–171.80	–8.90	0.70	0.60	35.00	MODRSS		48.21		MODTES	CL		84.00		27M0F8W		1	P	
NZL	TKL05801	158.00	20	17691.90	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CL		84.00		27M0F8W		1	P	
PAK	PAK28200	38.00	20	17691.90	68.50	25.80	1.32	0.62	133.00	MODRSS		45.32		MODTES	CL		84.00		27M0F8W			P	
PHL	PHL28500	98.00	20	17691.90	121.30	11.10	3.46	1.76	99.00	MODRSS		36.60		MODTES	CL		84.00		27M0F8W			P	
PLW	PLW00000	146.00	20	17691.90	132.99	5.52	1.29	0.60	55.84	MODRSS		45.55		MODTES	CL		84.00		27M0F8W			P	4
RRW	RRW31000	11.00	20	17691.90	30.00	–2.10	0.66	0.60	42.00	MODRSS		48.47		MODTES	CR		84.00		27M0F8W			P	
S	SIRIUS03	5.20	20	17691.90	14.00	63.00	1.30	0.70	142.00	R13RSS		43.00		R13TES	CL		84.00		27M0F8W	SIRIUS	29	AE	
SVN	SVN14800	34.00	20	17691.90	15.01	46.18	0.60	0.60	90.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	4
ALB	ALB29600	–7.00	21	17711.08	20.10	41.00	1.17	0.65	128.00	MODRSS		45.64		MODTES	CL		84.00		27M0F8W			P	
BEL	BEL01800	–19.00	21	17711.08	4.60	50.60	0.82	0.60	167.00	MODRSS		47.53		MODTES	CL		84.00		27M0F8W			P	
BFA	BFA10700	–30.00	21	17711.08	–1.50	12.20	1.45	1.14	29.00	MODRSS		42.26		MODTES	CL		84.00		27M0F8W			P	4
BRM	BRM29800	74.00	21	17711.08	97.10	19.10	3.58	1.48	104.00	MODRSS		37.21		MODTES	CL		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
CHN	CHN17500	92.00	21	17711.08	121.40	23.80	1.14	0.82	64.00	MODRSS		44.74		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN17600	79.80	21	17711.08	113.70	33.90	1.20	0.80	141.00	MODRSS		44.62		MODTES	CL		84.00		27M0F8W			P	
CYP	CYP08600	5.00	21	17711.08	33.30	35.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
D	D2-21600	–1.00	21	17711.08	12.60	52.10	0.83	0.63	172.00	MODRSS		47.26		MODTES	CR		84.00		27M0F8W			P	4, 7
DJI	DJI09900	23.00	21	17711.08	42.50	11.60	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
E	HISPASA2	–30.00	21	17711.08	–8.80	35.40	3.00	1.90	45.00	MODRSS		36.90		MODTES	CR		84.00		27M0F8W	HISPASAT-2	22	A	4
F	F 09306	–7.00	21	17711.08	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		27M0F8W	RADIOSAT	19	A	
F	F3_A2751	–7.00	21	17711.08	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3351	–7.00	21	17711.08	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2751	–7.00	21	17711.08	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		69.40		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3351	–7.00	21	17711.08	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		69.40		33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	21	17711.08	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	21	17711.08	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	21	17711.08	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	21	17711.08	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	21	17711.08	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	21	17711.08	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	21	17711.08	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
IND	IND03800	56.00	21	17711.08	75.90	33.40	1.52	1.08	33.00	MODRSS		42.29		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03200	80.20	21	17711.08	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CR		84.00		27M0F8W			P	
ISL	ISL04900	–33.50	21	17711.08	–19.00	64.90	1.00	0.60	177.00	MODRSS		46.67		MODTES	CR		82.00		27M0F8W			P	
KEN	KEN24900	11.00	21	17711.08	37.90	1.10	2.29	1.56	94.00	MODRSS		38.92		MODTES	CL		84.00		27M0F8W			P	
LVA	LVA06100	23.00	21	17711.08	24.53	56.20	0.83	0.60	0.05	MODRSS		47.50		MODTES	CR		84.00		27M0F8W			P	4
MCO	MCO11600	–37.00	21	17711.08	7.40	43.70	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		83.00		27M0F8W			P	
NPL	NPL12200	50.00	21	17711.08	83.70	28.30	1.72	0.60	163.00	MODRSS		44.31		MODTES	CR		84.00		27M0F8W			P	
NZL	NZL28700	128.00	21	17711.08	173.00	–41.00	3.30	1.28	48.00	MODRSS		38.19		MODTES	CL		84.00		27M0F8W			P	
TON	TON21500	170.00	21	17711.08	–174.70	–18.00	1.41	0.68	85.00	MODRSS		44.63		MODTES	CR		84.00		27M0F8W			P	
UAE	UAE27400	17.00	21	17711.08	53.60	24.40	0.98	0.80	162.00	MODRSS		45.50		MODTES	CL		84.00		27M0F8W			P	
USA	GUM33100	122.00	21	17711.08	151.10	11.60	6.48	3.49	179.00	MODRSS		30.90		MODTES	CR		87.00		27M0F8W		15	P	
USA	GUM33101	122.00	21	17711.08	–157.50	21.00	2.02	0.60	115.00	MODRSS		43.61		MODTES	CR		87.00		27M0F8W		15	P	
AUS	AUS00800	164.00	22	17730.26	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CL		87.00		27M0F8W			P	
BDI	BDI27000	11.00	22	17730.26	29.90	–3.10	0.71	0.60	80.00	MODRSS		48.15		MODTES	CR		84.00		27M0F8W			P	
BGD	BGD22000	74.00	22	17730.26	90.30	23.60	1.46	0.84	135.00	MODRSS		43.56		MODTES	CR		84.00		27M0F8W			P	
CBG	CBG29900	68.00	22	17730.26	105.00	12.70	1.01	0.90	110.00	MODRSS		44.86		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15900	79.80	22	17730.26	106.00	32.50	5.00	3.70	150.00	MODRSS		31.78		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN16800	92.00	22	17730.26	124.80	48.10	2.68	0.92	157.00	MODRSS		40.53		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN18300	62.00	22	17730.26	104.80	39.00	1.48	0.60	142.00	MODRSS		44.96		MODTES	CL		84.00		27M0F8W			P	
COG	COG23500	–13.00	22	17730.26	14.60	–0.70	2.02	1.18	59.00	MODRSS		40.67		MODTES	CR		84.00		27M0F8W			P	
CTI	CTI23700	–30.00	22	17730.26	–5.80	7.40	1.55	1.43	162.00	MODRSS		40.99		MODTES	CR		84.00		27M0F8W			P	4
F	F2aA2762	–7.00	22	17730.26	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
F	F3_A2762	–7.00	22	17730.26	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3362	–7.00	22	17730.26	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2762	–7.00	22	17730.26	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3362	–7.00	22	17730.26	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	REU09700	29.00	22	17730.26	55.60	–19.20	1.56	0.78	96.00	MODRSS		43.59		MODTES	CL		84.00		27M0F8W		5	P	
F	REU09701	29.00	22	17730.26	3.70	45.20	1.94	1.68	24.00	MODRSS		39.32		MODTES	CL		84.00		27M0F8W		5	P	
F /EUT	E2WA7DA2	29.00	22	17730.26	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	22	17730.26	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	22	17730.26	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	22	17730.26	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	22	17730.26	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	22	17730.26	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	22	17730.26	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FIN	FIN10400	5.00	22	17730.26	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
G	G UKDBS	–33.50	22	17730.26	–3.50	53.80	1.84	0.72	142.00	MODRSS		43.20		MODTES	CL		84.00		27M0F8W	UKDBS-3		A	4
GEO	GEO06400	23.00	22	17730.26	43.35	42.27	1.11	0.60	161.21	MODRSS		46.23		MODTES	CL		84.00		27M0F8W			P	4
HNG	HNG10600	–1.00	22	17730.26	22.20	45.60	2.00	2.00	0.00	MODRSS		38.43		MODTES	CL		84.00		27M0F8W			P	
IND	IND04200	68.00	22	17730.26	79.30	27.70	2.14	1.16	147.00	MODRSS		40.50		MODTES	CR		89.00		27M0F8W			P	1
INS	INS03000	80.20	22	17730.26	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CL		84.00		27M0F8W			P	
KGZ	KGZ07000	44.00	22	17730.26	73.88	41.32	1.34	0.64	3.53	MODRSS		45.12		MODTES	CR		84.00		27M0F8W			P	4, 7
KRE	KRE28600	110.00	22	17730.26	127.00	39.10	1.30	1.10	31.00	MODRSS		42.89		MODTES	CL		87.00		27M0F8W			P	3, 4
KWT	KWT11300	17.00	22	17730.26	47.60	29.20	0.68	0.60	145.00	MODRSS		48.34		MODTES	CR		84.00		27M0F8W			P	
MLA	MLA22700	86.00	22	17730.26	102.10	4.10	1.62	0.82	135.00	MODRSS		43.21		MODTES	CL		84.00		27M0F8W			P	
MTN	MTN22300	–37.00	22	17730.26	–12.20	18.50	2.62	1.87	150.00	MODRSS		37.55		MODTES	CL		86.00		27M0F8W			P	
PAK	PAK28100	38.00	22	17730.26	65.20	27.90	1.52	1.42	28.00	MODRSS		41.11		MODTES	CL		84.00		27M0F8W			P	
PHL	PHL28500	98.00	22	17730.26	121.30	11.10	3.46	1.76	99.00	MODRSS		36.60		MODTES	CL		84.00		27M0F8W			P	
SDN	SDN23100	–7.00	22	17730.26	29.90	12.90	2.64	2.08	155.00	MODRSS		37.05		MODTES	CR		86.00		27M0F8W			P	
SUI	SUI14000	–19.00	22	17730.26	8.20	46.60	0.98	0.70	171.00	MODRSS		46.08		MODTES	CR		84.00		27M0F8W			P	2
SYR	SYR22900	11.00	22	17730.26	38.30	34.90	1.04	0.90	7.00	MODRSS		44.73		MODTES	CL		84.00		27M0F8W			P	
TUN	TUN15000	–25.00	22	17730.26	9.50	33.50	1.88	0.72	135.00	MODRSS		43.13		MODTES	CL		84.00		27M0F8W			P	
AGL	AGL29500	–13.00	23	17749.44	16.50	–12.00	3.09	2.26	84.00	MODRSS		36.01		MODTES	CL		84.00		27M0F8W			P	
ARS	ARS34000	17.00	23	17749.44	44.60	23.40	4.21	2.48	145.00	MODRSS		34.28		MODTES	CL		84.00		27M0F8W		71	P	
AUS	AUS00400	152.00	23	17749.44	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CL		87.00		27M0F8W		76	P	
AUS	AUS0040A	152.00	23	17749.44	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	4
AUS	AUS0040B	152.00	23	17749.44	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	4
AUS	AUS0040C	152.00	23	17749.44	135.36	–23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	CL		87.00		27M0F8W		76	P	4
AUS	AUS00700	164.00	23	17749.44	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		77	P	
AUS	AUS0070A	164.00	23	17749.44	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		77	P	4
BHR	BHR2550A	17.00	23	17749.44	50.50	26.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W		71	P	4

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
BRM	BRM29800	74.00	23	17749.44	97.10	19.10	3.58	1.48	104.00	MODRSS		37.21		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN15800	79.80	23	17749.44	106.00	32.50	5.00	3.70	150.00	MODRSS		31.78		MODTES	CL		84.00		27M0F8W			P	
CVA	CVA08500	–37.00	23	17749.44	10.80	41.50	2.00	0.60	138.00	MODRSS		43.66		MODTES	CR		84.00		27M0F8W			P	
CZE	CZE14400	17.00	23	17749.44	15.50	49.79	0.92	0.60	174.55	MODRSS		47.02		MODTES	CR		84.00		27M0F8W			P	4
E	CNR13000	–30.00	23	17749.44	–15.70	28.40	1.54	0.60	5.00	MODRSS		44.79		MODTES	CR		84.00		27M0F8W		22	P	4
E	HISPASA2	–30.00	23	17749.44	–8.80	35.40	3.00	1.90	45.00	MODRSS		36.90		MODTES	CR		84.00		27M0F8W	HISPASAT-2	22	A	4
ERI	ERI09200	23.00	23	17749.44	39.41	14.98	1.67	0.95	145.48	MODRSS		42.44		MODTES	CL		84.00		27M0F8W			P	4
F	F2aA2773	–7.00	23	17749.44	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2773	–7.00	23	17749.44	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3373	–7.00	23	17749.44	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2773	–7.00	23	17749.44	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3373	–7.00	23	17749.44	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	23	17749.44	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	23	17749.44	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	23	17749.44	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	23	17749.44	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	23	17749.44	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	23	17749.44	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	23	17749.44	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
GHA	GHA10800	–25.00	23	17749.44	–1.20	7.90	1.48	1.06	102.00	MODRSS		42.49		MODTES	CR		83.00		27M0F8W			P	
GNE	GNE30300	–19.00	23	17749.44	10.30	1.50	0.68	0.60	10.00	MODRSS		48.34		MODTES	CR		84.00		27M0F8W			P	
HOL	HOL21300	–19.00	23	17749.44	5.40	52.00	0.76	0.60	171.00	MODRSS		47.86		MODTES	CL		84.00		27M0F8W			P	
IND	IND04600	68.00	23	17749.44	84.70	20.50	1.60	0.86	30.00	MODRSS		43.06		MODTES	CL		84.00		27M0F8W			P	1
INS	INS03200	80.20	23	17749.44	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CR		84.00		27M0F8W			P	
ISL	ISL05000	5.00	23	17749.44	–19.50	61.00	2.20	0.80	4.00	MODRSS		41.99		MODTES	CL		84.00		27M0F8W			P	
JOR	JOR22400	11.00	23	17749.44	35.80	31.40	0.84	0.78	114.00	MODRSS		46.28		MODTES	CR		85.00		27M0F8W			P	
KIR	KIR00002	176.00	23	17749.44	–157.78	–0.33	2.40	0.64	110.62	MODRSS		42.60		MODTES	CL		84.00		27M0F8W			P	
NOR	BIFROS21	–0.80	23	17749.44	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CR		84.00		27M0FXF	BIFROST-2		A	
NPL	NPL1220A	50.00	23	17749.44	83.70	28.30	1.72	0.60	163.00	MODRSS		44.31		MODTES	CR		84.00		27M0F8W			P	4, 7
NZL	NIU05400	158.00	23	17749.44	–169.80	–19.00	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W		2	P	
NZL	NIU05401	158.00	23	17749.44	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CR		84.00		27M0F8W		2	P	
SDN	SDN23000	–7.00	23	17749.44	29.90	9.80	2.95	2.17	123.00	MODRSS		36.38		MODTES	CL		86.00		27M0F8W			P	
SRL	SRL25900	–33.50	23	17749.44	–11.80	8.60	0.78	0.68	114.00	MODRSS		47.20		MODTES	CL		84.00		27M0F8W			P	4
TKM	TKM06800	44.00	23	17749.44	59.18	38.84	2.25	0.99	164.51	MODRSS		40.94		MODTES	CL		84.00		27M0F8W			P	4, 7
ZWE	ZWE13500	–1.00	23	17749.44	29.60	–18.80	1.46	1.36	37.00	MODRSS		41.47		MODTES	CR		85.00		27M0F8W			P	
ARM	ARM06400	23.00	24	17768.62	44.99	39.95	0.73	0.60	148.17	MODRSS		48.02		MODTES	CL		84.00		27M0F8W			P	4
AUS	AUS00500	152.00	24	17768.62	135.00	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
CAF	CAF25800	–13.00	24	17768.62	21.00	6.30	2.25	1.68	31.00	MODRSS		38.67		MODTES	CR		84.00		27M0F8W			P	
CBG	CBG29900	68.00	24	17768.62	105.00	12.70	1.01	0.90	110.00	MODRSS		44.86		MODTES	CL		84.00		27M0F8W			P	
CHN	CHN16600	92.00	24	17768.62	121.10	41.70	1.52	0.78	154.00	MODRSS		43.71		MODTES	CR		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
CHN	CHN17700	79.80	24	17768.62	111.80	30.80	1.42	0.82	160.00	MODRSS		43.79		MODTES	CR		84.00		27M0F8W			P	
CHN	CHN18800	62.00	24	17768.62	101.50	25.10	1.86	1.08	132.00	MODRSS		41.42		MODTES	CR		84.00		27M0F8W			P	
DNK	DNK09000	5.00	24	17768.62	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
F	F2_A2788	–7.00	24	17768.62	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2784	–7.00	24	17768.62	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2788	–7.00	24	17768.62	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2784	–7.00	24	17768.62	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A2788	–7.00	24	17768.62	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3384	–7.00	24	17768.62	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_A3388	–7.00	24	17768.62	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2784	–7.00	24	17768.62	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D2788	–7.00	24	17768.62	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3384	–7.00	24	17768.62	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3388	–7.00	24	17768.62	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	MYT09800	29.00	24	17768.62	45.10	–12.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W		7	P	
F	MYT09801	29.00	24	17768.62	3.60	45.60	1.97	1.71	22.00	MODRSS		39.17		MODTES	CL		84.00		27M0F8W		7	P	
F /EUT	E2WA7DA2	29.00	24	17768.62	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	24	17768.62	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	24	17768.62	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	24	17768.62	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	24	17768.62	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	24	17768.62	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	24	17768.62	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
I	I 08200	–19.00	24	17768.62	12.30	41.30	2.38	0.98	137.00	MODRSS		40.77		MODTES	CR		84.00		27M0F8W			P	
IND	IND04100	56.00	24	17768.62	78.40	16.00	2.08	1.38	35.00	MODRSS		39.87		MODTES	CR		84.00		27M0F8W			P	1
INS	INS03000	80.20	24	17768.62	113.60	–1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	CL		84.00		27M0F8W			P	
IRQ	IRQ25600	11.00	24	17768.62	43.50	33.00	2.28	1.32	145.00	MODRSS		39.66		MODTES	CL		84.00		27M0F8W			P	
KAZ	KAZ06600	44.00	24	17768.62	64.72	46.40	4.31	1.70	172.22	MODRSS		35.79		MODTES	CR		84.00		27M0F8W			P	4, 7
LSO	LSO30500	5.00	24	17768.62	27.80	–29.80	0.66	0.60	36.00	MODRSS		48.47		MODTES	CL		84.00		27M0F8W			P	
MLA	MLA22700	86.00	24	17768.62	102.10	4.10	1.62	0.82	135.00	MODRSS		43.21		MODTES	CL		84.00		27M0F8W			P	
MTN	MTN28800	–37.00	24	17768.62	–7.80	23.40	1.63	1.10	141.00	MODRSS		41.91		MODTES	CL		86.00		27M0F8W			P	
MWI	MWI30800	–1.00	24	17768.62	34.10	–13.00	1.54	0.60	87.00	MODRSS		44.79		MODTES	CL		84.00		27M0F8W			P	
NGR	NGR11500	–25.00	24	17768.62	8.30	16.80	2.54	2.08	44.00	MODRSS		37.22		MODTES	CL		85.00		27M0F8W			P	
NOR	BIFROS22	–0.80	24	17768.62	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CL		84.00		27M0FXF	BIFROST-2		A	
NZL	TKL05800	158.00	24	17768.62	–171.80	–8.90	0.70	0.60	35.00	MODRSS		48.21		MODTES	CL		84.00		27M0F8W		1	P	
NZL	TKL05801	158.00	24	17768.62	172.30	–39.70	2.88	1.56	47.00	MODRSS		37.92		MODTES	CL		84.00		27M0F8W		1	P	
OMA	OMA12300	17.00	24	17768.62	55.60	21.00	1.88	1.02	100.00	MODRSS		41.62		MODTES	CR		85.00		27M0F8W			P	
PAK	PAK28200	38.00	24	17768.62	68.50	25.80	1.32	0.62	133.00	MODRSS		45.32		MODTES	CL		84.00		27M0F8W			P	
PHL	PHL28500	98.00	24	17768.62	121.30	11.10	3.46	1.76	99.00	MODRSS		36.60		MODTES	CL		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
POR	AZR13400	–30.00	24	17768.62	–23.40	36.10	2.56	0.70	158.00	MODRSS		41.91		MODTES	CL		84.00		27M0F8W			P	
SDN	SDN23200	–7.00	24	17768.62	29.60	18.40	2.54	2.09	167.00	MODRSS		37.20		MODTES	CR		86.00		27M0F8W			P	
ALB	ALB29600	–7.00	25	17787.80	20.10	41.00	1.17	0.65	128.00	MODRSS		45.64		MODTES	CL		84.00		27M0F8W			P	
AUS	AUS00900	164.00	25	17787.80	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		78	P	
AUS	AUS0090A	164.00	25	17787.80	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
AUS	AUS0090B	164.00	25	17787.80	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
BEL	BEL01800	–19.00	25	17787.80	4.60	50.60	0.82	0.60	167.00	MODRSS		47.53		MODTES	CL		84.00		27M0F8W			P	
BFA	BFA10700	–30.00	25	17787.80	–1.50	12.20	1.45	1.14	29.00	MODRSS		42.26		MODTES	CL		84.00		27M0F8W			P	4
CYP	CYP08600	5.00	25	17787.80	33.30	35.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
D	D2-21600	–1.00	25	17787.80	12.60	52.10	0.83	0.63	172.00	MODRSS		47.26		MODTES	CR		84.00		27M0F8W			P	4, 7
DJI	DJI09900	23.00	25	17787.80	42.50	11.60	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
E	HISPASA2	–30.00	25	17787.80	–8.80	35.40	3.00	1.90	45.00	MODRSS		36.90		MODTES	CR		84.00		27M0F8W	HISPASAT-2	22	A	4
F	F 09306	–7.00	25	17787.80	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		27M0F8W	RADIOSAT	19	A	
F	F3_A2751	–7.00	25	17787.80	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3351	–7.00	25	17787.80	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2751	–7.00	25	17787.80	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3351	–7.00	25	17787.80	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	25	17787.80	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	25	17787.80	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	25	17787.80	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	25	17787.80	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	25	17787.80	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	25	17787.80	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	25	17787.80	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
ISL	ISL04900	–33.50	25	17787.80	–19.00	64.90	1.00	0.60	177.00	MODRSS		46.67		MODTES	CR		82.00		27M0F8W			P	
KEN	KEN24900	11.00	25	17787.80	37.90	1.10	2.29	1.56	94.00	MODRSS		38.92		MODTES	CL		84.00		27M0F8W			P	
LVA	LVA06100	23.00	25	17787.80	24.53	56.20	0.83	0.60	0.05	MODRSS		47.50		MODTES	CR		84.00		27M0F8W			P	4
MCO	MCO11600	–37.00	25	17787.80	7.40	43.70	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		83.00		27M0F8W			P	
MNG	MNG24800	74.00	25	17787.80	107.50	47.80	2.00	2.00	0.00	MODRSS		38.43		MODTES	CR		89.02		27M0F8W			P	
RUS	RSTRSA11	36.00	25	17787.80	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	25	17787.80	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	25	17787.80	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	25	17787.80	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	25	17787.80	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	25	17787.80	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	25	17787.80	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	25	17787.80	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-5	42	P	
RUS	RUS00400	110.00	25	17787.80	118.22	51.52					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W			P	3, 4
TON	TON21500	170.00	25	17787.80	–174.70	–18.00	1.41	0.68	85.00	MODRSS		44.63		MODTES	CR		84.00		27M0F8W			P	
UAE	UAE27400	17.00	25	17787.80	53.60	24.40	0.98	0.80	162.00	MODRSS		45.50		MODTES	CL		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
USA	GUM33100	122.00	25	17787.80	151.10	11.60	6.48	3.49	179.00	MODRSS		30.90		MODTES	CR		87.00		27M0F8W		15	P	
USA	GUM33101	122.00	25	17787.80	–157.50	21.00	2.02	0.60	115.00	MODRSS		43.61		MODTES	CR		87.00		27M0F8W		15	P	
AUS	AUS00600	152.00	26	17806.98	135.50	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
BDI	BDI27000	11.00	26	17806.98	29.90	–3.10	0.71	0.60	80.00	MODRSS		48.15		MODTES	CR		84.00		27M0F8W			P	
COG	COG23500	–13.00	26	17806.98	14.60	–0.70	2.02	1.18	59.00	MODRSS		40.67		MODTES	CR		84.00		27M0F8W			P	
CTI	CTI23700	–30.00	26	17806.98	–5.80	7.40	1.55	1.43	162.00	MODRSS		40.99		MODTES	CR		84.00		27M0F8W			P	4, 7
F	F2aA2762	–7.00	26	17806.98	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2762	–7.00	26	17806.98	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3362	–7.00	26	17806.98	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2762	–7.00	26	17806.98	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3362	–7.00	26	17806.98	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	REU09700	29.00	26	17806.98	55.60	–19.20	1.56	0.78	96.00	MODRSS		43.59		MODTES	CL		84.00		27M0F8W		5	P	
F	REU09701	29.00	26	17806.98	3.70	45.20	1.94	1.68	24.00	MODRSS		39.32		MODTES	CL		84.00		27M0F8W		5	P	
F /EUT	E2WA7DA2	29.00	26	17806.98	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	26	17806.98	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	26	17806.98	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	26	17806.98	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	26	17806.98	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	26	17806.98	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	26	17806.98	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
FIN	FIN10400	5.00	26	17806.98	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
G	G UKDBS	–33.50	26	17806.98	–3.50	53.80	1.84	0.72	142.00	MODRSS		43.20		MODTES	CL		84.00		27M0F8W	UKDBS-3		A	4
GEO	GEO06400	23.00	26	17806.98	43.35	42.27	1.11	0.60	161.21	MODRSS		46.23		MODTES	CL		84.00		27M0F8W			P	4
HNG	HNG10600	–1.00	26	17806.98	22.20	45.60	2.00	2.00	0.00	MODRSS		38.43		MODTES	CL		84.00		27M0F8W			P	
KGZ	KGZ07000	44.00	26	17806.98	73.88	41.32	1.34	0.64	3.53	MODRSS		45.12		MODTES	CR		84.00		27M0F8W			P	4, 7
KWT	KWT11300	17.00	26	17806.98	47.60	29.20	0.68	0.60	145.00	MODRSS		48.34		MODTES	CR		84.00		27M0F8W			P	
MTN	MTN22300	–37.00	26	17806.98	–12.20	18.50	2.62	1.87	150.00	MODRSS		37.55		MODTES	CL		86.00		27M0F8W			P	
RUS	RSTRSA12	36.00	26	17806.98	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	26	17806.98	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	26	17806.98	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	26	17806.98	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	26	17806.98	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	26	17806.98	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	26	17806.98	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	26	17806.98	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-5	42	P	
SDN	SDN23100	–7.00	26	17806.98	29.90	12.90	2.64	2.08	155.00	MODRSS		37.05		MODTES	CR		86.00		27M0F8W			P	
SUI	SUI14000	–19.00	26	17806.98	8.20	46.60	0.98	0.70	171.00	MODRSS		46.08		MODTES	CR		84.00		27M0F8W			P	2
SYR	SYR22900	11.00	26	17806.98	38.30	34.90	1.04	0.90	7.00	MODRSS		44.73		MODTES	CL		84.00		27M0F8W			P	
TUN	TUN15000	–25.00	26	17806.98	9.50	33.50	1.88	0.72	135.00	MODRSS		43.13		MODTES	CL		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
AGL	AGL29500	–13.00	27	17826.16	16.50	–12.00	3.09	2.26	84.00	MODRSS		36.01		MODTES	CL		84.00		27M0F8W			P	
AUS	AUS00900	164.00	27	17826.16	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		78	P	
AUS	AUS0090A	164.00	27	17826.16	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
AUS	AUS0090B	164.00	27	17826.16	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
BHR	BHR25500	17.00	27	17826.16	50.50	26.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
CVA	CVA08300	–37.00	27	17826.16	12.40	41.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
CZE	CZE14400	17.00	27	17826.16	15.50	49.79	0.92	0.60	174.55	MODRSS		47.02		MODTES	CR		84.00		27M0F8W			P	4
DNK	DNK09100	5.00	27	17826.16	–19.50	61.00	2.20	0.80	4.00	MODRSS		41.99		MODTES	CL		84.00		27M0F8W			P	
E	CNR13000	–30.00	27	17826.16	–15.70	28.40	1.54	0.60	5.00	MODRSS		44.79		MODTES	CR		84.00		27M0F8W		22	P	4, 7
E	HISPASA2	–30.00	27	17826.16	–8.80	35.40	3.00	1.90	45.00	MODRSS		36.90		MODTES	CR		84.00		27M0F8W	HISPASAT-2	22	A	4, 7
ERI	ERI09200	23.00	27	17826.16	39.41	14.98	1.67	0.95	145.48	MODRSS		42.44		MODTES	CL		84.00		27M0F8W			P	4
F	F2aA2773	–7.00	27	17826.16	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2773	–7.00	27	17826.16	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3373	–7.00	27	17826.16	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2773	–7.00	27	17826.16	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3373	–7.00	27	17826.16	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	27	17826.16	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	27	17826.16	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	27	17826.16	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	27	17826.16	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	27	17826.16	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	27	17826.16	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	27	17826.16	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
GHA	GHA10800	–25.00	27	17826.16	–1.20	7.90	1.48	1.06	102.00	MODRSS		42.49		MODTES	CR		83.00		27M0F8W			P	
GNE	GNE30300	–19.00	27	17826.16	10.30	1.50	0.68	0.60	10.00	MODRSS		48.34		MODTES	CR		84.00		27M0F8W			P	
HOL	HOL21300	–19.00	27	17826.16	5.40	52.00	0.76	0.60	171.00	MODRSS		47.86		MODTES	CL		84.00		27M0F8W			P	
JOR	JOR22400	11.00	27	17826.16	35.80	31.40	0.84	0.78	114.00	MODRSS		46.28		MODTES	CR		85.00		27M0F8W			P	
NOR	BIFROS21	–0.80	27	17826.16	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CR		84.00		27M0FXF	BIFROST-2		A	
RUS	RSTRSA11	36.00	27	17826.16	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	27	17826.16	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	27	17826.16	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	27	17826.16	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	27	17826.16	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	27	17826.16	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	27	17826.16	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	27	17826.16	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-5	42	P	
RUS	RUS00400	110.00	27	17826.16	118.22	51.52					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W			P	3, 4
SDN	SDN23000	–7.00	27	17826.16	29.90	9.80	2.95	2.17	123.00	MODRSS		36.38		MODTES	CL		86.00		27M0F8W			P	
SRL	SRL25900	–33.50	27	17826.16	–11.80	8.60	0.78	0.68	114.00	MODRSS		47.20		MODTES	CL		84.00		27M0F8W			P	4
TKM	TKM06800	44.00	27	17826.16	59.18	38.84	2.25	0.99	164.51	MODRSS		40.94		MODTES	CL		84.00		27M0F8W			P	4, 7

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
ZWE	ZWE13500	–1.00	27	17826.16	29.60	–18.80	1.46	1.36	37.00	MODRSS		41.47		MODTES	CR		85.00		27M0F8W			P	
ARM	ARM06400	23.00	28	17845.34	44.99	39.95	0.73	0.60	148.17	MODRSS		48.02		MODTES	CL		84.00		27M0F8W			P	4
AUS	AUS00600	152.00	28	17845.34	135.50	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
CAF	CAF25800	–13.00	28	17845.34	21.00	6.30	2.25	1.68	31.00	MODRSS		38.67		MODTES	CR		84.00		27M0F8W			P	
F	F2_A2788	–7.00	28	17845.34	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2784	–7.00	28	17845.34	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2788	–7.00	28	17845.34	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2784	–7.00	28	17845.34	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A2788	–7.00	28	17845.34	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3384	–7.00	28	17845.34	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_A3388	–7.00	28	17845.34	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2784	–7.00	28	17845.34	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D2788	–7.00	28	17845.34	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3384	–7.00	28	17845.34	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3388	–7.00	28	17845.34	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	MYT09800	29.00	28	17845.34	45.10	–12.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W		7	P	
F	MYT09801	29.00	28	17845.34	3.60	45.60	1.97	1.71	22.00	MODRSS		39.17		MODTES	CL		84.00		27M0F8W		7	P	
F /EUT	E2WA7DA2	29.00	28	17845.34	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	28	17845.34	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	28	17845.34	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	28	17845.34	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	28	17845.34	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	28	17845.34	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	28	17845.34	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
I	I 08200	–19.00	28	17845.34	12.30	41.30	2.38	0.98	137.00	MODRSS		40.77		MODTES	CR		84.00		27M0F8W			P	
IRQ	IRQ25600	11.00	28	17845.34	43.50	33.00	2.28	1.32	145.00	MODRSS		39.66		MODTES	CL		84.00		27M0F8W			P	
KAZ	KAZ06600	44.00	28	17845.34	64.72	46.40	4.31	1.70	172.22	MODRSS		35.79		MODTES	CR		84.00		27M0F8W			P	4, 7
LSO	LSO30500	5.00	28	17845.34	27.80	–29.80	0.66	0.60	36.00	MODRSS		48.47		MODTES	CL		84.00		27M0F8W			P	
MTN	MTN28800	–37.00	28	17845.34	–7.80	23.40	1.63	1.10	141.00	MODRSS		41.91		MODTES	CL		86.00		27M0F8W			P	
MWI	MWI30800	–1.00	28	17845.34	34.10	–13.00	1.54	0.60	87.00	MODRSS		44.79		MODTES	CL		84.00		27M0F8W			P	
NGR	NGR11500	–25.00	28	17845.34	8.30	16.80	2.54	2.08	44.00	MODRSS		37.22		MODTES	CL		85.00		27M0F8W			P	
NOR	BIFROS22	–0.80	28	17845.34	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CL		84.00		27M0FXF	BIFROST-2		A	
NOR	NOR12101	5.00	28	17845.34	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
OMA	OMA12300	17.00	28	17845.34	55.60	21.00	1.88	1.02	100.00	MODRSS		41.62		MODTES	CR		85.00		27M0F8W			P	
POR	AZR13400	–30.00	28	17845.34	–23.40	36.10	2.56	0.70	158.00	MODRSS		41.91		MODTES	CL		84.00		27M0F8W			P	7
RUS	RSTRSA12	36.00	28	17845.34	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	28	17845.34	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	28	17845.34	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	28	17845.34	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-5	42	P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin.	Beam	Orbital	Chan-	Centre	Boresight		Space antenna character.			Space	Shaped	Space ant. gain		Earth	Polarization		e.i.r.p.	Power	Designation	Satellite	Group	Status	Re-
symbol	identification	position°	nel	frequency	Long.°	Lat.°	Major°	Minor°	Orient.°	antenna	beam	Co-polar	X-polar	antenna	Type	Angle°	(dBW)	control	of emission	identification	code		marks
RUS	RSTRSD12	36.00	28	17845.34	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	28	17845.34	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	28	17845.34	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	28	17845.34	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-5	42	P	
SDN	SDN23200	–7.00	28	17845.34	29.60	18.40	2.54	2.09	167.00	MODRSS		37.20		MODTES	CR		86.00		27M0F8W			P	
ALB	ALB29600	–7.00	29	17864.52	20.10	41.00	1.17	0.65	128.00	MODRSS		45.64		MODTES	CL		84.00		27M0F8W			P	
AUS	AUS00900	164.00	29	17864.52	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		78	P	
AUS	AUS0090A	164.00	29	17864.52	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
AUS	AUS0090B	164.00	29	17864.52	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
BEL	BEL01800	–19.00	29	17864.52	4.60	50.60	0.82	0.60	167.00	MODRSS		47.53		MODTES	CL		84.00		27M0F8W			P	
BFA	BFA10700	–30.00	29	17864.52	–1.50	12.20	1.45	1.14	29.00	MODRSS		42.26		MODTES	CL		84.00		27M0F8W			P	4, 7
CYP	CYP08600	5.00	29	17864.52	33.30	35.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
D	D2-21600	–1.00	29	17864.52	12.60	52.10	0.83	0.63	172.00	MODRSS		47.26		MODTES	CR		84.00		27M0F8W			P	4, 7
DJI	DJI09900	23.00	29	17864.52	42.50	11.60	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
E	HISPASA2	–30.00	29	17864.52	–8.80	35.40	3.00	1.90	45.00	MODRSS		36.90		MODTES	CR		84.00		27M0F8W	HISPASAT-2	22	A	4, 7
F	F 09306	–7.00	29	17864.52	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		27M0F8W	RADIOSAT	19	A	
F	F3_A2751	–7.00	29	17864.52	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3351	–7.00	29	17864.52	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2751	–7.00	29	17864.52	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3351	–7.00	29	17864.52	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	29	17864.52	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	29	17864.52	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	29	17864.52	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	29	17864.52	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	29	17864.52	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	29	17864.52	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	29	17864.52	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
ISL	ISL04900	–33.50	29	17864.52	–19.00	64.90	1.00	0.60	177.00	MODRSS		46.67		MODTES	CR		82.00		27M0F8W			P	
KEN	KEN24900	11.00	29	17864.52	37.90	1.10	2.29	1.56	94.00	MODRSS		38.92		MODTES	CL		84.00		27M0F8W			P	
LVA	LVA06100	23.00	29	17864.52	24.53	56.20	0.83	0.60	0.05	MODRSS		47.50		MODTES	CR		84.00		27M0F8W			P	4
MCO	MCO11600	–37.00	29	17864.52	7.40	43.70	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		83.00		27M0F8W			P	
MNG	MNG24800	74.00	29	17864.52	107.50	47.80	2.00	2.00	0.00	MODRSS		38.43		MODTES	CR		89.02		27M0F8W			P	
RUS	RSTRSA11	36.00	29	17864.52	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	29	17864.52	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	29	17864.52	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	29	17864.52	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	29	17864.52	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	29	17864.52	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	29	17864.52	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	29	17864.52	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-5	42	P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
SEN	SEN22200	–37.00	29	17864.52	–14.40	13.80	1.46	1.04	139.00	MODRSS		42.63		MODTES	CR		85.00		27M0F8W			P	
TON	TON21500	170.00	29	17864.52	–174.70	–18.00	1.41	0.68	85.00	MODRSS		44.63		MODTES	CR		84.00		27M0F8W			P	
UAE	UAE27400	17.00	29	17864.52	53.60	24.40	0.98	0.80	162.00	MODRSS		45.50		MODTES	CL		84.00		27M0F8W			P	
USA	GUM33100	122.00	29	17864.52	151.10	11.60	6.48	3.49	179.00	MODRSS		30.90		MODTES	CR		87.00		27M0F8W		15	P	
USA	GUM33101	122.00	29	17864.52	–157.50	21.00	2.02	0.60	115.00	MODRSS		43.61		MODTES	CR		87.00		27M0F8W		15	P	
AUS	AUS00600	152.00	30	17883.70	135.50	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
BDI	BDI27000	11.00	30	17883.70	29.90	–3.10	0.71	0.60	80.00	MODRSS		48.15		MODTES	CR		84.00		27M0F8W			P	
COG	COG23500	–13.00	30	17883.70	14.60	–0.70	2.02	1.18	59.00	MODRSS		40.67		MODTES	CR		84.00		27M0F8W			P	
CTI	CTI23700	–30.00	30	17883.70	–5.80	7.40	1.55	1.43	162.00	MODRSS		40.99		MODTES	CR		84.00		27M0F8W			P	4
F	F2aA2762	–7.00	30	17883.70	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2762	–7.00	30	17883.70	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3362	–7.00	30	17883.70	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2762	–7.00	30	17883.70	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3362	–7.00	30	17883.70	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	REU09700	29.00	30	17883.70	55.60	–19.20	1.56	0.78	96.00	MODRSS		43.59		MODTES	CL		84.00		27M0F8W		5	P	
F	REU09701	29.00	30	17883.70	3.70	45.20	1.94	1.68	24.00	MODRSS		39.32		MODTES	CL		84.00		27M0F8W		5	P	
F /EUT	E2WA7DA2	29.00	30	17883.70	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	30	17883.70	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	30	17883.70	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	30	17883.70	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	30	17883.70	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	30	17883.70	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	30	17883.70	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
G	G UKDBS	–33.50	30	17883.70	–3.50	53.80	1.84	0.72	142.00	MODRSS		43.20		MODTES	CL		84.00		27M0F8W	UKDBS-3		A	4
GEO	GEO06400	23.00	30	17883.70	43.35	42.27	1.11	0.60	161.21	MODRSS		46.23		MODTES	CL		84.00		27M0F8W			P	4
HNG	HNG10600	–1.00	30	17883.70	22.20	45.60	2.00	2.00	0.00	MODRSS		38.43		MODTES	CL		84.00		27M0F8W			P	
KGZ	KGZ07000	44.00	30	17883.70	73.88	41.32	1.34	0.64	3.53	MODRSS		45.12		MODTES	CR		84.00		27M0F8W			P	4, 7
KWT	KWT11300	17.00	30	17883.70	47.60	29.20	0.68	0.60	145.00	MODRSS		48.34		MODTES	CR		84.00		27M0F8W			P	
MTN	MTN22300	–37.00	30	17883.70	–12.20	18.50	2.62	1.87	150.00	MODRSS		37.55		MODTES	CL		86.00		27M0F8W			P	
RUS	RSTRSA12	36.00	30	17883.70	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	30	17883.70	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	30	17883.70	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	30	17883.70	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	30	17883.70	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	30	17883.70	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	30	17883.70	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	30	17883.70	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-5	42	P	
S	S 13900	5.00	30	17883.70	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
SDN	SDN23100	–7.00	30	17883.70	29.90	12.90	2.64	2.08	155.00	MODRSS		37.05		MODTES	CR		86.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin.	Beam	Orbital	Chan-	Centre	Boresight		Space antenna character.			Space	Shaped	Space ant. gain		Earth	Polarization		e.i.r.p.	Power	Designation	Satellite	Group	Status	Re-
symbol	identification	position°	nel	frequency	Long.°	Lat.°	Major°	Minor°	Orient.°	antenna	beam	Co-polar	X-polar	antenna	Type	Angle°	(dBW)	control	of emission	identification	code		marks
SUI	SUI14000	–19.00	30	17883.70	8.20	46.60	0.98	0.70	171.00	MODRSS		46.08		MODTES	CR		84.00		27M0F8W			P	2
SYR	SYR22900	11.00	30	17883.70	38.30	34.90	1.04	0.90	7.00	MODRSS		44.73		MODTES	CL		84.00		27M0F8W			P	
TUN	TUN15000	–25.00	30	17883.70	9.50	33.50	1.88	0.72	135.00	MODRSS		43.13		MODTES	CL		84.00		27M0F8W			P	
AGL	AGL29500	–13.00	31	17902.88	16.50	–12.00	3.09	2.26	84.00	MODRSS		36.01		MODTES	CL		84.00		27M0F8W			P	
AUS	AUS00900	164.00	31	17902.88	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		78	P	
AUS	AUS0090A	164.00	31	17902.88	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
AUS	AUS0090B	164.00	31	17902.88	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
BHR	BHR25500	17.00	31	17902.88	50.50	26.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
CVA	CVA08300	–37.00	31	17902.88	12.40	41.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
CZE	CZE14400	17.00	31	17902.88	15.50	49.79	0.92	0.60	174.55	MODRSS		47.02		MODTES	CR		84.00		27M0F8W			P	4
E	CNR13000	–30.00	31	17902.88	–15.70	28.40	1.54	0.60	5.00	MODRSS		44.79		MODTES	CR		84.00		27M0F8W		22	P	4
E	HISPASA2	–30.00	31	17902.88	–8.80	35.40	3.00	1.90	45.00	MODRSS		36.90		MODTES	CR		84.00		27M0F8W	HISPASAT-2	22	A	4
ERI	ERI09200	23.00	31	17902.88	39.41	14.98	1.67	0.95	145.48	MODRSS		42.44		MODTES	CL		84.00		27M0F8W			P	4
F	F2aA2773	–7.00	31	17902.88	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2773	–7.00	31	17902.88	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3373	–7.00	31	17902.88	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2773	–7.00	31	17902.88	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3373	–7.00	31	17902.88	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	31	17902.88	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	31	17902.88	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	31	17902.88	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	31	17902.88	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	31	17902.88	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	31	17902.88	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	31	17902.88	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
GHA	GHA10800	–25.00	31	17902.88	–1.20	7.90	1.48	1.06	102.00	MODRSS		42.49		MODTES	CR		83.00		27M0F8W			P	
GNE	GNE30300	–19.00	31	17902.88	10.30	1.50	0.68	0.60	10.00	MODRSS		48.34		MODTES	CR		84.00		27M0F8W			P	
HOL	HOL21300	–19.00	31	17902.88	5.40	52.00	0.76	0.60	171.00	MODRSS		47.86		MODTES	CL		84.00		27M0F8W			P	
ISL	ISL05000	5.00	31	17902.88	–19.50	61.00	2.20	0.80	4.00	MODRSS		41.99		MODTES	CL		84.00		27M0F8W			P	
JOR	JOR22400	11.00	31	17902.88	35.80	31.40	0.84	0.78	114.00	MODRSS		46.28		MODTES	CR		85.00		27M0F8W			P	
NOR	BIFROS21	–0.80	31	17902.88	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CR		84.00		27M0FXF	BIFROST-2		A	
RUS	RSTRSA11	36.00	31	17902.88	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	31	17902.88	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	31	17902.88	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	31	17902.88	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	31	17902.88	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	31	17902.88	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	31	17902.88	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	31	17902.88	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-5	42	P	
RUS	RUS00400	110.00	31	17902.88	118.22	51.52					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W			P	3, 4

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
SDN	SDN23000	–7.00	31	17902.88	29.90	9.80	2.95	2.17	123.00	MODRSS		36.38		MODTES	CL		86.00		27M0F8W			P	
SRL	SRL25900	–33.50	31	17902.88	–11.80	8.60	0.78	0.68	114.00	MODRSS		47.20		MODTES	CL		84.00		27M0F8W			P	4
TKM	TKM06800	44.00	31	17902.88	59.18	38.84	2.25	0.99	164.51	MODRSS		40.94		MODTES	CL		84.00		27M0F8W			P	4, 7
ZWE	ZWE13500	–1.00	31	17902.88	29.60	–18.80	1.46	1.36	37.00	MODRSS		41.47		MODTES	CR		85.00		27M0F8W			P	
ARM	ARM06400	23.00	32	17922.06	44.99	39.95	0.73	0.60	148.17	MODRSS		48.02		MODTES	CL		84.00		27M0F8W			P	4
AUS	AUS00600	152.00	32	17922.06	135.50	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
CAF	CAF25800	–13.00	32	17922.06	21.00	6.30	2.25	1.68	31.00	MODRSS		38.67		MODTES	CR		84.00		27M0F8W			P	
F	F2_A2788	–7.00	32	17922.06	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2784	–7.00	32	17922.06	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2788	–7.00	32	17922.06	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2784	–7.00	32	17922.06	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A2788	–7.00	32	17922.06	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3384	–7.00	32	17922.06	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_A3388	–7.00	32	17922.06	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2784	–7.00	32	17922.06	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D2788	–7.00	32	17922.06	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3384	–7.00	32	17922.06	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3388	–7.00	32	17922.06	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	MYT09800	29.00	32	17922.06	45.10	–12.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W		7	P	
F	MYT09801	29.00	32	17922.06	3.60	45.60	1.97	1.71	22.00	MODRSS		39.17		MODTES	CL		84.00		27M0F8W		7	P	
F /EUT	E2WA7DA2	29.00	32	17922.06	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	32	17922.06	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	32	17922.06	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	32	17922.06	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	32	17922.06	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	32	17922.06	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	32	17922.06	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
I	I 08200	–19.00	32	17922.06	12.30	41.30	2.38	0.98	137.00	MODRSS		40.77		MODTES	CR		84.00		27M0F8W			P	
IRQ	IRQ25600	11.00	32	17922.06	43.50	33.00	2.28	1.32	145.00	MODRSS		39.66		MODTES	CL		84.00		27M0F8W			P	
KAZ	KAZ06600	44.00	32	17922.06	64.72	46.40	4.31	1.70	172.22	MODRSS		35.79		MODTES	CR		84.00		27M0F8W			P	4, 7
LSO	LSO30500	5.00	32	17922.06	27.80	–29.80	0.66	0.60	36.00	MODRSS		48.47		MODTES	CL		84.00		27M0F8W			P	
MTN	MTN28800	–37.00	32	17922.06	–7.80	23.40	1.63	1.10	141.00	MODRSS		41.91		MODTES	CL		86.00		27M0F8W			P	
MWI	MWI30800	–1.00	32	17922.06	34.10	–13.00	1.54	0.60	87.00	MODRSS		44.79		MODTES	CL		84.00		27M0F8W			P	
NGR	NGR11500	–25.00	32	17922.06	8.30	16.80	2.54	2.08	44.00	MODRSS		37.22		MODTES	CL		85.00		27M0F8W			P	
NOR	BIFROS22	–0.80	32	17922.06	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CL		84.00		27M0FXF	BIFROST-2		A	
NOR	NOR12102	5.00	32	17922.06	17.00	61.50	2.00	1.00	10.00	R13RSS		41.44		R13TES	CR		84.00		27M0F8W			PE	
OMA	OMA12300	17.00	32	17922.06	55.60	21.00	1.88	1.02	100.00	MODRSS		41.62		MODTES	CR		85.00		27M0F8W			P	
POR	AZR13400	–30.00	32	17922.06	–23.40	36.10	2.56	0.70	158.00	MODRSS		41.91		MODTES	CL		84.00		27M0F8W			P	
RUS	RSTRSA12	36.00	32	17922.06	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-1	38	P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
RUS	RSTRSA22	56.00	32	17922.06	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	32	17922.06	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	32	17922.06	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	32	17922.06	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	32	17922.06	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	32	17922.06	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	32	17922.06	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-5	42	P	
SDN	SDN23200	–7.00	32	17922.06	29.60	18.40	2.54	2.09	167.00	MODRSS		37.20		MODTES	CR		86.00		27M0F8W			P	
ALB	ALB29600	–7.00	33	17941.24	20.10	41.00	1.17	0.65	128.00	MODRSS		45.64		MODTES	CL		84.00		27M0F8W			P	
BEL	BEL01800	–19.00	33	17941.24	4.60	50.60	0.82	0.60	167.00	MODRSS		47.53		MODTES	CL		84.00		27M0F8W			P	
BFA	BFA10700	–30.00	33	17941.24	–1.50	12.20	1.45	1.14	29.00	MODRSS		42.26		MODTES	CL		84.00		27M0F8W			P	4
CYP	CYP08600	5.00	33	17941.24	33.30	35.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
D	D2-21600	–1.00	33	17941.24	12.60	52.10	0.83	0.63	172.00	MODRSS		47.26		MODTES	CR		84.00		27M0F8W			P	4, 7
DJI	DJI09900	23.00	33	17941.24	42.50	11.60	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
E	HISPASA2	–30.00	33	17941.24	–8.80	35.40	3.00	1.90	45.00	MODRSS		36.90		MODTES	CR		84.00		27M0F8W	HISPASAT-2	22	A	4
F	F 09306	–7.00	33	17941.24	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		27M0F8W	RADIOSAT	19	A	
F	F3_A2751	–7.00	33	17941.24	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3351	–7.00	33	17941.24	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2751	–7.00	33	17941.24	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3351	–7.00	33	17941.24	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	33	17941.24	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	33	17941.24	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	33	17941.24	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	33	17941.24	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	33	17941.24	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	33	17941.24	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	33	17941.24	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
ISL	ISL04900	–33.50	33	17941.24	–19.00	64.90	1.00	0.60	177.00	MODRSS		46.67		MODTES	CR		82.00		27M0F8W			P	
KEN	KEN24900	11.00	33	17941.24	37.90	1.10	2.29	1.56	94.00	MODRSS		38.92		MODTES	CL		84.00		27M0F8W			P	
LVA	LVA06100	23.00	33	17941.24	24.53	56.20	0.83	0.60	0.05	MODRSS		47.50		MODTES	CR		84.00		27M0F8W			P	4
MCO	MCO11600	–37.00	33	17941.24	7.40	43.70	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		83.00		27M0F8W			P	
MNG	MNG24800	74.00	33	17941.24	107.50	47.80	2.00	2.00	0.00	MODRSS		38.43		MODTES	CR		89.02		27M0F8W			P	
RUS	RSTRSA11	36.00	33	17941.24	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	33	17941.24	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	33	17941.24	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	33	17941.24	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	33	17941.24	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	33	17941.24	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	33	17941.24	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	33	17941.24	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-5	42	P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
SEN	SEN22200	–37.00	33	17941.24	–14.40	13.80	1.46	1.04	139.00	MODRSS		42.63		MODTES	CR		85.00		27M0F8W			P	
TON	TON21500	170.00	33	17941.24	–174.70	–18.00	1.41	0.68	85.00	MODRSS		44.63		MODTES	CR		84.00		27M0F8W			P	
UAE	UAE27400	17.00	33	17941.24	53.60	24.40	0.98	0.80	162.00	MODRSS		45.50		MODTES	CL		84.00		27M0F8W			P	
USA	GUM33100	122.00	33	17941.24	151.10	11.60	6.48	3.49	179.00	MODRSS		30.90		MODTES	CR		87.00		27M0F8W		15	P	
USA	GUM33101	122.00	33	17941.24	–157.50	21.00	2.02	0.60	115.00	MODRSS		43.61		MODTES	CR		87.00		27M0F8W		15	P	
BDI	BDI27000	11.00	34	17960.42	29.90	–3.10	0.71	0.60	80.00	MODRSS		48.15		MODTES	CR		84.00		27M0F8W			P	
COG	COG23500	–13.00	34	17960.42	14.60	–0.70	2.02	1.18	59.00	MODRSS		40.67		MODTES	CR		84.00		27M0F8W			P	
CTI	CTI23700	–30.00	34	17960.42	–5.80	7.40	1.55	1.43	162.00	MODRSS		40.99		MODTES	CR		84.00		27M0F8W			P	4
F	F2aA2762	–7.00	34	17960.42	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2762	–7.00	34	17960.42	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3362	–7.00	34	17960.42	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2762	–7.00	34	17960.42	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3362	–7.00	34	17960.42	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	REU09700	29.00	34	17960.42	55.60	–19.20	1.56	0.78	96.00	MODRSS		43.59		MODTES	CL		84.00		27M0F8W		5	P	
F	REU09701	29.00	34	17960.42	3.70	45.20	1.94	1.68	24.00	MODRSS		39.32		MODTES	CL		84.00		27M0F8W		5	P	
F /EUT	E2WA7DA2	29.00	34	17960.42	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	34	17960.42	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	34	17960.42	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	34	17960.42	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	34	17960.42	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	34	17960.42	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	34	17960.42	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
G	G UKDBS	–33.50	34	17960.42	–3.50	53.80	1.84	0.72	142.00	MODRSS		43.20		MODTES	CL		84.00		27M0F8W	UKDBS-3		A	4
GEO	GEO06400	23.00	34	17960.42	43.35	42.27	1.11	0.60	161.21	MODRSS		46.23		MODTES	CL		84.00		27M0F8W			P	4
HNG	HNG10600	–1.00	34	17960.42	22.20	45.60	2.00	2.00	0.00	MODRSS		38.43		MODTES	CL		84.00		27M0F8W			P	
KGZ	KGZ07000	44.00	34	17960.42	73.88	41.32	1.34	0.64	3.53	MODRSS		45.12		MODTES	CR		84.00		27M0F8W			P	4, 7
KWT	KWT11300	17.00	34	17960.42	47.60	29.20	0.68	0.60	145.00	MODRSS		48.34		MODTES	CR		84.00		27M0F8W			P	
MTN	MTN22300	–37.00	34	17960.42	–12.20	18.50	2.62	1.87	150.00	MODRSS		37.55		MODTES	CL		86.00		27M0F8W			P	
RUS	RSTRSA12	36.00	34	17960.42	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	34	17960.42	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	34	17960.42	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	34	17960.42	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	34	17960.42	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	34	17960.42	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	34	17960.42	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	34	17960.42	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-5	42	P	
S	S 13800	5.00	34	17960.42	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W		27	P	
SDN	SDN23100	–7.00	34	17960.42	29.90	12.90	2.64	2.08	155.00	MODRSS		37.05		MODTES	CR		86.00		27M0F8W			P	
SUI	SUI14000	–19.00	34	17960.42	8.20	46.60	0.98	0.70	171.00	MODRSS		46.08		MODTES	CR		84.00		27M0F8W			P	2

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight Long.°	Boresight Lat.°	Space antenna character. Major°	Minor°	Orient.°	Space antenna	Shaped beam	Space ant. gain Co-polar	X-polar	Earth antenna	Polarization Type	Angle°	e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
SYR	SYR22900	11.00	34	17960.42	38.30	34.90	1.04	0.90	7.00	MODRSS		44.73		MODTES	CL		84.00		27M0F8W			P	
TUN	TUN15000	–25.00	34	17960.42	9.50	33.50	1.88	0.72	135.00	MODRSS		43.13		MODTES	CL		84.00		27M0F8W			P	
AGL	AGL29500	–13.00	35	17979.60	16.50	–12.00	3.09	2.26	84.00	MODRSS		36.01		MODTES	CL		84.00		27M0F8W			P	
AUS	AUS00900	164.00	35	17979.60	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		78	P	
AUS	AUS0090A	164.00	35	17979.60	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
AUS	AUS0090B	164.00	35	17979.60	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
BHR	BHR25500	17.00	35	17979.60	50.50	26.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
CVA	CVA08300	–37.00	35	17979.60	12.40	41.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
CZE	CZE14400	17.00	35	17979.60	15.50	49.79	0.92	0.60	174.55	MODRSS		47.02		MODTES	CR		84.00		27M0F8W			P	4
DNK	DNK09100	5.00	35	17979.60	–19.50	61.00	2.20	0.80	4.00	MODRSS		41.99		MODTES	CL		84.00		27M0F8W			P	
E	CNR13000	–30.00	35	17979.60	–15.70	28.40	1.54	0.60	5.00	MODRSS		44.79		MODTES	CR		84.00		27M0F8W		22	P	4
E	HISPASA2	–30.00	35	17979.60	–8.80	35.40	3.00	1.90	45.00	MODRSS		36.90		MODTES	CR		84.00		27M0F8W	HISPASAT-2	22	A	4
ERI	ERI09200	23.00	35	17979.60	39.41	14.98	1.67	0.95	145.48	MODRSS		42.44		MODTES	CL		84.00		27M0F8W			P	4
F	F2aA2773	–7.00	35	17979.60	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2773	–7.00	35	17979.60	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3373	–7.00	35	17979.60	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2773	–7.00	35	17979.60	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3373	–7.00	35	17979.60	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	35	17979.60	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	35	17979.60	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	35	17979.60	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	35	17979.60	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	35	17979.60	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	35	17979.60	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	35	17979.60	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
GHA	GHA10800	–25.00	35	17979.60	–1.20	7.90	1.48	1.06	102.00	MODRSS		42.49		MODTES	CR		83.00		27M0F8W			P	
GNE	GNE30300	–19.00	35	17979.60	10.30	1.50	0.68	0.60	10.00	MODRSS		48.34		MODTES	CR		84.00		27M0F8W			P	
HOL	HOL21300	–19.00	35	17979.60	5.40	52.00	0.76	0.60	171.00	MODRSS		47.86		MODTES	CL		84.00		27M0F8W			P	
JOR	JOR22400	11.00	35	17979.60	35.80	31.40	0.84	0.78	114.00	MODRSS		46.28		MODTES	CR		85.00		27M0F8W			P	
NOR	BIFROS21	–0.80	35	17979.60	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CR		84.00		27M0FXF	BIFROST-2		A	
RUS	RSTRSA11	36.00	35	17979.60	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	35	17979.60	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	35	17979.60	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	35	17979.60	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	35	17979.60	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	35	17979.60	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	35	17979.60	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	35	17979.60	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-5	42	P	
RUS	RUS00400	110.00	35	17979.60	118.22	51.52					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W			P	3, 4
SDN	SDN23000	–7.00	35	17979.60	29.90	9.80	2.95	2.17	123.00	MODRSS		36.38		MODTES	CL		86.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
SRL	SRL25900	–33.50	35	17979.60	–11.80	8.60	0.78	0.68	114.00	MODRSS		47.20		MODTES	CL		84.00		27M0F8W			P	4
TKM	TKM06800	44.00	35	17979.60	59.18	38.84	2.25	0.99	164.51	MODRSS		40.94		MODTES	CL		84.00		27M0F8W			P	4, 7
ZWE	ZWE13500	–1.00	35	17979.60	29.60	–18.80	1.46	1.36	37.00	MODRSS		41.47		MODTES	CR		85.00		27M0F8W			P	
ARM	ARM06400	23.00	36	17998.78	44.99	39.95	0.73	0.60	148.17	MODRSS		48.02		MODTES	CL		84.00		27M0F8W			P	4
AUS	AUS00600	152.00	36	17998.78	135.50	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
CAF	CAF25800	–13.00	36	17998.78	21.00	6.30	2.25	1.68	31.00	MODRSS		38.67		MODTES	CR		84.00		27M0F8W			P	
DNK	DNK09000	5.00	36	17998.78	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
F	F2_A2788	–7.00	36	17998.78	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2784	–7.00	36	17998.78	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2788	–7.00	36	17998.78	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2784	–7.00	36	17998.78	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A2788	–7.00	36	17998.78	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3384	–7.00	36	17998.78	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_A3388	–7.00	36	17998.78	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2784	–7.00	36	17998.78	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D2788	–7.00	36	17998.78	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3384	–7.00	36	17998.78	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3388	–7.00	36	17998.78	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	MYT09800	29.00	36	17998.78	45.10	–12.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W		7	P	
F	MYT09801	29.00	36	17998.78	3.60	45.60	1.97	1.71	22.00	MODRSS		39.17		MODTES	CL		84.00		27M0F8W		7	P	
F /EUT	E2WA7DA2	29.00	36	17998.78	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	36	17998.78	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	36	17998.78	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	36	17998.78	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	36	17998.78	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	36	17998.78	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	36	17998.78	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
I	I 08200	–19.00	36	17998.78	12.30	41.30	2.38	0.98	137.00	MODRSS		40.77		MODTES	CR		84.00		27M0F8W			P	
IRQ	IRQ25600	11.00	36	17998.78	43.50	33.00	2.28	1.32	145.00	MODRSS		39.66		MODTES	CL		84.00		27M0F8W			P	
KAZ	KAZ06600	44.00	36	17998.78	64.72	46.40	4.31	1.70	172.22	MODRSS		35.79		MODTES	CR		84.00		27M0F8W			P	4, 7
LSO	LSO30500	5.00	36	17998.78	27.80	–29.80	0.66	0.60	36.00	MODRSS		48.47		MODTES	CL		84.00		27M0F8W			P	
MTN	MTN28800	–37.00	36	17998.78	–7.80	23.40	1.63	1.10	141.00	MODRSS		41.91		MODTES	CL		86.00		27M0F8W			P	
MWI	MWI30800	–1.00	36	17998.78	34.10	–13.00	1.54	0.60	87.00	MODRSS		44.79		MODTES	CL		84.00		27M0F8W			P	
NGR	NGR11500	–25.00	36	17998.78	8.30	16.80	2.54	2.08	44.00	MODRSS		37.22		MODTES	CL		85.00		27M0F8W			P	
NOR	BIFROS22	–0.80	36	17998.78	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CL		84.00		27M0FXF	BIFROST-2		A	
OMA	OMA12300	17.00	36	17998.78	55.60	21.00	1.88	1.02	100.00	MODRSS		41.62		MODTES	CR		85.00		27M0F8W			P	
POR	AZR13400	–30.00	36	17998.78	–23.40	36.10	2.56	0.70	158.00	MODRSS		41.91		MODTES	CL		84.00		27M0F8W			P	7
RUS	RSTRSA12	36.00	36	17998.78	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	36	17998.78	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-2	39	P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight Long.°	Boresight Lat.°	Space antenna character. Major°	Minor°	Orient.°	Space antenna	Shaped beam	Space ant. gain Co-polar	X-polar	Earth antenna	Polarization Type	Angle°	e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
RUS	RSTRSA32	86.00	36	17998.78	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	36	17998.78	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	36	17998.78	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	36	17998.78	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	36	17998.78	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	36	17998.78	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-5	42	P	
SDN	SDN23200	–7.00	36	17998.78	29.60	18.40	2.54	2.09	167.00	MODRSS		37.20		MODTES	CR		86.00		27M0F8W			P	
ALB	ALB29600	–7.00	37	18017.96	20.10	41.00	1.17	0.65	128.00	MODRSS		45.64		MODTES	CL		84.00		27M0F8W			P	
BEL	BEL01800	–19.00	37	18017.96	4.60	50.60	0.82	0.60	167.00	MODRSS		47.53		MODTES	CL		84.00		27M0F8W			P	
BFA	BFA10700	–30.00	37	18017.96	–1.50	12.20	1.45	1.14	29.00	MODRSS		42.26		MODTES	CL		84.00		27M0F8W			P	4, 7
CYP	CYP08600	5.00	37	18017.96	33.30	35.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
D	D2-21600	–1.00	37	18017.96	12.60	52.10	0.83	0.63	172.00	MODRSS		47.26		MODTES	CR		84.00		27M0F8W			P	4, 7
DJI	DJI09900	23.00	37	18017.96	42.50	11.60	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
E	HISPASA2	–30.00	37	18017.96	–8.80	35.40	3.00	1.90	45.00	MODRSS		36.90		MODTES	CR		84.00		27M0F8W	HISPASAT-2	22	A	4, 7
F	F 09306	–7.00	37	18017.96	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		27M0F8W	RADIOSAT	19	A	
F	F3_A2751	–7.00	37	18017.96	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3351	–7.00	37	18017.96	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2751	–7.00	37	18017.96	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3351	–7.00	37	18017.96	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		77.30		33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	37	18017.96	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	37	18017.96	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	37	18017.96	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	37	18017.96	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	37	18017.96	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	37	18017.96	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	37	18017.96	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
ISL	ISL04900	–33.50	37	18017.96	–19.00	64.90	1.00	0.60	177.00	MODRSS		46.67		MODTES	CR		82.00		27M0F8W			P	
KEN	KEN24900	11.00	37	18017.96	37.90	1.10	2.29	1.56	94.00	MODRSS		38.92		MODTES	CL		84.00		27M0F8W			P	
LVA	LVA06100	23.00	37	18017.96	24.53	56.20	0.83	0.60	0.05	MODRSS		47.50		MODTES	CR		84.00		27M0F8W			P	4
MCO	MCO11600	–37.00	37	18017.96	7.40	43.70	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		83.00		27M0F8W			P	
MNG	MNG24800	74.00	37	18017.96	107.50	47.80	2.00	2.00	0.00	MODRSS		38.43		MODTES	CR		89.02		27M0F8W			P	
RUS	RSTRSA11	36.00	37	18017.96	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	37	18017.96	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	37	18017.96	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	37	18017.96	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	37	18017.96	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	37	18017.96	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	37	18017.96	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	37	18017.96	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-5	42	P	
SEN	SEN22200	–37.00	37	18017.96	–14.40	13.80	1.46	1.04	139.00	MODRSS		42.63		MODTES	CR		85.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
UAE	UAE27400	17.00	37	18017.96	53.60	24.40	0.98	0.80	162.00	MODRSS		45.50		MODTES	CL		84.00		27M0F8W			P	
USA	GUM33100	122.00	37	18017.96	151.10	11.60	6.48	3.49	179.00	MODRSS		30.90		MODTES	CR		87.00		27M0F8W		15	P	
USA	GUM33101	122.00	37	18017.96	–157.50	21.00	2.02	0.60	115.00	MODRSS		43.61		MODTES	CR		87.00		27M0F8W		15	P	
BDI	BDI27000	11.00	38	18037.14	29.90	–3.10	0.71	0.60	80.00	MODRSS		48.15		MODTES	CR		84.00		27M0F8W			P	
COG	COG23500	–13.00	38	18037.14	14.60	–0.70	2.02	1.18	59.00	MODRSS		40.67		MODTES	CR		84.00		27M0F8W			P	
CTI	CTI23700	–30.00	38	18037.14	–5.80	7.40	1.55	1.43	162.00	MODRSS		40.99		MODTES	CR		84.00		27M0F8W			P	4, 7
F	F2aA2762	–7.00	38	18037.14	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2762	–7.00	38	18037.14	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3362	–7.00	38	18037.14	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2762	–7.00	38	18037.14	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3362	–7.00	38	18037.14	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	REU09700	29.00	38	18037.14	55.60	–19.20	1.56	0.78	96.00	MODRSS		43.59		MODTES	CL		84.00		27M0F8W		5	P	
F	REU09701	29.00	38	18037.14	3.70	45.20	1.94	1.68	24.00	MODRSS		39.32		MODTES	CL		84.00		27M0F8W		5	P	
F /EUT	E2WA7DA2	29.00	38	18037.14	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	38	18037.14	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	38	18037.14	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	38	18037.14	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	38	18037.14	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	38	18037.14	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	38	18037.14	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
G	G UKDBS	–33.50	38	18037.14	–3.50	53.80	1.84	0.72	142.00	MODRSS		43.20		MODTES	CL		84.00		27M0F8W	UKDBS-3		A	4
GEO	GEO06400	23.00	38	18037.14	43.35	42.27	1.11	0.60	161.21	MODRSS		46.23		MODTES	CL		84.00		27M0F8W			P	4
HNG	HNG10600	–1.00	38	18037.14	22.20	45.60	2.00	2.00	0.00	MODRSS		38.43		MODTES	CL		84.00		27M0F8W			P	
KGZ	KGZ07000	44.00	38	18037.14	73.88	41.32	1.34	0.64	3.53	MODRSS		45.12		MODTES	CR		84.00		27M0F8W			P	4, 7
KWT	KWT11300	17.00	38	18037.14	47.60	29.20	0.68	0.60	145.00	MODRSS		48.34		MODTES	CR		84.00		27M0F8W			P	
MTN	MTN22300	–37.00	38	18037.14	–12.20	18.50	2.62	1.87	150.00	MODRSS		37.55		MODTES	CL		86.00		27M0F8W			P	
NOR	NOR12000	5.00	38	18037.14	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	CR		84.00		27M0F8W			P	
RUS	RSTRSA12	36.00	38	18037.14	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	38	18037.14	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	38	18037.14	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	38	18037.14	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD12	36.00	38	18037.14	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	38	18037.14	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	38	18037.14	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	38	18037.14	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-5	42	P	
SDN	SDN23100	–7.00	38	18037.14	29.90	12.90	2.64	2.08	155.00	MODRSS		37.05		MODTES	CR		86.00		27M0F8W			P	
SUI	SUI14000	–19.00	38	18037.14	8.20	46.60	0.98	0.70	171.00	MODRSS		46.08		MODTES	CR		84.00		27M0F8W			P	2
SYR	SYR33900	11.00	38	18037.14	37.60	34.20	1.32	0.88	74.00	MODRSS		43.80		MODTES	CL		84.00		27M0F8W			P	
TUN	TUN27200	–25.00	38	18037.14	2.50	32.00	3.59	1.75	175.00	MODRSS		36.47		MODTES	CL		84.00		27M0F8W			P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight Long.°	Boresight Lat.°	Space antenna character. Major°	Minor°	Orient.°	Space antenna	Shaped beam	Space ant. gain Co-polar	X-polar	Earth antenna	Polarization Type	Angle°	e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
AGL	AGL29500	–13.00	39	18056.32	16.50	–12.00	3.09	2.26	84.00	MODRSS		36.01		MODTES	CL		84.00		27M0F8W			P	
AUS	AUS00900	164.00	39	18056.32	136.00	–23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	CR		87.00		27M0F8W		78	P	
AUS	AUS0090A	164.00	39	18056.32	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
AUS	AUS0090B	164.00	39	18056.32	136.62	–24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	CR		87.00		27M0F8W		78	P	4
BHR	BHR25500	17.00	39	18056.32	50.50	26.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W			P	
CVA	CVA08300	–37.00	39	18056.32	12.40	41.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CR		84.00		27M0F8W			P	
CZE	CZE14400	17.00	39	18056.32	15.50	49.79	0.92	0.60	174.55	MODRSS		47.02		MODTES	CR		84.00		27M0F8W			P	4
E	CNR13000	–30.00	39	18056.32	–15.70	28.40	1.54	0.60	5.00	MODRSS		44.79		MODTES	CR		84.00		27M0F8W		22	P	4, 7
E	HISPASA2	–30.00	39	18056.32	–8.80	35.40	3.00	1.90	45.00	MODRSS		36.90		MODTES	CR		84.00		27M0F8W	HISPASAT-2	22	A	4, 7
ERI	ERI09200	23.00	39	18056.32	39.41	14.98	1.67	0.95	145.48	MODRSS		42.44		MODTES	CL		84.00		27M0F8W			P	4
F	F2aA2773	–7.00	39	18056.32	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2773	–7.00	39	18056.32	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3373	–7.00	39	18056.32	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2773	–7.00	39	18056.32	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3373	–7.00	39	18056.32	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		76.60		33M0G9W	RADIOSAT-3	19	A	
F /EUT	E2WA7DA1	29.00	39	18056.32	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB1	29.00	39	18056.32	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC1	29.00	39	18056.32	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD1	29.00	39	18056.32	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE1	29.00	39	18056.32	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF1	29.00	39	18056.32	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG1	29.00	39	18056.32	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CL		84.00		27M0F9W	EUROPESAT-1	16	AE	9
GHA	GHA10800	–25.00	39	18056.32	–1.20	7.90	1.48	1.06	102.00	MODRSS		42.49		MODTES	CR		83.00		27M0F8W			P	
GNE	GNE30300	–19.00	39	18056.32	10.30	1.50	0.68	0.60	10.00	MODRSS		48.34		MODTES	CR		84.00		27M0F8W			P	
HOL	HOL21300	–19.00	39	18056.32	5.40	52.00	0.76	0.60	171.00	MODRSS		47.86		MODTES	CL		84.00		27M0F8W			P	
ISL	ISL05000	5.00	39	18056.32	–19.50	61.00	2.20	0.80	4.00	MODRSS		41.99		MODTES	CL		84.00		27M0F8W			P	
JOR	JOR22400	11.00	39	18056.32	35.80	31.40	0.84	0.78	114.00	MODRSS		46.28		MODTES	CR		85.00		27M0F8W			P	
MNG	MNG24800	74.00	39	18056.32	107.50	47.80	2.00	2.00	0.00	MODRSS		38.43		MODTES	CR		89.02		27M0F8W			P	
NOR	BIFROS21	–0.80	39	18056.32	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CR		84.00		27M0FXF	BIFROST-2		A	
RUS	RSTRSA11	36.00	39	18056.32	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA21	56.00	39	18056.32	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA31	86.00	39	18056.32	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA51	140.00	39	18056.32	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W	RST-5	42	P	
RUS	RSTRSD11	36.00	39	18056.32	38.00	53.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD21	56.00	39	18056.32	65.00	63.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD31	86.00	39	18056.32	97.00	62.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD51	140.00	39	18056.32	158.00	56.00					COP	38.40	8.40	MODTES	CR		84.00		27M0G7W	RST-5	42	P	
RUS	RUS00400	110.00	39	18056.32	118.22	51.52					COP	38.40	8.40	MODTES	CR		84.00		27M0F8W			P	3, 4, 7
SDN	SDN23000	–7.00	39	18056.32	29.90	9.80	2.95	2.17	123.00	MODRSS		36.38		MODTES	CL		86.00		27M0F8W			P	
SRL	SRL25900	–33.50	39	18056.32	–11.80	8.60	0.78	0.68	114.00	MODRSS		47.20		MODTES	CL		84.00		27M0F8W			P	4

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
TKM	TKM06800	44.00	39	18056.32	59.18	38.84	2.25	0.99	164.51	MODRSS		40.94		MODTES	CL		84.00		27M0F8W			P	4, 7
ZWE	ZWE13500	–1.00	39	18056.32	29.60	–18.80	1.46	1.36	37.00	MODRSS		41.47		MODTES	CR		85.00		27M0F8W			P	
ARM	ARM06400	23.00	40	18075.50	44.99	39.95	0.73	0.60	148.17	MODRSS		48.02		MODTES	CL		84.00		27M0F8W			P	4
AUS	AUS00600	152.00	40	18075.50	135.50	–24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	CR		87.00		27M0F8W			P	
CAF	CAF25800	–13.00	40	18075.50	21.00	6.30	2.25	1.68	31.00	MODRSS		38.67		MODTES	CR		84.00		27M0F8W			P	
F	F2_A2788	–7.00	40	18075.50	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CR		84.00		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2784	–7.00	40	18075.50	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F2aA2788	–7.00	40	18075.50	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-2	19	A	
F	F3_A2784	–7.00	40	18075.50	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A2788	–7.00	40	18075.50	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		27M0F9W	RADIOSAT-3	19	A	
F	F3_A3384	–7.00	40	18075.50	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_A3388	–7.00	40	18075.50	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0F9W	RADIOSAT-3	19	A	
F	F3_D2784	–7.00	40	18075.50	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D2788	–7.00	40	18075.50	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3384	–7.00	40	18075.50	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	F3_D3388	–7.00	40	18075.50	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	CL		76.60		33M0G9W	RADIOSAT-3	19	A	
F	MYT09800	29.00	40	18075.50	45.10	–12.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	CL		84.00		27M0F8W		7	P	
F	MYT09801	29.00	40	18075.50	3.60	45.60	1.97	1.71	22.00	MODRSS		39.17		MODTES	CL		84.00		27M0F8W		7	P	
F /EUT	E2WA7DA2	29.00	40	18075.50	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DB2	29.00	40	18075.50	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DC2	29.00	40	18075.50	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DD2	29.00	40	18075.50	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DE2	29.00	40	18075.50	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DF2	29.00	40	18075.50	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
F /EUT	E2WA7DG2	29.00	40	18075.50	16.30	44.30	5.77	2.96	11.00	R13RSS		32.50		R13TES	CR		84.00		27M0F9W	EUROPESAT-1	16	AE	9
I	I 08200	–19.00	40	18075.50	12.30	41.30	2.38	0.98	137.00	MODRSS		40.77		MODTES	CR		84.00		27M0F8W			P	
IRQ	IRQ25600	11.00	40	18075.50	43.50	33.00	2.28	1.32	145.00	MODRSS		39.66		MODTES	CL		84.00		27M0F8W			P	
KAZ	KAZ06600	44.00	40	18075.50	64.72	46.40	4.31	1.70	172.22	MODRSS		35.79		MODTES	CR		84.00		27M0F8W			P	4, 7
LSO	LSO30500	5.00	40	18075.50	27.80	–29.80	0.66	0.60	36.00	MODRSS		48.47		MODTES	CL		84.00		27M0F8W			P	
MTN	MTN28800	–37.00	40	18075.50	–7.80	23.40	1.63	1.10	141.00	MODRSS		41.91		MODTES	CL		86.00		27M0F8W			P	
MWI	MWI30800	–1.00	40	18075.50	34.10	–13.00	1.54	0.60	87.00	MODRSS		44.79		MODTES	CL		84.00		27M0F8W			P	
NGR	NGR11500	–25.00	40	18075.50	8.30	16.80	2.54	2.08	44.00	MODRSS		37.22		MODTES	CL		85.00		27M0F8W			P	
NOR	BIFROS22	–0.80	40	18075.50	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	CL		84.00		27M0FXF	BIFROST-2		A	
OMA	OMA12300	17.00	40	18075.50	55.60	21.00	1.88	1.02	100.00	MODRSS		41.62		MODTES	CR		85.00		27M0F8W			P	
POR	AZR13400	–30.00	40	18075.50	–23.40	36.10	2.56	0.70	158.00	MODRSS		41.91		MODTES	CL		84.00		27M0F8W			P	7
RUS	RSTRSA12	36.00	40	18075.50	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-1	38	P	
RUS	RSTRSA22	56.00	40	18075.50	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-2	39	P	
RUS	RSTRSA32	86.00	40	18075.50	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-3	40	P	
RUS	RSTRSA52	140.00	40	18075.50	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0F8W	RST-5	42	P	

1	2	3	4	5	6		7			8	9	10		11	12		13	14	15	16	17	18	19
Admin. symbol	Beam identification	Orbital position°	Chan-nel	Centre frequency	Boresight		Space antenna character.			Space antenna	Shaped beam	Space ant. gain		Earth antenna	Polarization		e.i.r.p. (dBW)	Power control	Designation of emission	Satellite identification	Group code	Status	Re-marks
					Long.°	Lat.°	Major°	Minor°	Orient.°			Co-polar	X-polar		Type	Angle°							
RUS	RSTRSD12	36.00	40	18075.50	38.00	53.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-1	38	P	
RUS	RSTRSD22	56.00	40	18075.50	65.00	63.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-2	39	P	
RUS	RSTRSD32	86.00	40	18075.50	97.00	62.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-3	40	P	
RUS	RSTRSD52	140.00	40	18075.50	158.00	56.00					COP	38.40	8.40	MODTES	CL		84.00		27M0G7W	RST-5	42	P	
S	S 13902	5.00	40	18075.50	17.00	61.50	2.00	1.00	10.00	R13RSS		41.44		R13TES	CR		84.00		27M0F8W			PE	
SDN	SDN23200	–7.00	40	18075.50	29.60	18.40	2.54	2.09	167.00	MODRSS		37.20		MODTES	CR		86.00		27M0F8W			P	

ARTICLE 10

Interference

10.1 The Member States shall endeavour to agree on the action required to reduce harmful interference which might be caused by the application of these provisions and the associated Plans.

ARTICLE 11

Period of validity of the provisions and associated Plans

11.1 The provisions and associated Plans have been prepared in order to meet the requirements for feeder-links for the broadcasting-satellite service in the bands concerned for a period extending until at least 1 January 1994.

11.2 In any event, the provisions and associated Plans shall remain in force until their revision by a competent administrative radio conference convened in accordance with the relevant provisions of the Convention in force.

ANNEX 1

Limits for determining whether a service of an administration is considered to be affected by a proposed modification to one of the regional Plans or when it is necessary under this Appendix to seek the agreement of any other administration

1 Limits applicable to protect a frequency assignment in the band 17.7-18.1 GHz to an earth station in the fixed-satellite service (space-to-Earth) (see § 4.2.1.2 and 4.2.3.2 of Article 4)

An administration shall be considered as being affected if, upon application of the procedures of Section 3 of Annex 4, that administration is included in the coordination area of the frequency assignment to a transmitting feeder-link earth station.

For the purpose of this calculation, the feeder-link transmitting earth station parameters notified by the administration, which may differ from those given in Annex 3, are used.

2 Limits applicable to protect a terrestrial station in the bands 14.5-14.8 GHz and 17.7-18.1 GHz (see § 4.2.1.3 and 4.2.3.3 of Article 4)

An administration shall be considered as being affected if, upon application of the procedures of Appendix **S7**, that administration is included in the coordination area of the frequency assignment to a transmitting feeder-link earth station[9] .

For the purpose of this calculation, the feeder-link transmitting earth station parameters notified by the administration, which may differ from those given in Annex 3, are used.

3 Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Region 2 Plan[10]

With respect to the modification to the Region 2 Plan and when it is necessary under this Appendix to seek the agreement of any other administration of Region 2, except in cases covered by Resolution **42 (Rev.Orb-88)**, an administration shall be considered affected if the overall equivalent protection margin[11] corresponding to a test point of its entry in the Plan, including the cumulative effect of any previous modification to the Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:

– the Plan as established by the 1983 Conference; *or*

– a modification of the assignment in accordance with this Appendix; *or*

– a new entry in the Plan under Article 4; *or*

– any agreement reached in accordance with this Appendix except for Resolution **42 (Rev.Orb-88)**.

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[9] In Regions 1 and 3, for the application of the procedures of Appendix **S7**, the e.i.r.p. for the feeder-link earth station is the sum of the values specified in columns 13 and 14 of the Plan.

[10] With respect to § 3 the limit specified relates to the overall equivalent protection margin calculated in accordance with § 1.12 of Annex 3 to this Appendix.

[11] For the definition of the overall equivalent protection margin, see § 1.11 of Annex 5 to Appendix **S30**.

4 Limits to the change in the feeder-link equivalent protection margin with respect to frequency assignments in conformity with the Regions 1 and 3 Plan[12]

With respect to the modification to the Regions 1 and 3 Plan and when it is necessary under this Appendix to seek the agreement of any other administration of Region 1 or 3, an administration shall be considered affected if the feeder-link equivalent protection margin[13] corresponding to a test point of its entry in the Plan, including the cumulative effect of any previous modification to the Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:

– the Plan as established by the 1988 Conference; *or*

– a modification of the assignment in accordance with this Appendix; *or*

– a new entry in the Plan under Article 4; *or*

– any agreement reached in accordance with this Appendix.

5 Limits applicable to protect a frequency assignment in the bands 17.3-18.1 GHz (Regions 1 and 3) and 17.3-17.8 GHz (Region 2) to a receiving space station in the fixed-satellite service (Earth-to-space)

An administration in Region 1 or 3 shall be considered affected by a proposed modification in Region 2 or vice versa when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link station would cause an increase in the noise temperature of the feeder-link space station which exceeds the threshold value of $\Delta T/T$ corresponding to 3%, where $\Delta T/T$ is calculated in accordance with the method given in Appendix **S8**, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the total RF bandwidth of the feeder-link carriers (24 MHz for Region 2 and 27 MHz for Regions 1 and 3).

Interim systems of Region 2 in accordance with Resolution **42 (Rev.Orb-88)** shall not be taken into consideration when applying this provision to proposed modifications to the Regions 1 and 3 Plan. However, this provision shall be applied to Region 2 interim systems with respect to the Regions 1 and 3 Plan.

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[12] With respect to § 4, the limit specified relates to the feeder-link equivalent protection margin calculated in accordance with § 1.7 of Annex 3.

[13] For the definition of the equivalent protection margin, see § 1.7 of Annex 3.

ANNEX 2

Basic characteristics to be furnished in notices[14] relating to feeder-link stations in the fixed-satellite service operating in the frequency bands 14.5-14.8 GHz and 17.3-18.1 GHz[15]

1 The following information shall be provided in notices relating to both transmitting earth stations and receiving space stations.

1.1 Country and beam identification.

1.2 Assigned frequency.

1.3 Assigned frequency band.

1.4 Date of bringing into use.

1.5 Designation of emission (in accordance with Article **S2**).

1.6 Modulation characteristics:

a) type of modulation;

b) pre-emphasis characteristics;

c) TV system;

d) sound-broadcasting characteristics;

e) frequency deviation;

f) composition of the baseband;

g) type of multiplexing of the video and sound signals;

h) energy dispersal characteristics;

i) in the case of a digital modulation, the effective and transmitted bit/symbol rates

2 The following additional information shall be provided in notices relating to transmitting earth stations.

2.1 Identity of the transmitting feeder-link station.

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[14] The Bureau shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Annex. The Bureau is further invited to consider the feasibility of a single notice for feeder-link earth stations operating within more than one feeder-link service area.

[15] Only those notices relating to frequency assignments for space stations and earth stations used for telecommand and tracking purposes associated with the Plan shall be furnished in accordance with Appendix **S4**.

2.2 For a specific feeder-link earth station, identity of the earth station and the geographical coordinates of the antenna site.

2.3 Feeder-link service area identified by:

a) a set of a maximum of twenty feeder-link test points, and

b) a service-area contour on the surface of the Earth or a service area defined by a minimum elevation angle in degrees.

2.4 Identity of the associated space station with which communication is to be established.

2.5 Power characteristics of the transmission:

a) The following information is required for each assigned frequency:

- total transmitting power (dBW) in the assigned frequency band supplied to the input of the antenna;
- for the band 17.3-18.1 GHz, the maximum power density per Hz (dB(W/Hz)) supplied to the input of the antenna averaged over the worst 1 MHz band;
- for the band 14.5-14.8 GHz, the maximum power density per Hz (dB(W/Hz)) supplied to the input of the antenna averaged over the worst 4 kHz band;
- for the band 17.3-17.8 GHz, the maximum power density per Hz (dB(W/Hz)) supplied to the input of the antenna averaged over the total RF bandwidth (24 MHz for Region 2 or 27 MHz for Regions 1 and 3).

b) Additional information required if power control is used (see § 3.11 and 4.10 of Annex 3):

- range, expressed in dB, above the transmitting power used in § *a)* above.

2.6 Earth station transmitting antenna characteristics:

a) antenna diameter (m);

b) gain of the antenna in the direction of maximum radiation referred to an isotropic radiator (dBi);

c) half-power beamwidth in degrees (describe in detail if not symmetrical);

d) measured radiation diagram of the antenna (taking as a reference the direction of maximum radiation), or reference radiation diagram to be used for coordination;

e) type of polarization;

f) sense of polarization, and, in the case of a linear polarization, the angle (degrees) measured counter-clockwise in a plane normal to the beam axis from the equatorial plane to the electric vector of the wave as seen from the satellite in the direction of the nominal boresight or aim point as defined under § 3.4 *e)* or 3.4 *f)* below;

g) horizon elevation angle in degrees and the antenna gain in the direction of the horizon for each azimuth[16] around the earth station;

h) altitude of the antenna above mean sea level (m);

i) minimum elevation angle (degrees).

2.7 Regular hours of operation (UTC).

2.8 Coordination.

2.9 Agreements.

2.10 Other information.

2.11 Operating administration or agency.

3 The following information shall be provided in notices relating to receiving space stations.

3.1 Orbital position (from the Greenwich Meridian).

3.2 Identity of the space station.

3.3 Class of station.

3.4 Space station receiving antenna characteristics:

a) co-polar gain of the antenna in the direction of maximum radiation referred to an isotropic radiator (dBi), as well as the cross-polar gain of the antenna in the case of a beam of other than elliptical shape;

b) pointing accuracy (degrees);

c) type of polarization;

d) sense of polarization, and, in the case of a linear polarization, the angle (degrees) measured counter-clockwise in a plane normal to the beam axis from the equatorial plane to the electric vector of the wave as seen from the satellite in the direction of the nominal boresight or aim point as defined under § 3.4 *e)* or 3.4 *f)* below;

e) for elliptical beams[17], indicate the following:

– co-polar and cross-polar radiation patterns;

– rotation accuracy (degrees);

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[16] At suitable increments, e.g. every five degrees, in tabular or graphic form.

[17] A circular beam is considered as a particular elliptical beam where the major and minor axes are equal and where the major axis orientation and rotational accuracy are equal to 0°.

– orientation (degrees);

– major axis (degrees) at the half-power beamwidth;

– minor axis (degrees) at the half-power beamwidth;

– nominal intersection of the antenna beam axis with the Earth (boresight longitude and latitude);

f) for beams of other than elliptical shape, indicate the following:

– co-polar and cross-polar gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite onto a plane perpendicular to the axis from the centre of the Earth to the satellite. The isotropic gain shall be indicated at each contour which corresponds to a decrease in gain of 2, 4, 6, 10 and 20 dB and thereafter at 10 dB intervals down to a value of 0 dB relative to an isotropic radiator;

– wherever practicable, a numerical equation or table providing the necessary information to allow the gain contours to be plotted;

– nominal intersection of the antenna beam axis with the Earth (boresight or aim point, longitude and latitude);

g) for an assignment in the bands 14.5-14.8 GHz or 17.7-18.1 GHz, the isotropic gain in the direction of those parts of the geostationary-satellite orbit which are not obstructed by the Earth. Use a diagram showing estimated isotropic gain relative to orbit longitude.

3.5 Receiver system noise temperature referred to the output of the antenna (K).

3.6 Station-keeping accuracy (degrees).

3.7 Regular hours of operation (UTC).

3.8 Coordination.

3.9 Agreements.

3.10 Other information.

3.11 Operating administration or agency.

3.12 Range of automatic gain control[18].

4 Connection between Earth-to-space and space-to-Earth frequencies in the network in the case of Region 2.

5 Description of the group(s) required in the case of non-simultaneous emissions.

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[18] See § 3.10 and 4.9 of Annex 3.

ANNEX 3*

Technical data used in establishing the provisions and associated Plans and which should be used for their application[19]

1 Definitions

1.1 Feeder link

The term feeder link, as defined in No. **S1.115**, is further qualified to indicate a fixed-satellite service link in the frequency band 17.3-17.8 GHz in the Region 2 broadcasting-satellite service Plan and in the frequency bands 14.5-14.8 GHz for countries outside Europe, and 17.3-18.1 GHz in the Regions 1 and 3 Plan, from any earth station within the feeder-link service area to the associated space station in the broadcasting-satellite service.

1.2 Feeder-link beam area

The area delineated by the intersection of the half-power beam of the satellite receiving antenna with the surface of the Earth.

1.3 Feeder-link service area

The area on the surface of the Earth within the feeder-link beam area within which the administration responsible for the service has the right to locate transmitting earth stations for the purpose of providing feeder-links to broadcasting-satellite space stations.

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[19] In revising this Annex at WRC-97, no changes were made to the technical data applicable to the Region 2 Plan. However, for all three Regions it should be noted that some of the parameters of networks proposed as modifications to the Plans may differ from the technical data presented herein.

* *Note by the Secretariat:* Subsequent to WARC Orb-88, certain errors have been discovered in the technical information for fast roll-off antenna patterns as contained in Appendices **S30A** and **S30B**. This technical information as corrected by the ex-IFRB derives from other relevant Conference decisions and is given in the provisional ex-IFRB Rule of Procedure No. H38, published in ex-IFRB Circular-letter No. 790 of 12 july 1989. Copies of the latter may be obtained directly from the Bureau.

1.4 Nominal orbital position

The longitude of a position in the geostationary-satellite orbit associated with a frequency assignment to a space station in a space radiocommunication service. The position is given in degrees from the Greenwich meridian.

1.5 Adjacent channel

The RF channel in the broadcasting-satellite service frequency Plan, or in the associated feeder-link frequency Plan, which is situated immediately higher or lower in frequency with respect to the reference channel.

1.6 Second adjacent channel

The RF channel in the broadcasting-satellite service frequency Plan, or in the associated feeder-link frequency Plan, which is situated immediately beyond either of the adjacent channels, with respect to the reference channel.

1.7 Feeder-link equivalent protection margin for Regions 1 and 3[20]

The feeder-link equivalent protection margin (M_u) is given by the formula:

$$M_u = -10 \log (10^{-M_1/10} + 10^{-M_2/10} + 10^{-M_3/10}) \quad \text{dB}$$

where:

M_1 is the value in dB of the protection margin for the same channel, i.e.:

$$M_1 = \left[\frac{\text{wanted power}}{\text{sum of the co-channel interfering powers}} \right] - \text{co-channel protection ratio}$$

[20] This quantity is used in the alternative formula for the overall equivalent protection margin given in § 1.12. However, in certain cases (e.g. when the channel spacing and/or bandwidth are different from the values given in § 3.5 and 3.8 of Annex 5 to Appendix **S30**, equivalent protection margins for the second adjacent channels may be used. Appropriate protection masks included in ITU-R Recommendations should be used if available. Until a relevant ITU-R Recommendation is incorporated in this Annex by reference, the Bureau will use the worst-case approach as adopted by the Radio Regulations Board.

M_2 and M_3 are the values in dB of the protection margin for the upper and lower adjacent channels, respectively, i.e.:

$$M_2 = \left[\frac{\text{wanted power}}{\text{sum of the upper adjacent channel interfering powers}}\right] - \text{adjacent channel protection ratio}$$

$$M_3 = \left[\frac{\text{wanted power}}{\text{sum of the lower adjacent channel interfering powers}}\right] - \text{adjacent channel protection ratio}$$

All powers are evaluated at the receiver input. All protection ratios are given in § 3.3.

1.8 Overall carrier-to-interference (*C*/*I*) ratio

The overall *C*/*I* ratio is the ratio of the wanted carrier power to the sum of all interfering RF powers in a given channel including both feeder-links and downlinks. The overall *C*/*I* ratio due to interference from the given channel is calculated as the reciprocal of the sum of the reciprocals of the feeder-link *C*/*I* ratio and the downlink *C*/*I* ratio referred to the satellite receiver input and earth station receiver input, respectively[21].

1.9 Overall co-channel protection margin

The overall co-channel protection margin in a given channel is the difference in dB between the overall co-channel *C*/*I* ratio and the co-channel protection ratio.

1.10 Overall adjacent channel protection margin

The overall adjacent channel protection margin is the difference (dB) between the overall adjacent channel *C*/*I* ratio and the adjacent channel protection ratio.

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[21] In Region 2, there are a total of five overall *C*/*I* ratios used in the analysis of the Plan, namely, co-channel, upper and lower adjacent channels and upper and lower second adjacent channels. In Regions 1 and 3, three ratios are used, namely, co-channel and upper and lower adjacent channels.

1.11 Overall second adjacent channel protection margin

The overall second adjacent channel protection margin is the difference (dB) between the overall second adjacent channel *C*/*I* ratio and the second adjacent channel protection ratio.

1.12 Overall equivalent protection margin

The overall equivalent protection margin *M* is given in dB by the expression[22]:

$$M = -10 \log \left(\sum_{i=1}^{n} 10^{(-M_i/10)} \right)$$

where:

n is generally equal to 3 for Regions 1 and 3, *n* is equal to 5 for Region 2;

M_1: overall co-channel protection margin (dB) (as defined in § 1.9);

M_2, M_3: overall adjacent channel protection margins for the upper and lower adjacent channels, respectively (dB) (as defined in § 1.10);

M_4, M_5: overall second adjacent channel protection margins for the upper and lower second adjacent channels, respectively (dB) as defined in § 1.11).[23]

The adjective “equivalent” indicates that the protection margins for all interference sources from the adjacent and second adjacent as well as co-channel interference sources have been included.

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[22] This formula is also used to calculate the overall equivalent protection margin of the assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997.

[23] M_4 and M_5 are applicable only for Region 2. However, in certain cases (e.g. when the channel spacing and/or bandwidth are different from the values given in § 3.5 and 3.8 of Annex 5 to Appendix **S30**), these margins may also be used for Regions 1 and 3. Appropriate protection masks included in ITU-R Recommendations should be used if available. Until a relevant ITU-R Recommendation is incorporated in this Annex by reference, the Bureau will use the worst-case approach as adopted by the Radio Regulations Board.

The following alternative formula for overall equivalent protection margin was used at the 1988 Conference (WARC Orb-88) in developing the original feeder-link Plan for Regions 1 and 3. It may be used as a tool to assess the relative contributions of the feeder link and downlink to the overall equivalent protection margin defined above .

$$M = -10 \log \left(10^{-(M_u + R_{cu})/10} + 10^{-(M_d + R_{cd})/10} \right) - R_{co}$$

where:

M_u: equivalent protection margin for the feeder link (as defined in § 1.7);

M_d: equivalent protection margin for the downlink (as defined in § 3.4, Annex 5 to Appendix **S30**;

R_{cu}: co-channel feeder-link protection ratio;

R_{cd}: co-channel downlink protection ratio;

R_{co}: co-channel overall protection ratio.

The values of the protection ratios used for the 1988 feeder-link Plan were as follows:

R_{cu} = 40 dB

R_{cd} = 31 dB

R_{co} = 30 dB

The adjective “equivalent” indicates that the protection margins for all interference sources from the adjacent channels as well as co-channel interference sources have been included.

The corresponding values for analysing the 1997 feeder-link Plan are:

R_{cu} = 30 dB

R_{cd} = 24 dB

R_{co} = 23 dB

However, the latter values are restricted to the case of channels having the standard channel spacing and necessary bandwidth given in § 3.5 and 3.8, respectively, of Annex 5 to Appendix **S30**.

2 Radio propagation factors

The propagation loss on an Earth-to-space path is equal to the free-space path loss plus the atmospheric absorption loss plus the rain attenuation exceeded for 1% of the worst month in Region 2. In Regions 1 and 3, the atmospheric absorption loss is not included.

2.1 Atmospheric absorption

For Region 2 (see Fig. 2)

The loss due to atmospheric absorption (i.e. clear-sky attenuation) is given by:

$$A_a = \frac{92.20}{\cos\theta}\left(0.020F_o + 0.008\,\rho F_w\right) \quad \text{dB} \quad \text{for } \theta < 5°$$

where:

$$F_o = \left\{24.88\tan\theta + 0.339\sqrt{1\,416.77\tan^2\theta + 5.51}\right\}^{-1}$$

$$F_w = \left\{40.01\tan\theta + 0.339\sqrt{3\,663.79\tan^2\theta + 5.51}\right\}^{-1}$$

and:

$$A_a = \frac{0.0478 + 0.0118\,\rho}{\sin\theta} \quad \text{dB} \quad \text{for } \theta \geq 5°$$

where:

θ: elevation angle (degrees),

ρ: surface water vapour concentration, g/m^3, with

ρ = 10 g/m^3 for rain climatic zones A to K and

ρ = 20 g/m^3 for rain climatic zones M to P.

For Regions 1 and 3 (see Figs. 1 and 3 taken from Recommendation ITU-R P.837-1)

In the Regions 1 and 3 feeder-link Plan, the atmospheric absorption loss is not included for the calculation of margins.

2.2 Rain attenuation

The propagation model for feeder-links using circularly polarized signals is based on the value of rain attenuation for 1% of the worst month.

Figures 1, 2 and 3 give the rain climatic zones for Regions 1, 2 and 3.

Figure 4 presents a plot of rain attenuation of circularly polarized signals exceeded for 1% of the worst month at 17.5 GHz as a function of earth station latitude and elevation angle for each of the rain climatic zones in Region 2.

For calculation, the following data are needed:

$R_{0.01}$: point rainfall rate for the location exceeded for 0.01% of an average year (mm/h)

h_0: height above mean sea level of the earth station (km)

θ: elevation angle (degrees)

f: frequency (GHz)

ζ: latitude of earth station (degrees).

Mean frequencies will be used for calculations for the frequency bands, i.e. 17.7 GHz and 14.65 GHz for Regions 1 and 3, 17.5 GHz for Region 2.

The calculation procedure used for the Region 2 feeder-link Plan and for the original 1988 Regions 1 and 3 feeder-link Plan consists of the following seven steps:

Step 1: the mean zero-degree isotherm height h_F is:

$$h_F = 5.1 - 2.15 \log \left[1 + 10^{\frac{(|\zeta| - 27)}{25}} \right] \quad \text{km}$$

Step 2: the rain height h_R is:

$$h_R = C \cdot h_F \quad \text{km}$$

where:

$$C = 0{,}6 \quad \text{for} \quad 0° \leq |\zeta| < 20°$$

$$C = 0{,}6 + 0{,}02\,(|\zeta| - 20) \quad \text{for} \quad 20° \leq |\zeta| < 40°$$

$$C = 1 \quad \text{for} \quad |\zeta| \geq 40°$$

Step 3: the slant-path length, L_s, below the rain height is:

$$L_s = \frac{2(h_R - h_0)}{\left[\sin^2 \theta + 2 \frac{(h_R - h_0)}{R_e} \right]^{1/2} + \sin \theta} \quad \text{km}$$

where R_e is the effective radius of the Earth (8 500 km).

Step 4: the horizontal projection, L_G, of the slant-path is:

$$L_G = L_s \cos \theta \quad \text{km}$$

Step 5: the rain path reduction factor $r_{0.01}$, for 0.01% of the time is:

$$r_{0.01} = \frac{90}{90 + 4L_G}$$

Step 6: the specific attenuation γ_R is determined from:

$$\gamma_R = k\,(R_{0.01})^{\alpha} \quad \text{dB/km}$$

where $R_{0.01}$ is given in Table 1 for each rain climatic zone. The frequency dependent coefficients k and α are given in Table 2 and the rain climatic zones are given in Figs. 1, 2 and 3 for Regions 1, 2 and 3.

TABLE 1

Rainfall intensity (*R*) for the rain climatic zones (exceeded for 0.01% of an average year)

Rain climatic zone	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**P**	**Q**
Rainfall intensity (mm/h)	8	12	15	19	22	28	30	32	35	42	60	63	95	145	115

TABLE 2

Frequency dependent coefficients

Frequency (GHz)	***k***	α	
14.65	0.0327	1.149	For Regions 1 and 3
17.5	0.0521	1.114	For Region 2
17.7	0.0531	1.110	For Regions 1 and 3

Step 7: the attenuation exceeded for 1% of the worst month is:

$$A_{1\%} = 0.223\,\gamma_R\,L_s\,r_{0.01} \text{ dB} \qquad \text{for Regions 1 and 3}$$

$$A_{1\%} = 0.21\,\gamma_R\,L_s\,r_{0.01} \text{ dB} \qquad \text{for Region 2.}$$

For calculation of the permissible increase in e.i.r.p. to overcome rain fading (power control, see § 3.11.1) in the Regions 1 and 3 Plan revised byWRC-97, the same calculation procedure is used with the following changes to conform to Recommendation ITU-R P.618-5.

To calculate the rain height h_R, *steps 1* and *2* are replaced by:

$$h_R = \begin{cases} 5 - 0.075(\zeta - 23) & \text{for } \zeta > 23^\circ \text{ Northern Hemisphere} \\ 5 & \text{for } 0^\circ \le \zeta \le 23^\circ \text{ Northern Hemisphere} \\ 5 & \text{for } 0^\circ \ge \zeta \ge -21^\circ \text{ Southern Hemisphere} \\ 5 + 0.1(\zeta + 21) & \text{for } -71^\circ \le \zeta < -21^\circ \text{ Southern Hemisphere} \\ 0 & \text{for } \zeta < -71^\circ \text{ Southern Hemisphere} \end{cases}$$

Steps 3 and *4* remain the same. However, to calculate the rain path reduction factor $r_{0.01}$, for 0.01% of the time, the equation of *Step 5* is replaced by:

$$r_{0.01} = \frac{1}{1 + L_G / L_0}$$

where:

$$L_0 = 35 \exp(-0.015 R_{0.01})$$

and $R_{0.01}$ is given in Table 1 for each rain climatic zone.

Step 6 remains the same except the frequency dependent coefficients k and α shall be obtained from Recommendation ITU-R P.838.

Step 7 should be replaced as follows:

$$\frac{A_p}{A_{0.01}} = 0.12\, p^{-(0.546 + 0.043 \log p)}$$

where:

$$p\,(\%) = 0.30\, p_w\,(\%)^{1.15} \qquad \text{(Recommendation ITU-R P.841)}$$

p is the average annual time percentage of excess corresponding to desired worst-month time percentage of excess p_w.

2.3 Rain attenuation limit

In the analysis of the Plan for Region 2, a maximum rain attenuation on the feeder link of 13 dB was considered assuming that other means would be used at the implementation stage to compensate for larger rain attenuation on the feeder link.

In the analysis of the Regions 1 and 3 Plan, no rain attenuation is included in the margins.

2.4 Depolarization

Rain and ice can cause depolarization of radio frequency signals. The level of the co-polar component relative to the depolarized component is given by the cross-polarization discrimination (XPD) ratio. For the feeder link, the XPD ratio (dB) not exceeded for 1% of the worst month, is given by:

$$XPD = 30 \log f - 40 \log (\cos \theta) - V \log A_p \qquad \text{for } 5° \leq \theta \leq 60°$$

where:

$$V = 20 \qquad \text{for 14.5-14.8 GHz}$$

and

$$V = 23 \qquad \text{for 17.3-18.1 GHz}$$

where:

A_p: co-polar rain attenuation exceeded for 1% of the worst month

f: frequency (GHz)

θ: elevation angle (degrees).

To calculate the depolarization value to be used for power control in the Regions 1 and 3 Plan, the following algorithm (*Steps 1* to *8*), which was obtained from Recommendation ITU-R P.618-5, shall be used.

To calculate long-term statistics of depolarization from rain attenuation statistics the following parameters are needed:

A_p: rain attenuation (dB) exceeded for the required percentage of time, p, for the path in question, commonly called co-polar attenuation (CPA)

τ: tilt angle of the linearly-polarized electric field vector with respect to the horizontal (for circular polarization use $\tau = 45°$)

f: frequency (GHz)

θ: path elevation angle (degrees).

The method described below to calculate XPD statistics from rain attenuation statistics for the same path is valid for 8 GHz $\leq f \leq$ 35 GHz and $\theta \leq 60°$.

Step 1: calculate the frequency-dependent term:

$$C_f = 30 \log f \qquad \text{for 8 GHz} \leq f \leq 35 \text{ GHz}$$

Step 2: calculate the rain attenuation dependent term:

$$C_A = V(f) \log A_p$$

where:

$$V(f) = 12.8 f^{0.19} \quad \text{for} \quad 8 \text{ GHz} \leq f \leq 20 \text{ GHz}$$

$$V(f) = 22.6 \quad \text{for} \quad 20 \text{ GHz} < f \leq 35 \text{ GHz}$$

Step 3: calculate the polarization improvement factor:

$$C_\tau = -10 \log [1 - 0.484 (1 + \cos 4\tau)]$$

The improvement factor $C_\tau = 0$ for $\tau = 45°$ and reaches a maximum value of 15 dB for $\tau = 0°$ or 90°.

Step 4: calculate the elevation angle dependent term:

$$C_\theta = -40 \log (\cos \theta) \quad \text{for } \theta \leq 60°$$

Step 5: calculate the canting angle dependent term:

$$C_\sigma = 0.0052 \sigma^2$$

σ is the effective standard deviation of the raindrop canting angle distribution, expressed in degrees; σ takes the value 0°, 5°, 10° and 15° for 1%, 0.1%, 0.01% and 0.001% of the time, respectively.

Step 6: calculate rain XPD not exceeded for *p*% of the time:

$$XPD_{rain} = C_f - C_A + C_\tau + C_\theta + C_\sigma \quad \text{dB}$$

Step 7: calculate the ice crystal dependent term:

$$C_{ice} = XPD_{rain} (0.3 + 0.1 \log p)/2 \quad \text{dB}$$

Step 8: calculate the XPD not exceeded for *p*% of the time, including the effects of ice:

$$XPD_p = XPD_{rain} - C_{ice} \quad \text{dB}$$

For values of θ greater than 60°, use $\theta = 60°$ in the above equations.

FIGURE 1

Rain-climatic zones for Regions 1 and 3 between longitudes 45° W and 105° E

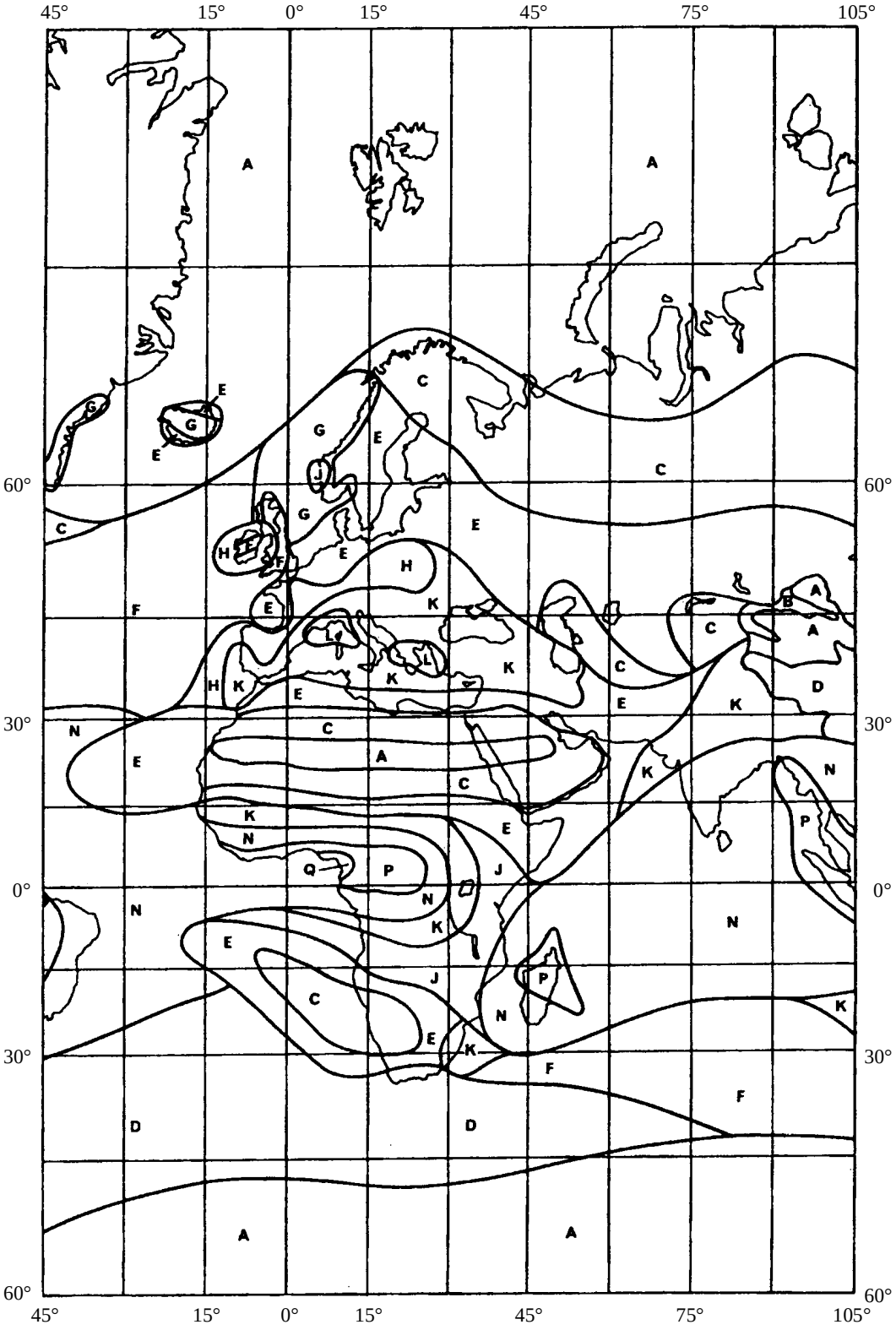
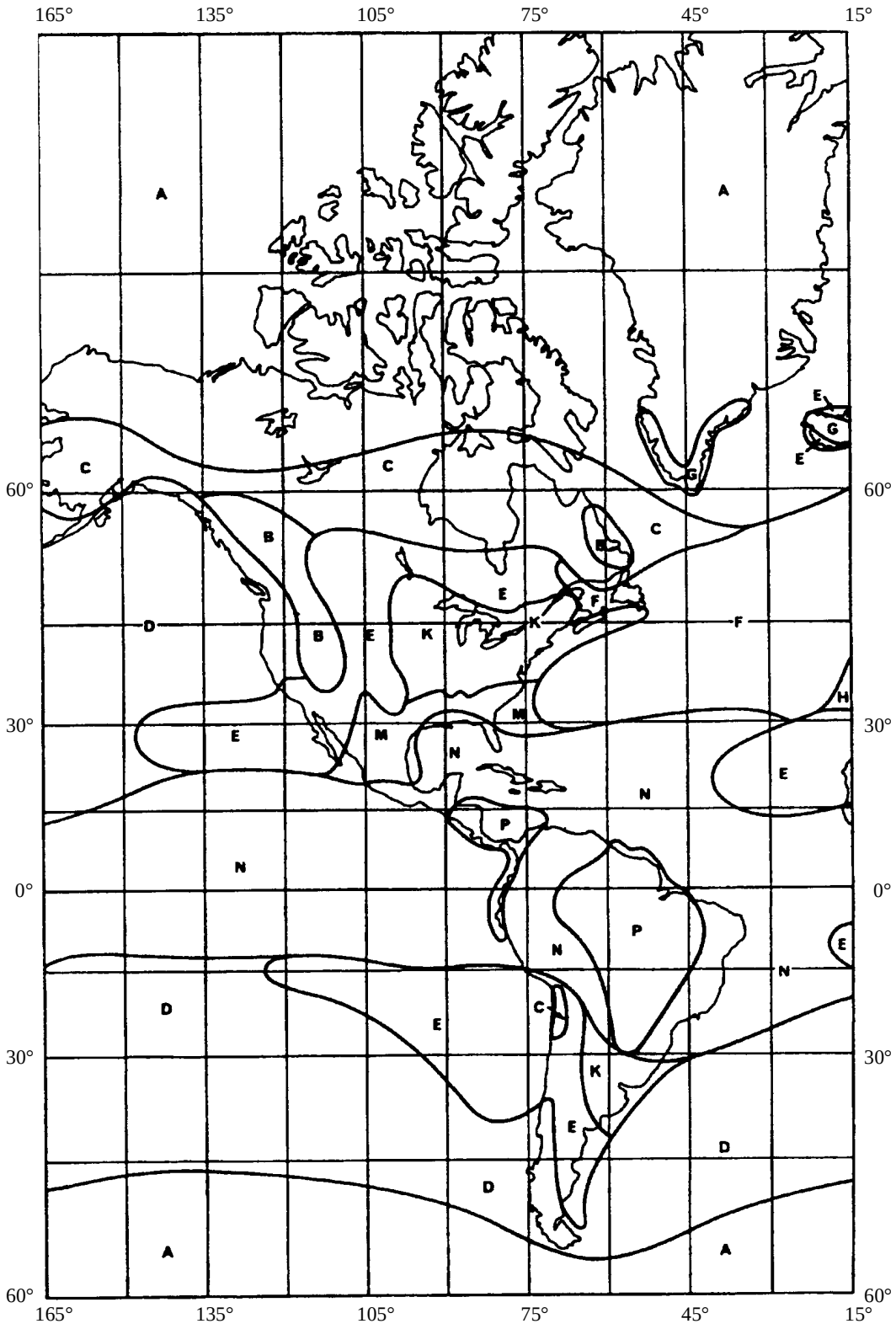


FIGURE 2

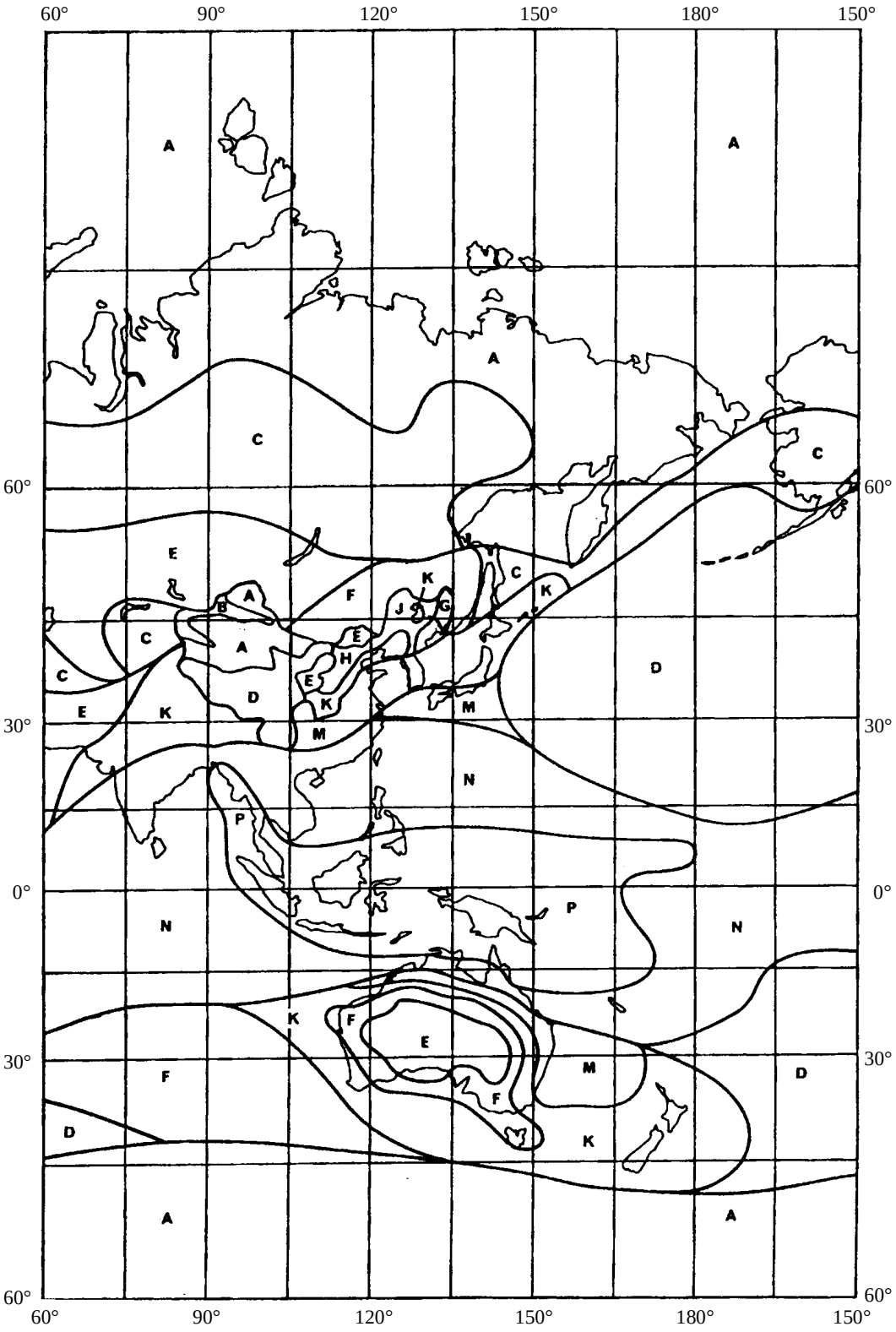
Rain-climatic zones (Region 2)



APS30A/30AA3-02

FIGURE 3

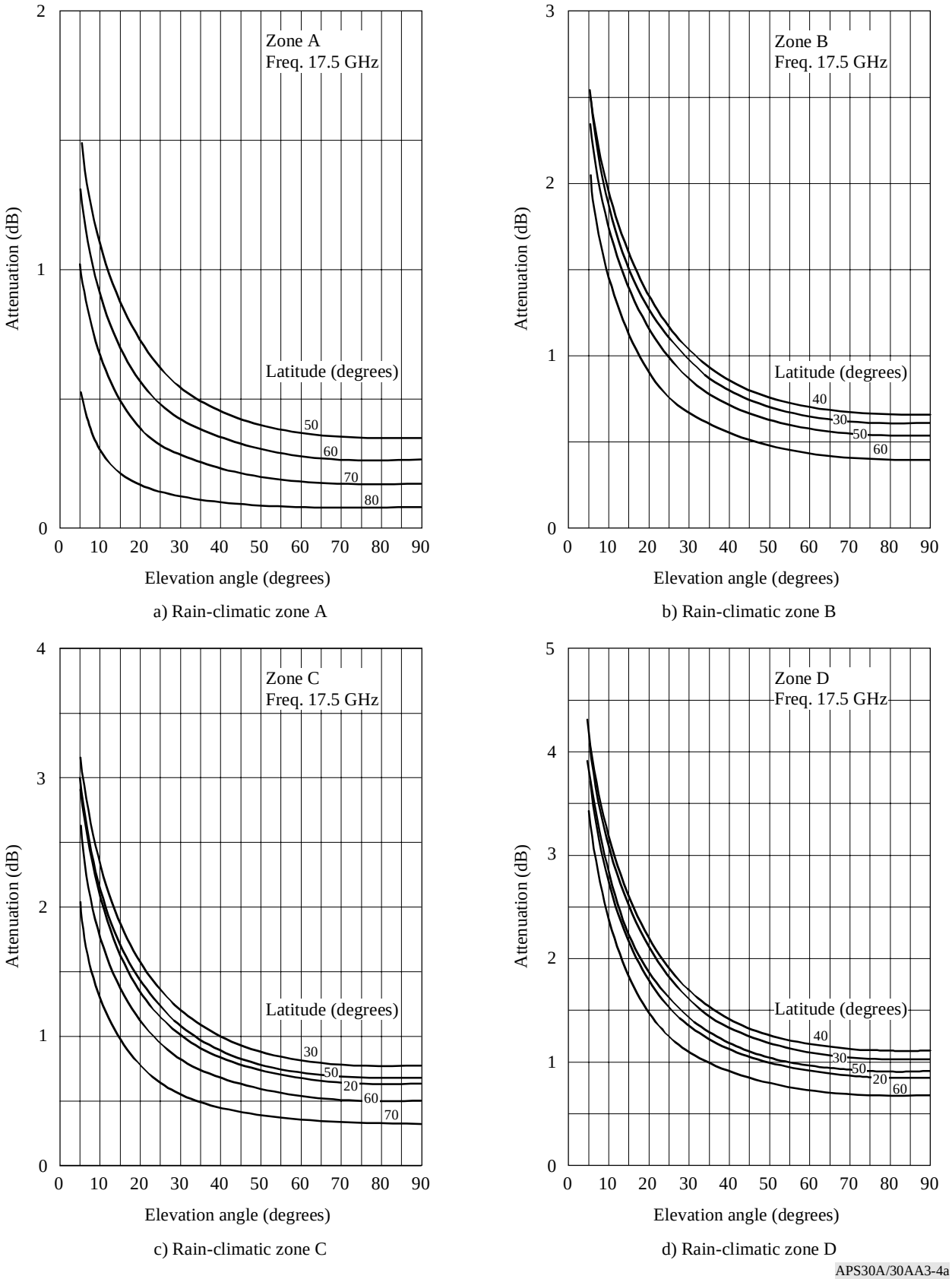
Rain-climatic zones for Regions 1 and 3 between longitudes 60° E and 150° W



APS30A/30AA3-03

FIGURE 4

Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain-climatic zones



a) Rain-climatic zone A

b) Rain-climatic zone B

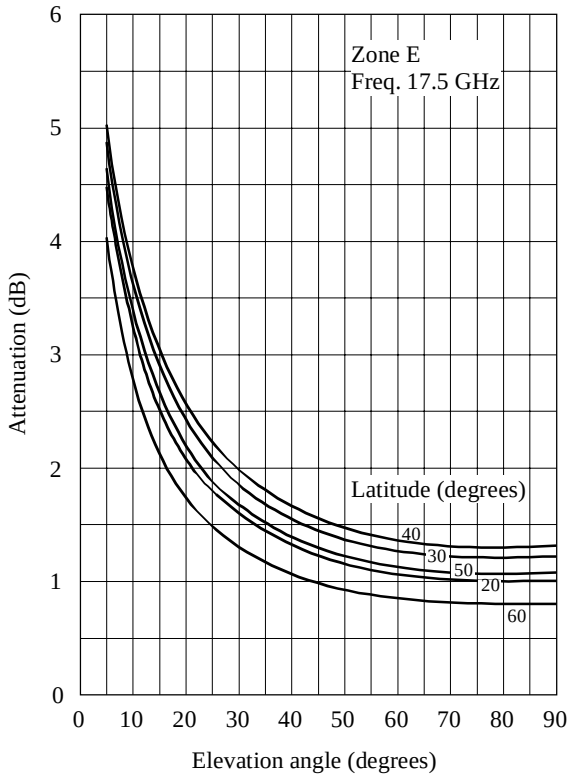
c) Rain-climatic zone C

d) Rain-climatic zone D

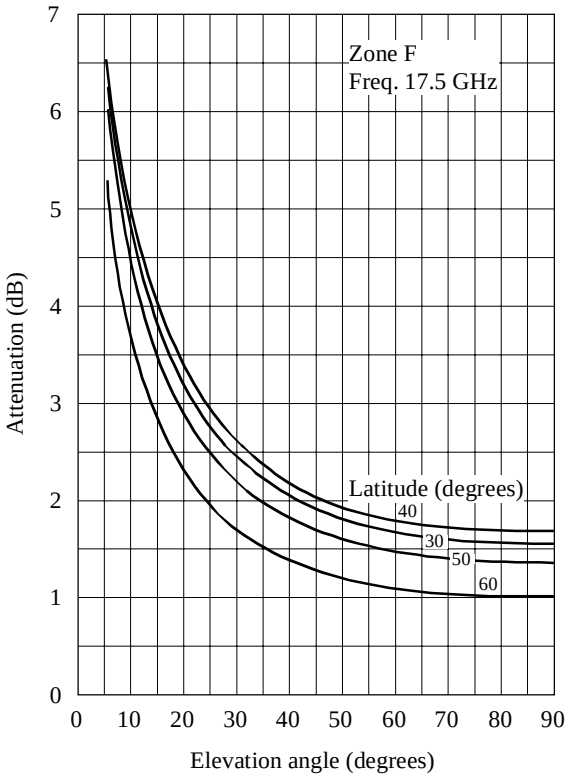
APS30A/30AA3-4a

FIGURE 4 (*continued*)

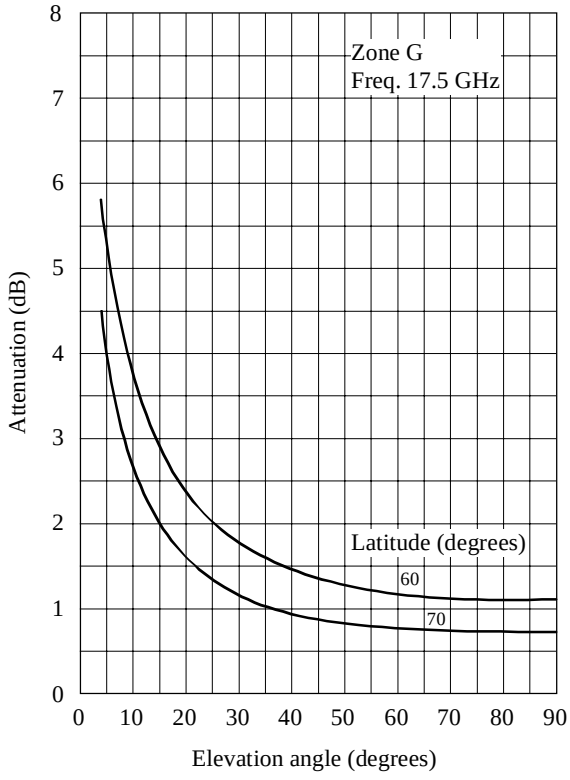
Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain-climatic zones



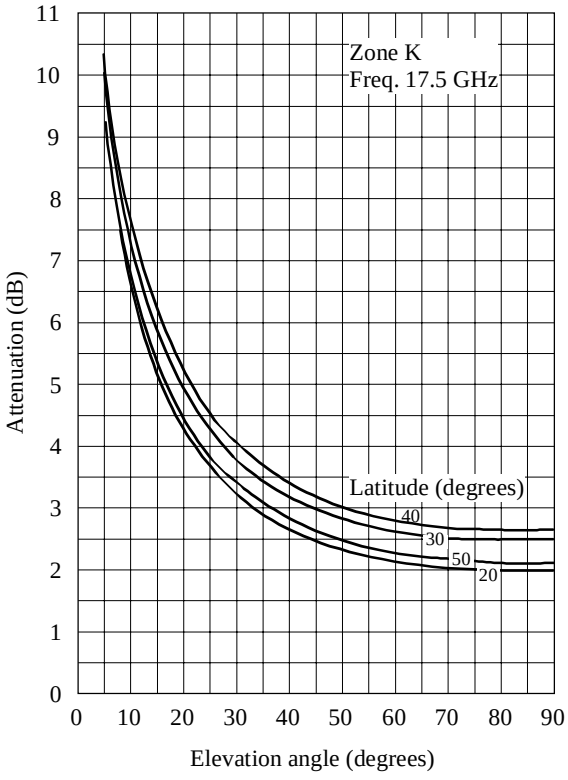
e) Rain-climatic zone E



f) Rain-climatic zone F



g) Rain-climatic zone G

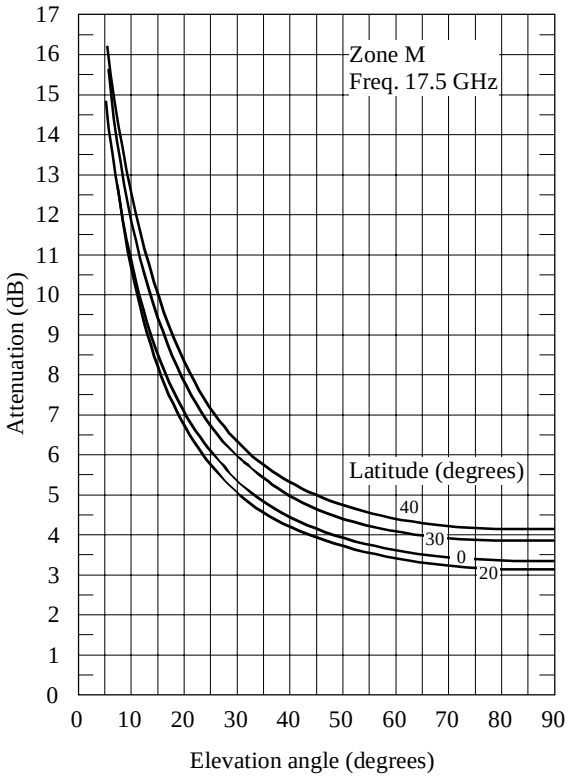


h) Rain-climatic zone K

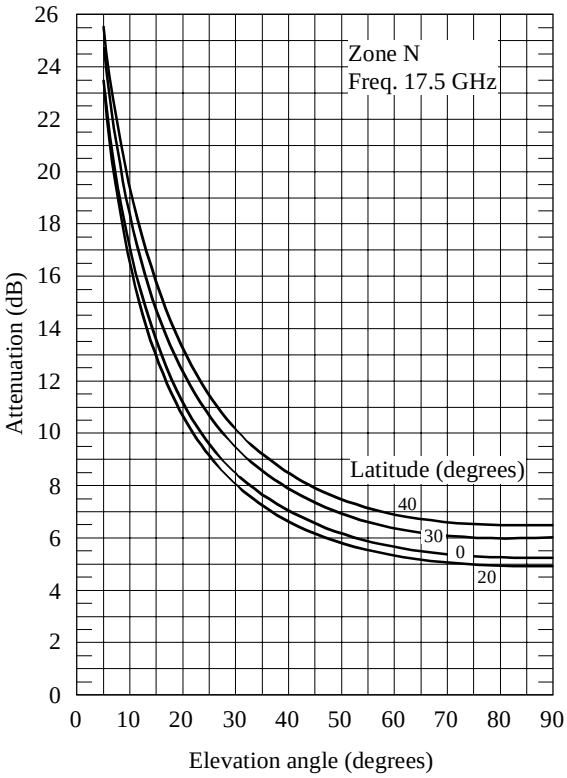
APS30A/30AA3-4b

FIGURE 4 (continued)

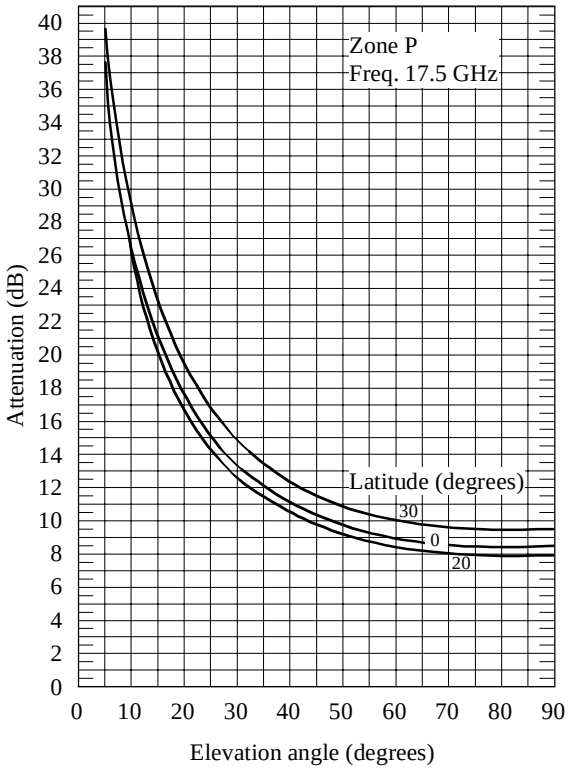
Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain-climatic zones



i) Rain-climatic zone M



j) Rain-climatic zone N



k) Rain-climatic zone P

APS30A/30AA3-4c

2.5 Procedure for calculating the *C*/*I* ratio at a space station receiver input

In Region 2, the calculation of the feeder-link *C*/*I* ratio (exceeded for 99% of the worst month) at a space station receiver input used to obtain the overall equivalent protection margin at a test point assumes a rain attenuation value not exceeded for 99% of the worst month on the wanted feeder-link path. For the interfering feeder-link signal path, clear sky propagation (i.e., including atmospheric absorption only) is assumed.

In Regions 1 and 3, the calculation of the feeder-link *C*/*I* ratio at a space station receiver input used to obtain the feeder-link equivalent protection margin at a test point assumes free space conditions on the wanted feeder-link path and on the interfering feeder-link path.

3 Basic technical characteristics for Regions 1 and 3

3.1 Translation frequency and guardbands

a) *17 GHz feeder-links*

The feeder-link Plan generally uses a frequency translation of 5.6 GHz between the 17 GHz feeder-link channels and the 12 GHz downlink channels. Other values of the translation frequency may be used, provided that the corresponding channels have been assigned to the space station of the administration concerned.

With the value of frequency translation between the feeder-link frequency band (17.3-18.1 GHz in Regions 1 and 3) and the downlink frequency band (11.7-12.5 GHz in Region 1 and 11.7-12.2 GHz in Region 3), the guardbands specified in § 3.9 of Annex 5 to Appendix **S30** for the downlink Plan result in corresponding guardband bandwidths of 11 MHz at the upper and 14 MHz at the lower feeder-link band edges. These feeder-link guardbands may be used for transmissions in the space operation service.

b) *14 GHz feeder-links*

As the maximum available bandwidth for the feeder-link band 14.5-14.8 GHz is only 300 MHz divided into fourteen 27 MHz channels, against 800 MHz (40 channels) and 500 MHz (24 channels) in the downlink Plan for Regions 1 and 3, respectively, several translation frequencies must be considered to allow any channel in the Plan to be used. Consequently, a particular feeder-link channel has been assigned to several broadcasting-satellite service Plan channels simultaneously.

Generally, the translation frequencies from the feeder-link channels are:

2 797.82 MHz to downlink broadcasting-satellite service channels 1 to 14

2 529.30 MHz to downlink broadcasting-satellite service channels 15 to 28

2 260.78 MHz to downlink broadcasting-satellite service channels 29 to 40

The guardband bandwidths are 11.80 MHz at the lower band edge and 11.86 MHz at the upper band edge.

c) Frequency translation rules

Specific rules for selecting appropriate frequency translations are given in § 6.2.1.2.2 and 6.2.1.3.3 of the 1985 Conference (WARC Orb-85) Report to the 1988 Conference (WARC Orb-88). These rules permit the derivation of simple-to-use tables that define the channel translations that were avoided in revising the Regions 1 and 3 feeder-link Plan for both the 14 GHz and 17 GHz bands (see Tables 3 and 4).

TABLE 3

14.5-14.8 GHz/11.7-12.5 GHz channel translations that should be avoided (as far as possible) according to the 1985 Conference frequency translation rules

14 GHz feeder-link channel number	**Downlink channel numbers to be avoided (as far as possible)**				
1	7	8	9	19	20
2	8	9	10	20	21
3	9	10	11	21	22
4	10	11	12	22	23
5	11	12	13	23	24
6	12	13	14	24	25
7	13	14	15	25	26
8	14	15	16	26	27
9	15	16	17	27	28
10	16	17	18	28	29
11	17	18	19	29	30
12	18	19	20	30	31
13	19	20	21	31	32
14	20	21	22	32	33

TABLE 4

17.3-18.1 GHz/11.7-12.5 GHz channel translations that should be avoided (as far as possible) according to the 1985 Conference frequency translation rules

17 GHz feeder-link channel number	Downlink channel numbers to be avoided (as far as possible)																														
1			10	11	12	13	14	15	16	17	18	19	20	21	22																
2			11	12	13	14	15	16	17	18	19	20	21	22	23																
3			12	13	14	15	16	17	18	19	20	21	22	23	24																
4			13	14	15	16	17	18	19	20	21	22	23	24	25																
5			14	15	16	17	18	19	20	21	22	23	24	25	26																
6			15	16	17	18	19	20	21	22	23	24	25	26	27																
7			16	17	18	19	20	21	22	23	24	25	26	27	28																
8			17	18	19	20	21	22	23	24	25	26	27	28	29																
9			18	19	20	21	22	23	24	25	26	27	28	29	30																
10	1			19	20	21	22	23	24	25	26	27	28	29	30	31															
11	1	2			20	21	22	23	24	25	26	27	28	29	30	31	32														
12	1	2	3			21	22	23	24	25	26	27	28	29	30	31	32	33														
13	1	2	3	4			22	23	24	25	26	27	28	29	30	31	32	33	34													
14	1	2	3	4	5			23	24	25	26	27	28	29	30	31	32	33	34	35												
15	1	2	3	4	5	6			24	25	26	27	28	29	30	31	32	33	34	35	36											
16	1	2	3	4	5	6	7			25	26	27	28	29	30	31	32	33	34	35	36	37										
17	1	2	3	4	5	6	7	8			26	27	28	29	30	31	32	33	34	35	36	37	38									
18	1	2	3	4	5	6	7	8	9			27	28	29	30	31	32	33	34	35	36	37	38	39								
19	1	2	3	4	5	6	7	8	9	10			28	29	30	31	32	33	34	35	36	37	38	39	40							
20	1	2	3	4	5	6	7	8	9	10	11			29	30	31	32	33	34	35	36	37	38	39	40							
21	1	2	3	4	5	6	7	8	9	10	11	12			30	31	32	33	34	35	36	37	38	39	40							
22	1	2	3	4	5	6	7	8	9	10	11	12	13			31	32	33	34	35	36	37	38	39	40							
23	1	2	3	4	5	6	7	8	9	10	11	12	13	14			32	33	34	35	36	37	38	39	40							
24		2	3	4	5	6	7	8	9	10	11	12	13	14	15			33	34	35	36	37	38	39	40							
25			3	4	5	6	7	8	9	10	11	12	13	14	15	16			34	35	36	37	38	39	40							
26				4	5	6	7	8	9	10	11	12	13	14	15	16	17			35	36	37	38	39	40							
27					5	6	7	8	9	10	11	12	13	14	15	16	17	18			36	37	38	39	40							
28						6	7	8	9	10	11	12	13	14	15	16	17	18	19			37	38	39	40							
29							7	8	9	10	11	12	13	14	15	16	17	18	19	20			38	39	40							
30								8	9	10	11	12	13	14	15	16	17	18	19	20	21			39	40							
31									9	10	11	12	13	14	15	16	17	18	19	20	21	22			40							
32										10	11	12	13	14	15	16	17	18	19	20	21	22	23									
33											11	12	13	14	15	16	17	18	19	20	21	22	23	24								
34												12	13	14	15	16	17	18	19	20	21	22	23	24	25							
35													13	14	15	16	17	18	19	20	21	22	23	24	25	26						
36														14	15	16	17	18	19	20	21	22	23	24	25	26	27					
37															15	16	17	18	19	20	21	22	23	24	25	26	27	28				
38																16	17	18	19	20	21	22	23	24	25	26	27	28	29			
39																	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
40																		18	19	20	21	22	23	24	25	26	27	28	29	30	31	

3.2 Carrier-to-noise ratio

§ 3.3 of Annex 5 to Appendix **S30/30** provides guidance for planning and the basis for the evaluation of the carrier-to-noise (*C*/*N*) ratios of the feeder-link and downlink Plans.

As guidance for planning, the reduction in quality in the downlink due to thermal noise in the feeder-link is taken as equivalent to a degradation in the downlink *C*/*N* ratio of approximately 0.5 dB not exceeded for 99% of the worst month.

For downlinks, as indicated in Appendix **S30/30**, the 1977 Conference (WARC SAT-77) adopted a *C/N* value of 14.5 dB for 99% of the worst month at the edge of the service area. The required feeder-link *C/N* is 24 dB for 99% of the worst month, at the edge of the service area, to produce an overall *C/N* performance of 14 dB.

3.3 Protection ratios

For planning in Regions 1 and 3 at the 1988 Conference (WARC Orb-88), the following protection ratios were applied for the purpose of calculating the feeder-link equivalent protection margins[24]:

– co-channel protection ratio = 40 dB;

– adjacent channel protection ratio = 21 dB.

The method for the calculation of the feeder-link equivalent protection margin is given in § 1.7.

For revising the Regions 1 and 3 Plan at WRC-97, the corresponding values of aggregate protection ratio that were used to calculate the feeder-link equivalent protection margins which appear in the alternative formula for overall equivalent protection margin given in § 1.12 are specified in Recommendation ITU-R BO.1297, as follows:

– co-channel protection ratio = 30 dB;

– adjacent channel protection ratio = 22 dB.

However, it should be noted that the revision of the Regions 1 and 3 Plan by the WRC-97 was, in accordance with Recommendation **521 (WRC-95)**, based on “simultaneous planning of

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[24] These protection ratio values may be used for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997.

feeder-link and downlink with calculation of overall equivalent protection margins" (as defined in § 1.11 of Annex 5 to Appendix **S30/30** and in § 1.12 using the following values of aggregate protection ratio:

– co-channel = 23 dB;

– adjacent channel = 15 dB.

Recommendation **521 (WRC-95)** also specified that for the revision of the Regions 1 and 3 Plan no overall co-channel single entry *C*/*I* ratio should be lower than 28 dB.

Nevertheless, for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997, the overall equivalent protection margins were calculated using a co-channel overall protection ratio of 30 dB and lower and upper overall adjacent channel protection ratios of 14 dB.

Revision of the Regions 1 and 3 Plan at WRC-97 was generally based on a set of reference parameters such as the average e.i.r.p., the reference earth station transmitting antenna, all test points placed within the –3 dB contour, a bandwidth of 27 MHz and the predetermined value of *C*/*N*.

Protection masks and associated calculation methods for interference into broadcasting-satellite systems involving digital emissions are given in Recommendation ITU-R BO.1293.

3.4 Feeder-link e.i.r.p.

The level of e.i.r.p. of each feeder-link is specified in Article 9A.

The level of e.i.r.p. specified in the Plan can only be exceeded under certain conditions explained in § 3.11 of this Annex (see also Article 5, § 5.1.1).

3.5 Transmitting antenna

3.5.1 Antenna diameter

The feeder-link Plan is based on an antenna diameter of 5 m for the band 17.3-18.1 GHz and 6 m for the band 14.5-14.8 GHz.

For all antenna diameters including antennas smaller than 5 m for the 17.3-18.1 GHz band and 6 m for the 14.5-14.8 GHz band, the off-axis e.i.r.p. shall not exceed the limits indicated by curve A in Fig. A of § 3.5.3 of this Annex for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997 and by the curve A′ of Fig. A for other assignments.

3.5.2 On-axis gain

The on-axis gain for the 5 m antenna at 17.3-18.1 GHz and for the 6 m antenna at 14.5 to 14.8 GHz is taken as 57 dBi.

3.5.3 Off-axis e.i.r.p. of transmitting antennas

The co-polar and cross-polar off-axis e.i.r.p. values used for the original 1988 feeder-link Plan in Regions 1 and 3 are shown by curves A and B respectively in Fig. A[25] .

The corresponding off-axis e.i.r.p. values used for planning at WRC-97 are shown by curves A′ and B′ in Fig. A as specified in Recommendation ITU-R BO.1295.

3.5.4 Pointing accuracy

The Plan has been developed to accommodate a loss in gain of 1 dB due to earth station antenna mispointing.

The deviation of the antenna beam from its nominal pointing direction must not exceed a limit of 0.1° in any direction. Moreover, the angular rotation of the receiving beam about its axis must not exceed a limit of ±1°; the limit on rotation is not necessary for beams of circular cross section using circular polarization.

3.6 Transmitter power

The maximum transmitter power delivered to the input of the antenna of the feeder-link earth station per 27 MHz television channel shall be such as to ensure that the e.i.r.p. envelope in § 3.5.3 is not exceeded except under certain conditions specified in § 3.11.

3.7 Satellite receiving antenna

3.7.1 Cross-section of receiving antenna beam

Planning has generally been based on beams of elliptical or circular cross-section. When the assignments are implemented, or when the Plan is modified, administrations may use non-elliptical (shaped) beams as described in Annex 2.

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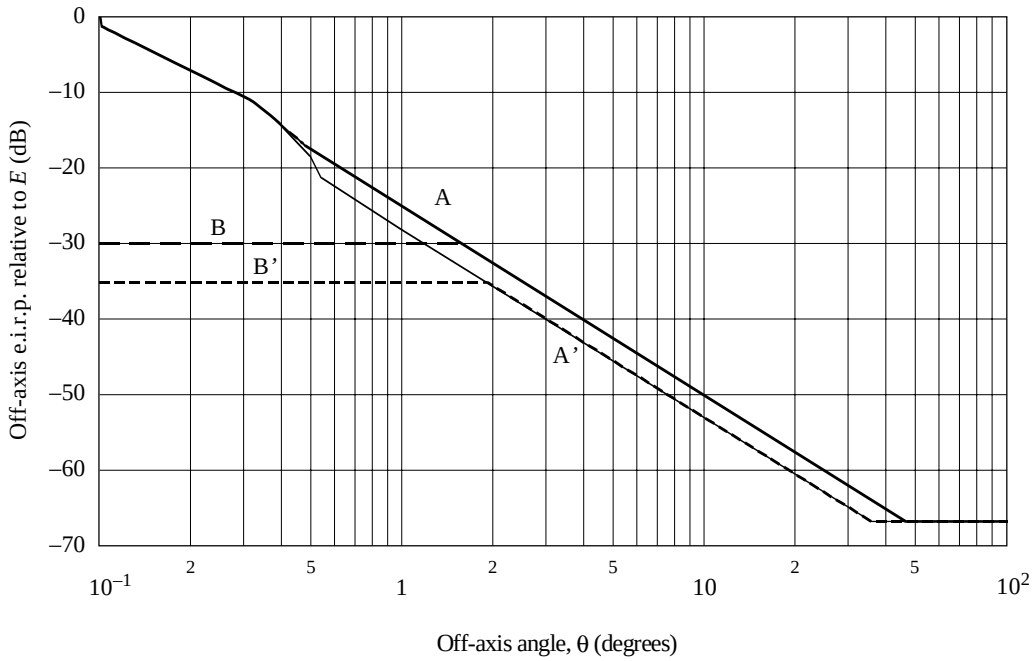
[25] This antenna pattern is used in the revision of the Regions 1 and 3 Plan for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997.

FIGURE A

Earth station e.i.r.p. at off-axis antenna angles



Curves A: WARC Orb-88 Regions 1 and 3 co-polar

A': WRC-97 co-polar

B: WARC Orb-88 Regions 1 and 3 cross-polar

B': WRC-97 cross-polar

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Co-polar component (dBW):

Curve A (WARC Orb-88)			*Curve A'* (WRC-97)		
E	for	$0° \le \theta \le 0.1°$	E	for	$0° \le \theta \le 0.1°$
$E - 21 - 20 \log \theta$	for	$0.1° < \theta \le 0.32°$	$E - 21 - 20 \log \theta$	for	$0.1° < \theta \le 0.32°$
$E - 5.7 - 53.2\ \theta^2$	for	$0.32° < \theta \le 0.44°$	$E - 5.7 - 53.2\ \theta^2$	for	$0.32° < \theta \le 0.54°$
$E - 25 - 25 \log \theta$	for	$0.44° < \theta \le 48°$	$E - 28 - 25 \log \theta$	for	$0.54° < \theta \le 36.31°$
$E - 67$	for	$48° < \theta$	$E - 67$	for	$36.31° < \theta$

Co-polar component (dBW):

Curve B (WARC Orb-88)			*Curve B'* (WRC-97)		
$E - 30$	for	$0° \le \theta \le 1.6°$	$E - 35$	for	$0° \le \theta \le 1.91°$
$E - 25 - 25 \log \theta$	for	$1.6° < \theta \le 48°$	$E - 28 - 25 \log \theta$	for	$1.91° < \theta \le 36.31°$
$E - 67$	for	$48° < \theta$	$E - 67$	for	$36.31° < \theta$

where:

E: earth station e.i.r.p. on the antenna axis (dBW);

θ: off-axis angle referred to the main lobe axis (degrees).

For planning purposes at WRC-97, an antenna diameter of 5 m for the band 17.3-18.1 GHz and 6 m for the band 14.5-14.8 GHz were assumed.

The on-axis gain for the 5 m antenna at 17.3-18.1 GHz and for the 6 m antenna at 14.5 to 14.8 GHz is taken as 57 dBi.

If the cross-section of the receiving antenna beam is elliptical, the effective beamwidth φ_0 is a function of the angle of rotation *q* between the plane containing the satellite and the major axis of the beam cross-section and the plane in which the beamwidth is required.

The relationship between the maximum gain of an antenna and the half-power beamwidth can be derived from the expression:

$$G_m = 27\,843/ab$$

where:

a and *b* are the angles (degrees) subtended at the satellite by the major and minor axes of the elliptical cross-section of the beam. An antenna efficiency of 55% is assumed.

3.7.2 Minimum beamwidth

A minimum value of 0.6° for the half-power beamwidth of the receiving antenna has been used for planning.

3.7.3 Reference patterns

The reference patterns for the co-polar and cross-polar components of the satellite receiving antenna used for planning at the 1988 Conference (WARC Orb-88) are given by curves A and B respectively in Fig. B[26].

The corresponding curves used for replanning at WRC-97 are given by curves A′ and B′ in Fig.B, as specified in Recommendation ITU-R BO.1296.

In some cases, to reduce co-polar interference, the pattern shown in Fig. C is used; this use is indicated in the Plan by note 1. This pattern is derived from an antenna producing an elliptical beam with fast roll-off in the main lobe assuming a “beamlet” beamwidth of 0.6^o. Three curves for different values of φ_0 are shown as examples.

3.7.4 Pointing accuracy

The deviation of the receiving antenna beam from its nominal pointing direction must not exceed 0.1^o in any direction. Moreover, the angular rotation of the receiving beam about its axis must not exceed ±1°; this limit is not necessary for beams of circular cross-section using circular polarization.

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[26] See footnote 25.

3.8 System noise temperature

The satellite system noise temperature values generally used in the Plan at the 1988 Conference (WARC Orb-88) are 1 800 K for 17 GHz and 1 500 K for 14 GHz[27] . For revising the Regions 1 and 3 Plan at WRC-97 these values are 900 K for 17 GHz and 750 K for 14 GHz.

3.9 Polarization

In Regions 1 and 3, circular polarization was normally used for the purpose of planning the feeder-links.

For the definitions of the terms “direct and indirect polarization”, see § 3.2.3 of Annex 5 to Appendix **S30**.

For the planning of the broadcasting-satellite service, circular polarization is generally used. However, for implementation of assignments in the Regions 1 and 3 Plan, linear polarization may also be used subject to successful application of the modification procedure of Article 4. Linear polarization is defined in Recommendation ITU-R BO.1212. This Recommendation should be used when analysing linearly polarized signals.

3.10 Automatic gain control

The downlink Plan was based on constant satellite output power. However, the feeder-link Plan does not take account of the effect of automatic gain control on board satellites. Up to 15 dB of automatic gain control is permitted, subject to no increase in interference to other satellite systems.

3.11 Power control

In Regions 1 and 3, a permitted increase which may be used to overcome rain fading for each assignment is included in the Plan.

In the calculation, in cases where satellites do not use common or adjacent channels cross-polarized to each other, the maximum permissible e.i.r.p. increase, which must not exceed 10 dB, corresponds to the amount of rain attenuation which occurs on the interfering feeder link.

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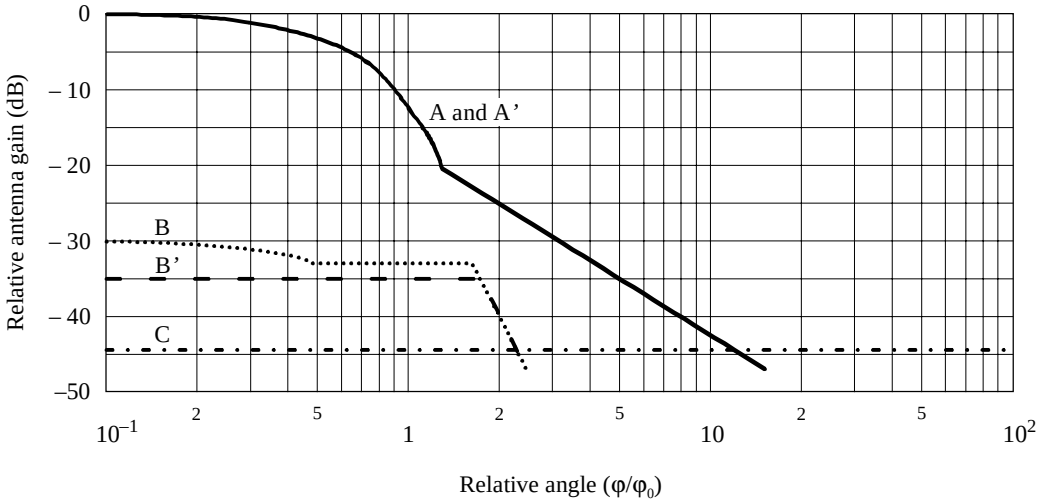
[27] These system temperature values are still used for assignments notified, which are in conformity with this Appendix, brought into use, and for which the date of bringing into use has been confirmed to the Bureau before 27 October 1997.

FIGURE B

Receiving space station circularly polarized antenna co-polar and cross-polar reference patterns for elliptical beams for planning in Regions 1 and 3



Curves A and A': WARC Orb-88 and WRC-97 co-polar

B: WARC Orb-88 cross-polar

B': WRC-97 cross-polar

C: Curve C (minus the on-axis gain)

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Co-polar relative gain (dB):

Curve A (WARC Orb-88) and *Curve A'* (WRC-97):

$G = -12\ (\varphi/\varphi_0)^2$ for $0 \le \varphi/\varphi_0 < 1{,}3$

$G = -17.5 - 25 \log (\varphi/\varphi_0)$ for $1.3 \le \varphi/\varphi_0$

After intersection with curve C, as curve C

Cross-polar relative gain (dB):

Curve B (WARC Orb-88)

$G = -30 - 12\ (\varphi/\varphi_0)^2$ for $0 \le \varphi/\varphi_0 \le 0.5$

$G = -33$ for $0.5 < \varphi/\varphi_0 \le 1.67$

$G = -40 - 40 \log \left(\frac{\varphi}{\varphi_0} - 1 \right)$ for $1.67 \le \varphi/\varphi_0$

After intersection with curve C, as curve C

Curve B' (WRC-97)

$G = -35$ for $0 \le \varphi/\varphi_0 < 1.75$

$G = -40 - 40 \log \left(\frac{\varphi}{\varphi_0} - 1 \right)$ for $1.75 \le \varphi/\varphi_0$

After intersection with curve C, as curve C

Curve C: minus the on-axis gain (curve C in the above figure illustrates the particular case of an antenna with an on-axis gain of 44.44 dBi)

where:

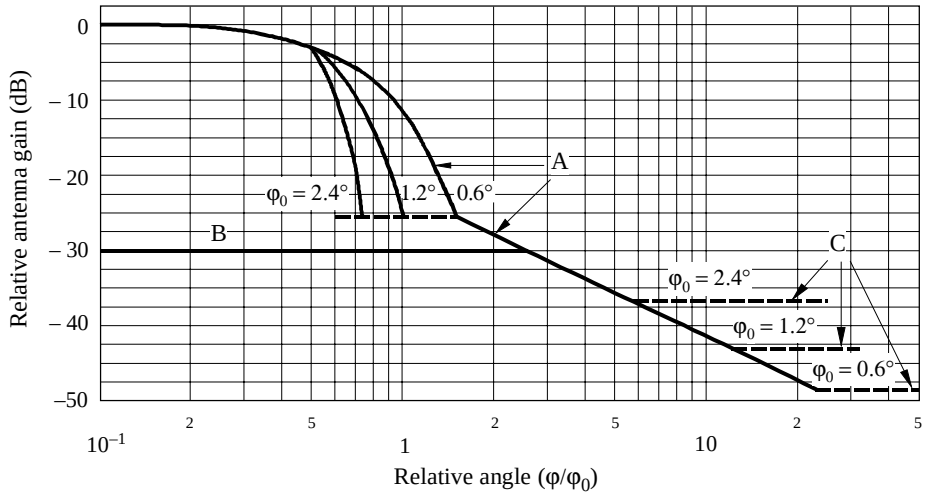
φ: off-axis angle (degrees)

φ_0: cross-sectional half-power beamwidth in the direction of interest (degrees).

The relationship between the maximum gain of an antenna and the half-power beamwidth can be derived from the expression in § 3.7.1.

FIGURE C

Reference patterns for co-polar and cross-polar components for satellite receiving antennas with fast roll-off in the main beam for Regions 1 and 3



APS30A/30AA3-C

Curve A: co-polar component (dB relative to main beam gain)

$-12\ (\varphi/\varphi_0)^2$ for $0 \le \varphi/\varphi_0 \le 0.5$

$-33.33\ \varphi_0^2 \left(\frac{\varphi}{\varphi_0} - x\right)^2$ for $0.5 < \varphi/\varphi_0 \le \frac{0.87}{\varphi_0} + x$

-25.23 for $\frac{0.87}{\varphi_0} + x < \varphi/\varphi_0 \le 1.45$

$-(22 + 20 \log (\varphi/\varphi_0))$ for $\varphi/\varphi_0 > 1.45$

After intersection with curve C, as curve C.

Curve B: cross-polar component (dB relative to main beam gain)

-30 for $0 \le \varphi/\varphi_0 < 2.51$

After intersection with curve A, as curve A.

Curve C: minus the on-axis gain (curves A and C represent examples for three antennas having different values of φ_0 as labelled in Fig. C. The on-axis gains of these antennas are 37, 43 and 49 dBi, respectively),

where:

φ: off-axis angle (degrees);

φ_0: dimension of the minimum ellipse fitted around the feeder-link service area in the direction of interest (degrees);

$x = 0.5\left(1 - \frac{0.6}{\varphi_0}\right)$

3.11.1 Method for determination of the increase in e.i.r.p. during rain attenuation for an assignment over the Plan value

Condition to be observed

The increase in e.i.r.p. of the assignment studied must not entail an impairment of more than 0.5 dB of the feeder-link equivalent protection margin of any other assignment of any other administration.

Calculation method

Step 1: compile a list of all assignments of other administrations (A, B, C, . . .) in the same orbital position and positions within ± 6^o (or further if no station is found within 6^o arc) liable to suffer interference from the assignment studied.

Step 2: calculate the feeder-link equivalent protection margin of assignment A in free-space conditions, taking account of all interference sources affecting A at the worst test points, namely:

– for assignment A: the point corresponding to the minimum *C/N* ratio;

– for each interference source affecting A: the point corresponding to the maximum interference power affecting A.

Step 3: introduce for the assignment studied the rain attenuation for 0.1% of the worst month and the corresponding rain depolarization value.

Step 4: recalculate the feeder-link equivalent protection margin of assignment A at the worst test points, namely:

– for assignment A: the test point used in *Step 2* above;

– for the assignment studied: the test point corresponding to the maximum interference power affecting A.

At this stage, the e.i.r.p. of the assignment studied is that contained in the Plan.

Step 5: increase the e.i.r.p. of the assignment studied by 0.1 dB and recalculate the equivalent uplink margin of A as in *Step 4* above.

Step 6: repeat the operation of *Step 5* above until the equivalent uplink margin of assignment A is impaired by more than 0.5 dB in relation to the value found under *Step 2* above, or until the e.i.r.p. increase exceeds 10 dB or the rain attenuation (see *Step 3*). Adopt the e.i.r.p. increase in the preceding iteration step.

Step 7: repeat the operations in *Step 2* to *Step 6* above, considering the assignments B, C, . . .

Step 8: adopt the smallest of the increases in e.i.r.p. found under *Step 6* above for the various assignments A, B, C, . . .

3.11.2 Propagation model

For the calculation of rain attenuation for 0.1% of the worst month, the model described in § 2.2 should be used. It shall be assumed that the 0.1% value is 3.3 times the 1% value (dB).

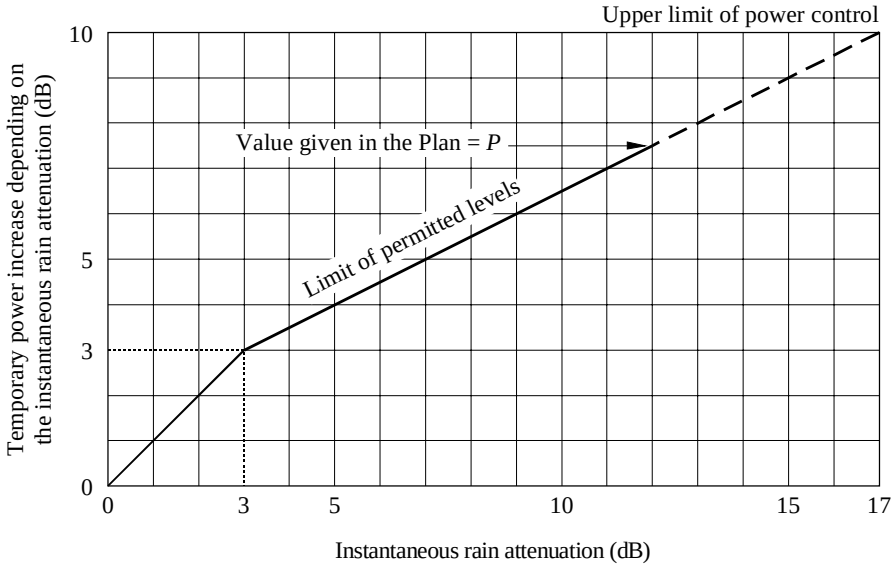
Rain depolarization shall be calculated on the basis of attenuation, using the method described in § 2.4.

3.11.3 Variation of power with rain attenuation

The instantaneous increase in power to overcome rain attenuation must not exceed the bounds given by the characteristics shown in Fig. 5.

FIGURE 5

Characteristic for up-link power control



P: value of permitted increase given in the Plan, or calculated by the BR, which varies for each assignment. The upper limit of this value is 10 dB.

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3.11.4 Procedures

An administration wishing to introduce power control may use a value not exceeding that given in Article 9A or it may request, where this is possible, the use of a higher value for a given earth station location. In this latter case, it shall request the Bureau to calculate the maximum permissible value for that site. The administration shall provide the Bureau with the coordinates of the station, the proposed antenna characteristics, including the off-axis co-polar and cross-polar characteristics, and the rain climatic zone.

The Bureau shall calculate the permissible increase in power using the method described in § 3.11.1.

The Bureau shall communicate the results of the calculations to the requesting administrations as well as to those administrations whose feeder-link equivalent protection margin is reduced.

In any case, the permitted increase in e.i.r.p. above that given in the Plan shall not exceed 10 dB.

In the event of modifications to the Plan, the Bureau shall recalculate the value of power control for the assignment subject to the modification and insert the appropriate value for that assignment in the Plan. A modification to the Plan shall not require the adjustment of the values of permissible power increase of other assignments in the Plan.

3.12 (SUP - WRC-97).

3.13 Depolarization compensation

The Plan is developed without the use of depolarization compensation. Depolarization compensation is permitted only to the extent that interference to other satellites does not increase by more than 0.5 dB[28] relative to that calculated in the feeder-link Plan.

3.14 Amplitude-modulation to phase-modulation conversion

The degradation caused by AM to PM conversion was taken into account when calculating the carrier-to-noise ratio of the feeder link. A value of 2.0 dB was allowed.

3.15 Orbit positions

The Plan is generally based on the use of regular arrangements of 6° from 37° W to 29° E and from 38° E to 160° W. The orbital positions are those given in the Plan.

The Regions 1 and 3 Plan is also based on the grouping of space stations in nominal orbital positions of $\pm 0.2°$ from the centre of the cluster.

Generally, the space stations are shown in the Plan in the centre of the cluster. However, in some cases, the space stations are shown at the edge of the cluster. Administrations may locate satellites within a cluster at any orbital position within that cluster, provided they obtain the agreement of other administrations having assignments to space stations in the same cluster.

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[28] This margin has to be shared between power control effects and depolarization compensation effects when both are involved (see Section 3.11).

3.16 Satellite station-keeping

Space stations in the broadcasting-satellite service must be maintained in position with an accuracy equal to or better than $\pm 0.1^{o}$ in the E-W direction. For such space stations, the maintenance of the tolerance $\pm 0.1°$ in the N-S direction is recommended but is not a requirement.

4 Basic technical characteristics for Region 2

4.1 Translation frequency and guard bands

The feeder-link Plan is based on the use of a single frequency translation of 5.1 GHz between the 17 GHz feeder-link channels and the 12 GHz downlink channels. Other values of the translation frequency may be used, provided that the corresponding channels have been assigned to the space station of the administration concerned.

With a single value frequency translation between the feeder-link frequency band (17.3-17.8 GHz) and the downlink frequency band (12.2-12.7 GHz), the guard bands present in the downlink Plan result in corresponding bandwidths of 12 MHz at the upper and lower feeder-link band edges. These feeder-link guard bands may be used for transmissions in the space operation service.

4.2 Carrier-to-noise ratio

Section 3.3 of Annex 5 to Appendix **S30** provides guidance for planning and the basis for the evaluation of the carrier-to-noise ratios of the feeder-link and downlink Plans.

As a guidance for planning, the reduction in quality in the downlink due to thermal noise in the feeder link is taken as equivalent to a degradation in the downlink carrier-to-noise ratio of approximately 0.5 dB not exceeded for 99% of the worst month.

4.3 Carrier-to-noise ratio

Section 3.4 of Annex 5 to Appendix **S30** provides guidance for planning for the contribution of the feeder-link co-channel interference to the overall co-channel carrier-to-interference ratio. However, the feeder-link and downlink Plans are evaluated on the overall equivalent protection margin which includes the combined downlink and feeder-link contributions. Definitions given in § 1.7, 1.8, 1.9, 1.10 and 1.11 of this Annex and the protection ratios given in Section 3.4 of Annex 5 to Appendix **S30** are used in the analysis of the Plans.

For the adjacent channels, the Plan is based on an orbital separation of 0.4° between nominally co-located satellites having cross-polarized adjacent channel assignments.

For the second adjacent channels, the Plan is based on a 10 dB improvement on the feeder-link carrier-to-interference ratio due to the satellite receive filtering.

4.4 Transmitting antenna

4.4.1 Antenna diameter

The feeder-link Plan is based on an antenna diameter of 5 m.

The minimum antenna diameter permitted in the Plan is 2.5 m. However, the feeder-link carrier-to-noise ratio and carrier-to-interference ratio resulting from the use of antennas with diameters smaller than 5 m would generally be less than those calculated in the Plan.

The use of antennas larger than 5 m, with corresponding values of on-axis e.i.r.p. higher than the planned value (indicated in § 4.4.3) but without augmented off-axis e.i.r.p., is permitted if the orbital separation between the assigned orbital location of the administration and the assigned orbital location of any other administration is greater than 0.5°.

Antennas with diameters larger than 5 m can also be implemented if the above orbital separation is less than 0.5° and if the e.i.r.p. of the desired feeder-link earth station does not exceed the planned value of e.i.r.p.

If the above orbital separation is less than 0.5° and if the e.i.r.p. of the desired feeder-link earth station exceeds the planned value, agreement between administrations is required.

4.4.2 Reference patterns of transmitting antennas

The co-polar and cross-polar reference patterns of transmitting antennas used for planning in Region 2 are given in Fig. 6.

4.4.3 Antenna efficiency

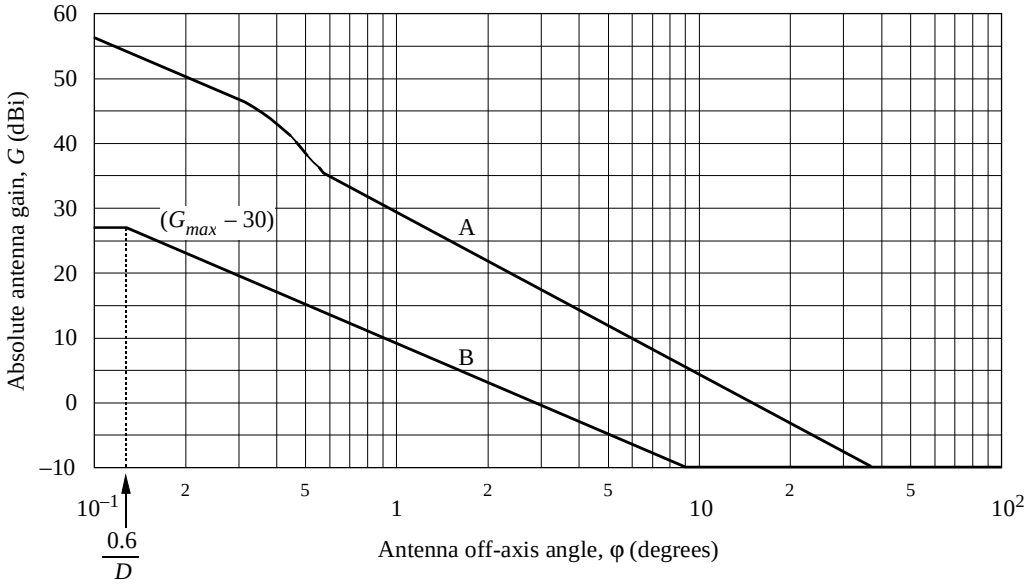
The Plan is based on an antenna efficiency of 65%. The corresponding on-axis gain for an antenna having a 5 m diameter is 57.4 dBi at 17.55 GHz, and the corresponding value of e.i.r.p. used for planning purposes is 87.4 dBW.

4.4.4 Pointing accuracy

The Plan has been developed to accommodate a loss in gain due to earth station antenna mis-pointing of 1 dB. Under no circumstances shall the Plan allow for a mis-pointing angle greater than 0.1°.

FIGURE 6

Reference patterns for co-polar and cross-polar components for transmitting antennas for Region 2



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Curve A: co-polar component (dBi)

$36 - 20 \log \varphi$	for	$0.1° \le \varphi < 0.32°$
$51.3 - 53.2 \varphi^2$	for	$0.32° \le \varphi < 0.54°$
$29 - 25 \log \varphi$	for	$0.54° \le \varphi < 36°$
-10	for	$\varphi \ge 36°$

Curve B: cross-polar component (dBi)

$G_{max} - 30$	for	$\varphi < \left(\frac{0.6}{D}\right)°$
$9 - 20 \log \varphi$	for	$\left(\frac{0.6}{D}\right)° \le \varphi < 8.7°$
-10	for	$\varphi \ge 8.7°$

where:

φ: off-axis angle referred to the main-lobe axis (degrees);

G_{max}: on-axis co-polar gain of the antenna (dBi);

D: diameter of the antenna (m) ($D \ge 2.5$).

NOTE 1 – In the angular range between 0.1° and 0.54°, the co-polar gain must not exceed the reference pattern.

NOTE 2 – In the angular range between 0° and (0.6/D)°, the cross polar gain must not exceed the reference pattern.

NOTE 3 – At the larger off-axis angles and for 90% of all side-lobe peaks in each of the reference angular windows, the gain must not exceed the reference pattern. The reference angular windows are 0.54° to 1°, 1° to 2°, 2° to 4°, 4° to 7°, 7° to 10°, 10° to 20°, 20° to 40°, 40° to 70°, 70° to 100° and 100° to 180°. The first reference angular window for evaluating the cross-polar component should be (0.6/D)° to 1°.

4.5 Transmit power

The maximum transmit power delivered to the input of the antenna of the feeder-link earth station is 1000 W per 24 MHz television channel. This level of power can only be exceeded under certain conditions specified in § 4.10.

4.6 Receiving antenna

4.6.1 Cross-section of receiving antenna beam

Planning has been based on beams of elliptical or circular cross-section. When the assignments are implemented, or when the Plan is modified, administrations may use non-elliptical or shaped beams.

If the cross-section of the receiving antenna beam is elliptical, the effective beamwidth φ_0 is a function of the angle of rotation q between the plane containing the satellite and the major axis of the beam cross-section and the plane in which the beamwidth is required.

The relationship between the maximum gain of an antenna and the half-power beamwidth can be derived from the expression:

$$G_m = 27\,843/ab$$

or

$$G_m \text{ (dB)} = 44.44 - 10 \log a - 10 \log b$$

where:

a and b are the angles (degrees) subtended at the satellite by the major and minor axes of the elliptical cross-section of the beam.

An antenna efficiency of 55% is assumed.

4.6.2 Minimum beamwidth

A minimum value of 0.6° for the half-power beamwidth of the receiving antenna has been agreed on for planning.

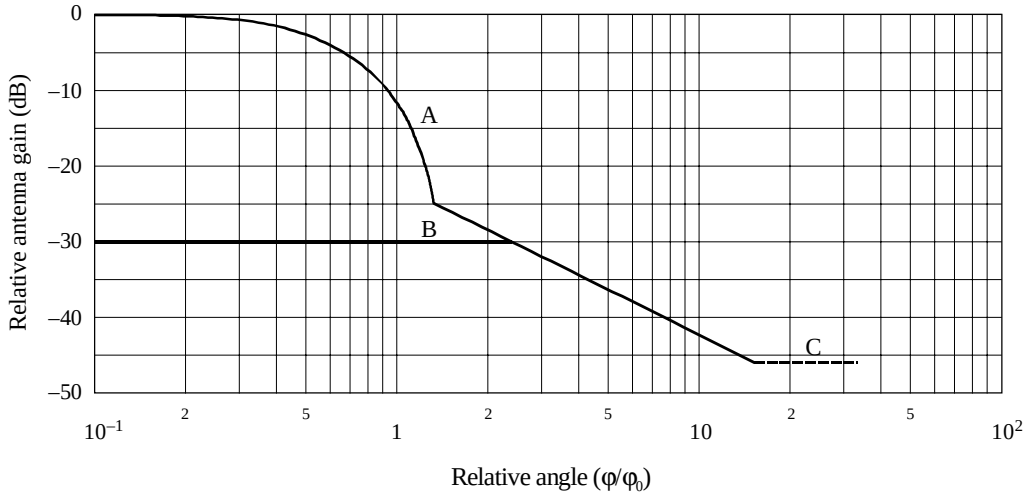
4.6.3 Reference patterns

The reference patterns for the co-polar and cross-polar components of the satellite receiving antenna used in preparing the Plan are given in Fig. 7.

Where it was necessary to reduce interference, the pattern shown in Fig. 8 was used; this use will be indicated in the Plan by an appropriate symbol. This pattern is derived from an antenna producing an elliptical beam with fast roll-off in the main lobe. Three curves for different values of φ_0 are shown as examples.

FIGURE 7

Reference patterns for co-polar and cross-polar components for satellite receiving antenna in Region 2



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Curve A: co-polar component (dB relative to main beam gain)

$-12\ (\varphi/\varphi_0)^2$ for $0 \leq (\varphi/\varphi_0) \leq 1.45$

$-(22 + 20 \log (\varphi/\varphi_0))$ for $(\varphi/\varphi_0) > 1.45$

after intersection with curve C, as curve C

Curve B: cross-polar component (dB relative to main beam gain)

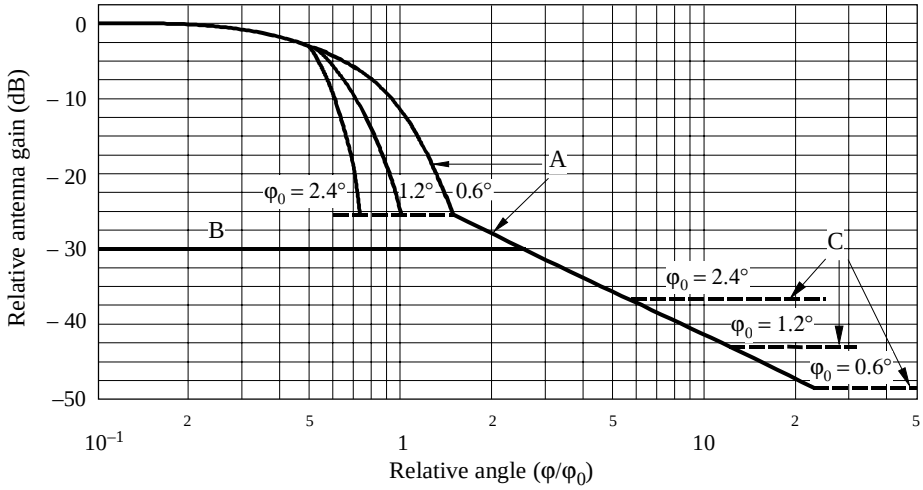
-30 for $0 \leq (\varphi/\varphi_0) \leq 2.51$

after intersection with curve A, as curve A

Curve C: minus the on-axis gain (curve C in this figure illustrates the particular case of an antenna with an on-axis gain of 46 dBi)

FIGURE 8

Reference patterns for co-polar and cross-polar components for satellite receiving antennas with fast roll-off in the main beam for Region 2



APS30A/30AA3-08

Curve A: co-polar component (dB relative to main beam gain)

$$-12\,(\varphi/\varphi_0)^2 \quad \text{for} \quad 0 \le \varphi/\varphi_0 \le 0.5$$

$$-33.33\,\varphi_0^2\,(\varphi/\varphi_0 - x)^2 \quad \text{for} \quad 0.5 < \varphi/\varphi_0 \le \frac{0.87}{\varphi_0} + x$$

$$-25.23 \quad \text{for} \quad \frac{0.87}{\varphi_0} + x < \varphi/\varphi_0 \le 1.413$$

$$-(22 + 20 \log(\varphi/\varphi_0)) \quad \text{for} \quad \varphi/\varphi_0 > 1.413$$

after intersection with curve C, as curve C

Curve B: cross-polar component (dB relative to main beam gain)

$$-30 \quad \text{for} \quad 0 \le \varphi/\varphi_0 < 2.51$$

after intersection with curve A, as curve A

Curve C: minus the on-axis gain (curves A and C represent examples for three antennas having different values of φ_0 as labelled in Fig. 8. The on-axis gains of these antennas are 37, 43 and 49 dBi, respectively).

where:

φ: off-axis angle (degrees)

φ_0: dimension of the minimum ellipse fitted around the feeder-link service area in the direction of interest (degrees)

$$x = 0.5\left(1 - \frac{0.6}{\varphi_0}\right).$$

4.6.4 Pointing accuracy

The deviation of the receiving antenna beam from its nominal pointing direction must not exceed 0.1° in any direction. Moreover, the angular rotation of the receiving beam about its axis must not exceed ±1°; this latter limit is not necessary for beams of circular cross-section using circular polarization.

4.7 System noise temperature

The Plan is based on a value of 1 500 K for the satellite system noise temperature.

4.8 Polarization

4.8.1 In Region 2, for the purpose of planning the feeder links, circular polarization is used.

4.8.2 In the cases where there are polarization constraints, use of polarization other than circular is permitted only upon agreement of administrations that may be affected.

4.9 Automatic gain control

4.9.1 The Plan is based on the use of automatic gain control on board satellites to maintain a constant signal level at the satellite transponder output.

4.9.2 The dynamic range of automatic gain control is limited to 15 dB when satellites are located within 0.4° of each other and operate on cross-polarized adjacent channels serving common or adjacent feeder-link service areas.

4.9.3 The 15 dB limit of automatic gain control does not apply to satellites other than those specified in § 4.9.2 above.

4.10 Power control

The Plan has been developed without the use of power control.

The use of transmit power levels higher than those given in § 4.5 is permitted only when rain attenuation exceeds 5 dB at 17 GHz. In such cases, the transmit power may be increased by the amount that the instantaneous rain attenuation exceeds 5 dB at 17 GHz up to the limit given in Table 5.

TABLE 5

Transmit radio frequency power (delivered to the input of the feeder-link earth station antenna) permitted in excess of 1 000 W as a function of elevation angle

Elevation angle of feeder-link earth station antenna (degrees)	Transmit power permitted in excess of 1 000 W (dB)
0 to 40	0
40 to 50	2
50 to 60	3
60 to 90	5

4.11 Site diversity

Site diversity refers to the alternate use during rain of two or more transmitting earth stations which may be separated by sufficient distance to ensure uncorrelated rainfall conditions.

The use of site diversity is permitted and is considered to be an effective technique for maintaining high carrier-to-noise ratio and carrier-to-interference ratio during periods of moderate to severe rain attenuation. However, the Plan is not based on the use of site diversity.

4.12 Depolarization compensation

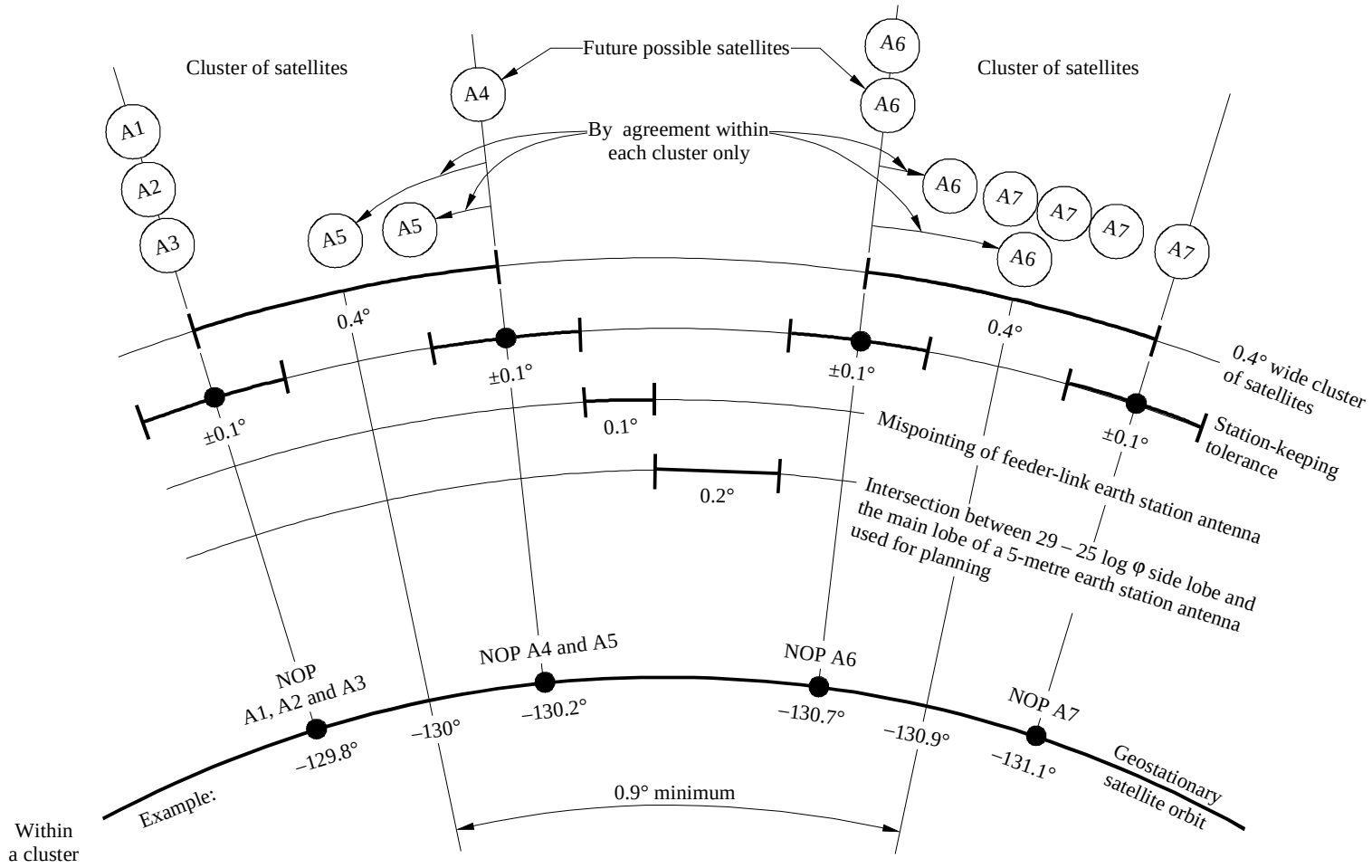
The Plan is developed without the use of depolarization compensation. Depolarization compensation is permitted only to the extent that interference to other satellites does not increase by more than 0.5 dB relative to that calculated in the feeder-link Plan.

4.13 Minimum separation between satellites

Figure 9 illustrates two adjacent clusters of satellites separated by 0.9° between the centres of the clusters. Aη identifies a satellite of administration η. A cluster is formed by two or more satellites separated by 0.4° and located at two nominal orbital positions as specified in the Plan; one position for right-hand polarized channels and the other position for left-hand polarized channels.

FIGURE 9

Exploded view of geostationary satellite orbit



Aη: specific Administration
NOP 1: nominal orbital position, right hand polarization
NOP 2: nominal orbital position, left hand polarization

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4.13.1 Satellites of the same cluster

The Plan is based on an orbital separation of 0.4° between satellites having cross-polarized adjacent channels (i.e. satellites located at $+0.2°$ and $-0.2°$ from the centre of the cluster). However, satellites within a cluster may be located at any orbital position within the cluster, requiring only the agreement of the other administrations having satellites sharing the same cluster. Such orbital positioning of satellites within a cluster is illustrated in Fig. 9 by some of the satellites A5, A6 and A7.

The station-keeping tolerance of $\pm 0.1°$ indicated in § 3.11 of Annex 5 to Appendix **S30** must be applied to satellites located at any position within the 0.4° wide cluster.

4.13.2 Satellites of different clusters

In the Plan, the orbital separation between the centres of adjacent clusters of satellites is at least 0.9°. The value of 0.9° is also the minimum orbital separation to provide flexibility in the implementation of feeder links indicated in § 4.4.1 without the need for an agreement (see § 4.13.1).

ANNEX 4

Criteria for sharing between services

1 Threshold values for determining when coordination is required between transmitting space stations in the fixed-satellite service or the broadcasting-satellite service and a receiving space station in the feeder-link Plans in the frequency bands 17.3-18.1 GHz (Regions 1 and 3) and 17.3-17.8 GHz (Region 2)

With respect to § 7.1, Article 7 of this Appendix, coordination of a transmitting space station in the fixed-satellite service or in the broadcasting-satellite service with a receiving space station in a broadcasting-satellite feeder link in the Regions 1 and 3 Plan or the Region 2 Plan is required, for inter-satellite geocentric angular separations of less than 3° or greater than 150°, when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link station of another administration would cause an increase in the noise temperature of the feeder-link space station which exceeds a threshold value of $\Delta T_S/T_S$ corresponding to 4%. $\Delta T_S/T_S$ is calculated in accordance with Case II of the method given in Appendix **S8**.

The above provision does not apply when the geocentric angular separation between a transmitting space station in the fixed-satellite service or in the broadcasting-satellite service and a receiving space station in the feeder-link Plan, exceeds 150° of arc and the free-space power flux-density of the transmitting space station in the fixed-satellite service does not exceed a value of –137 dB(W/m^2/MHz) on the Earth's surface at the equatorial Earth limb.

2 Not used.

3 Method for the determination of the coordination area around a feeder-link transmitting earth station of the Region 2 and Regions 1 and 3 Plans with respect to receiving earth stations in the fixed-satellite service in the frequency band 17.7-18.1 GHz

3.1 Introduction

In the frequency band 17.7-17.8 GHz in Region 2 and 17.7-18.1 GHz in Regions 1 and 3, which is allocated to the fixed-satellite service, in both the Earth-to-space direction (for broadcasting-satellite service feeder links only), and the space-to-Earth direction, emissions from transmitting feeder-link earth stations might cause interference at receiving earth stations in the fixed-satellite service.

Electromagnetic coupling of an emission originating at a feeder-link earth station into a receiving earth station might occur through two propagation mechanisms or "modes":

Propagation mode (1): coupling along a great circle tropospheric interference horizon path;

Propagation mode (2): coupling through scatter from hydrometeors.

The determination of whether emissions from a feeder-link earth station might cause unacceptable interference in a receiving earth station is by means of coordination contours drawn around a feeder-link earth station on a map. When a receiving earth station is located within either or both coordination contours, i.e., within the coordination area, there is a possibility of unacceptable interference.

The procedure for the determination of the coordination area for a feeder-link earth station in relation to a receiving earth station in the fixed-satellite service is similar to that described in Appendix **S7** but differs from it in the details described below.

3.2 Determination of the coordination contour for propagation mode (1)

The distance at which a signal of power $P_{t'}$ (dBW) applied to the antenna terminals of a feeder-link earth station will produce a received power $P_r(p)$ at the antenna terminals of a receiving earth station, for propagation mode (1), is given by:

$$d_1 = (P_{t'} + G_{t'} + G_r - P_r(p) - A_0 - A_h)/\beta \quad \text{km} \quad (1)$$

as derived from equations (2) and (8) of Appendix **S7**,

where:

$P_{t'}$: maximum RF power (dBW) in any 1 MHz band applied to the antenna terminals of a feeder-link earth station;

$G_{t'}$: gain (dB) of the feeder-link earth station antenna towards the physical horizon on the azimuth to the receiving earth station;

G_r: gain (dB) of the receiving earth station antenna towards the physical horizon on the azimuth to the feeder-link earth station;

$P_r(p)$: permissible interfering RF power (dBW) in any 1 MHz band to be exceeded for no more than p% of the time at the antenna terminals of the receiving earth station;

A_0: constant equal to 145.0 dB;

A_h: sum (dB) of available site shielding at the feeder-link earth station, $A_{ht'}$, and at the receiving earth station, A_{hr}, on the respective azimuth towards the other earth station (both in dB);

β: rate of attenuation along the interference path (dB/km), a function of the radio-climatic zone and of p as used in $P_r(p)$ above.

To determine the coordination contour for propagation mode (1) for a feeder-link earth station, equation (1) is solved for all azimuths around the earth station site (in suitable increments; e.g., every 5°), and the resulting distances plotted for all azimuths on a map of suitable scale from the earth station site. The connection of the so marked distance points constitutes the coordination contour for the feeder-link earth station.

3.3 Determination of parameters used in equation (1)

The parameters used in equation (1) are determined as follows:

3.3.1 Determination of $G_{t'}$ and G_r

The determination of $G_{t'}$ follows the procedure set forth in Annex II to Appendix **S7** using the notified feeder-link earth station antenna pattern.

For the receiving earth station, a minimum main beam elevation angle of 5° is assumed for which the reference antenna radiation diagram of § 4 of Annex II to Appendix **S7** yields, in the absence of site shielding, a horizon antenna gain of $G_r = 14.5$ dB.

3.3.2 Determination of $A_{ht'}$ and A_{hr}

The calculation of $A_{ht'}$ requires the determination of the horizon elevation angle θ (degrees) for all azimuths around a feeder-link earth station site. With these horizon elevation angles and the frequency of $f = 17.75$ GHz, $A_{ht'}$ is then calculated for each azimuth from equation (7a) of Appendix **S7** for $\theta > 0°$, and it should be taken as equal to 0 dB for $\theta < 0°$.

For the fixed-satellite receiving earth station, the assumption must be made that no site shielding is available; hence, $A_{hr} = 0$ dB.

3.3.3 Determination of $P_r(p)$ and p

The maximum permissible interfering RF power in any 1 MHz band is taken, under nominal conditions, to be limited to 15% of the total noise received at an earth station, or about 20% of the thermal noise of the receiving system. This corresponds to a value of –7 dB for the parameter J of Appendix **S7**. For percentages of time of less than 0.003%, a permissible increase in the interference by 5 dB is assumed (parameter $M(p)$ of Appendix **S7**). Considering further that the band 17.7-17.8 GHz is also shared with terrestrial services, the assumption is made that up to three equivalent entries of interference may be present which, however, produce their maximum interference during periods uncorrelated in time, thus allowing each to produce the maximum permissible value of interfering RF power during $p = 0.001\%$ of the time.

Therefore, according to equation (3) of Appendix **S7**:

$$P_r(p) = 10 \log(kTB) - 2 \qquad \text{dB(W/MHz)} \qquad (2)$$

which, with

k: Boltzmann’s constant,

B: 1 MHz, and

T: receiving system noise temperature, assumed to be 200 K

yields:

$$P_r(p) = -147.6 \text{ (dB(W/MHz))},$$

with p = 0.001% of the time.

3.3.4 Determination of β

The rates of attenuation for a percentage of time of 0.001%, for the three radio-climatic zones as defined in § 3.1 of Appendix **S7** at 17.75 GHz, are the following:

Zone A: $\beta_A = 0.198$ dB/km

Zone B: $\beta_B = 0.06$ dB/km

Zone C: $\beta_C = 0.074$ dB/km

3.3.5 Graphical method

Figure 1 provides curves by means of which d_1 may be determined when only a single radio-climatic zone is involved. The three curves shown are for the three radio-climatic zones as defined in Appendix **S7**. The abscissa is given in terms of the parameter P as defined below:

$$P = P_{t'} + G_{t'} + G_r - P_r(p) - A_0 - A_h \quad \text{dB}$$

3.4 Mixed zone contours

When the solution of equation (1) yields a distance d_1, which, on the azimuth under consideration, produces a point which lies in a different radio-climatic zone from that in which the feeder-link earth station is located, it is necessary to determine a mixed-zone coordination distance for that azimuth. Thus, if the feeder-link earth station is located in a radio-climatic zone identified by the suffix "*a*" and the solution of equation (1) produces a distance which ends in another radio-climatic zone, identified by the suffix "*b*" (*a* and *b* referring to any one of the zones A, B or C, with $a \neq b$), the coordination distance is calculated from:

$$d_1 = \frac{P - d_a \beta_a}{\beta_b} + d_a \quad \text{km} \tag{3}$$

where d_a is the distance (km) from the feeder-link earth station site to the boundary between the two climatic zones.

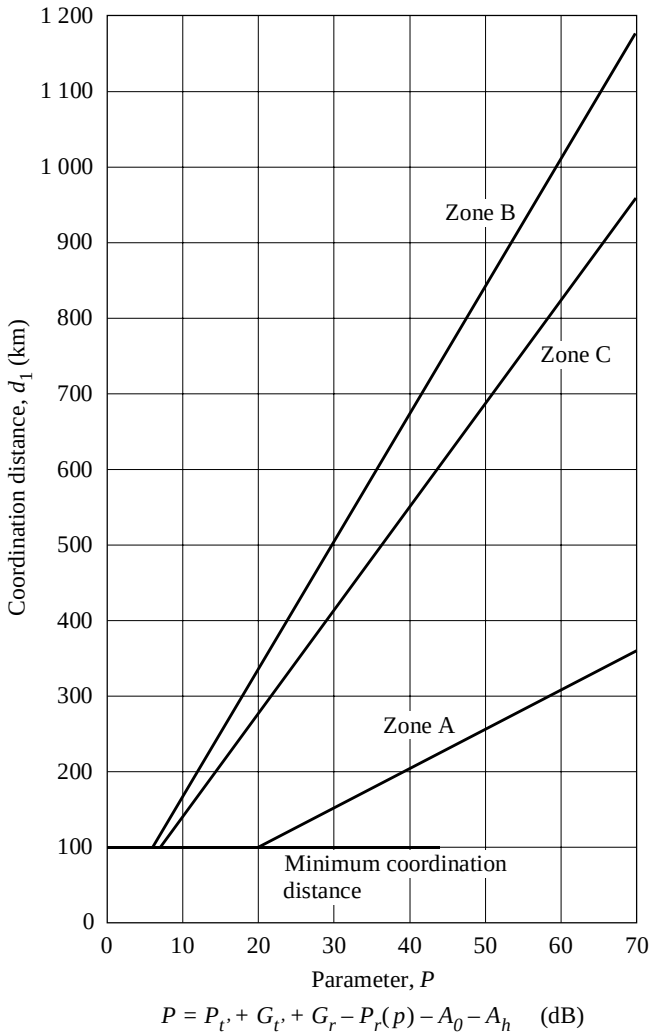
For the rare case where more than two radio-climatic zones are involved, the applicable equation would be:

$$d_1 = \frac{P - d_a \beta_a - d_b \beta_b}{\beta_c} + d_a + d_b \quad \text{km} \tag{4}$$

where the subscript "*c*" denotes the zone farthest away from the feeder-link earth station site within which the coordination distance ends.

FIGURE 1

Coordination distance as a function of parameter *P*; propagation mode (1); 17.75 GHz; *p* = 0.001% of the time



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3.5 Determination of the coordination contour for propagation mode (2)

In the case of scattering from hydrometeors, the high main beam e.i.r.p. from a transmitting feeder-link earth station antenna and the expected high sensitivity of a fixed-satellite service receiving earth station suggest that interference from a feeder-link earth station into a fixed-satellite earth station may be unacceptable only when either earth station can see the main beam of the other, below the maximum altitudes from which significant hydrometeor scatter reflectivity prevails.

Accordingly, to avoid such mutual visibility conditions, the rain scatter distance d_r is to be that distance at which the receiving earth station's horizon intersects the maximum expected rain scatter altitude h_S[29] .

3.5.1 Rain scatter distance d_r

For an assumed horizon elevation angle of zero degree at the fixed-satellite receiving earth station, d_r is given by:

$$d_r = 130\sqrt{h_s} \qquad \text{km} \tag{5}$$

in a 4/3 earth radius reference atmosphere, with

$$h_s = 5.1 - 2.15 \log\left(1 + 10^{(\varphi - 27)/25}\right) \qquad \text{km} \tag{6}$$

where φ is the latitude (North or South) of the feeder-link earth station site (degrees).

The rain scatter distance d_r so calculated yields the rain scatter coordination contour for the feeder-link earth station by the procedure described in § 4.5 of Appendix **S7**.

3.5.2 Graphical method

Figure 2 provides a curve by means of which the rain scatter distance d_r may be read directly for a given feeder-link earth station latitude ζ.

3.6 Minimum coordination distance

The minimum coordination distance for a feeder-link earth station shall be 100 km.

3.7 Coordination area

The coordination area for a feeder-link earth station is the total area contained within the combined coordination contours for propagation modes (1) and (2).

3.8 In the case of Regions 1 and 3, the e.i.r.p. to be taken into account is derived by adding the values specified in columns 13 and 14 of the Plan.

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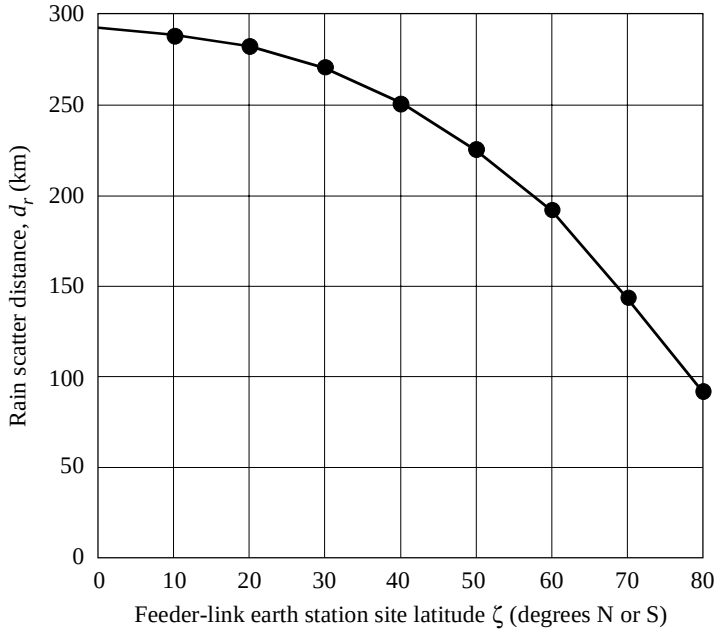
[29] The maximum scatter height h_s is similar to the maximum rain height h_R of § 2.4.2 of Annex 5, Appendix **S30**, used in the calculation of effective path-length for the determination of rain attenuation, except that the factor "*c*" of § 2.4.2 of Annex 5, Appendix **S30**, is omitted.

FIGURE 2

Rain scatter distance d_r as a function of feeder-link earth station site latitude ζ



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APPENDIX S30B

Provisions and associated Plan for the fixed-satellite service in the frequency bands 4 500-4 800 MHz, 6 725-7 025 MHz, 10.70-10.95 GHz, 11.20-11.45 GHz and 12.75-13.25 GHz

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ARTICLE 1

Objective of the provisions and associated Plan

1.1 The objective of the procedures prescribed in this Appendix is to guarantee in practice, for all countries, equitable access to the geostationary-satellite orbit in the frequency bands of the fixed-satellite service covered by this Appendix.

1.2 The procedures prescribed in this Appendix shall in no way prevent the implementation of assignments in conformity with Part A of the Plan.

ARTICLE 2

Definitions

2.1 *Conference:* World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, First Session, Geneva, 1985; Second Session, Geneva, 1988.

2.2 *Plan:* The Plan for the fixed-satellite service in the frequency bands contained in this Appendix, consisting of two parts:

a) Part A, containing the national allotments;

b) Part B, containing the networks of existing systems.

2.3 *Allotment:* For the purpose of this Appendix, an allotment comprises:

– a nominal orbital position;

– a bandwidth of 800 MHz (up-link and down-link) in the frequency bands listed in Article 3 of this Appendix;

– a service area for national coverage;

– generalized parameters as defined in Annex 1 to this Appendix;

– a predetermined arc (PDA).

2.4 *Existing systems:* Those satellite systems, in the frequency bands covered by this Appendix:

a) which are recorded in the Master International Frequency Register (MIFR); *or*

b) for which the coordination procedure has been initiated; *or*

c) for which the information relating to advance publication was received by the Bureau before 8 August 1985,

and which in all cases are listed in Part B of the Plan.

2.5 *Subregional systems:* For the purpose of the application of the provisions of this Appendix, a subregional system is a satellite system created by agreement among neighbouring countries Member States ‡ of the ITU or their authorized telecommunications operating agencies

and intended to provide domestic or subregional services within the geographical areas of the countries concerned.

2.6 *Additional use:* For the application of the provisions of this Appendix, additional uses shall be those of an administration:

a) which has a requirement whose characteristics differ from those used in the preparation of Part A of the Plan; any such requirement shall be limited to the national coverage, taking into account technical constraints, of the administration concerned, unless otherwise agreed. Additionally, such requirement can be met only if the allotment of the interested administration, or part of this allotment, has been converted into an assignment, or if the requirement cannot be met by the conversion of the allotment into an assignment;

b) which requires the use of all or part of its national allotment that has been suspended in accordance with § 6.54 of Article 6;

c) which intends to participate in a subregional system using the procedures of Section III of Article 6, instead of using the procedures of Section II thereof.

ARTICLE 3

Frequency bands

3.1 The provisions of this Appendix shall apply to the fixed-satellite service in the frequency bands between:

– 4 500 and 4 800 MHz (space-to-Earth);

– 6 725 and 7 025 MHz (Earth-to-space);

– 10.70 and 10.95 GHz (space-to-Earth);

– 11.20 and 11.45 GHz (space-to-Earth);

– 12.75 and 13.25 GHz (Earth-to-space).

ARTICLE 4

Execution of the provisions and associated Plan

4.1 The Member States ‡ of the Union shall adopt, for their fixed-satellite service stations operating in the frequency bands referred to in this Appendix, the characteristics consistent with those specified in the Plan and its associated provisions.

4.2 The Member States ‡ of the Union shall not change the characteristics, or bring into use assignments to fixed-satellite service stations, or stations in the other services to which these frequency bands are allocated, except as provided for in the Radio Regulations and the appropriate articles and annexes of this Appendix.

ARTICLE 5

The Plan and the associated List of assignments

5.1 The Plan consists of:

a) Part A containing the allotments;

b) Part B containing the networks of existing systems.

5.2 A List of assignments as described in § 5.5 will be associated with the Plan.

5.3 The predetermined arc (PDA) is a segment of the geostationary- satellite orbit (GSO) about a nominal orbital position intended to provide flexibility in the Plan.

a) The size of the PDA depends on the stage of development of the satellite system:

– for a system in the *pre-design stage*, the PDA is the fixed portion of the GSO defined by the intersection between a segment of ±10° about the nominal orbital position established at the Conference and the corresponding service arc. After twenty years from the date of entry into force of this Appendix, the PDA for a system in the pre-design stage is the fixed portion of the GSO defined by the intersection between a segment of ±20° about the nominal orbital position established at the Conference and the corresponding service arc, provided that the minimum elevation angle after the application of this procedure is not less than 20° or than the value indicated for each climatic zone in Annex 1 to this Appendix, whichever is larger, for all allotments affected;

– for a system in the *design stage*, the PDA is the fixed portion of the GSO defined by the intersection between a segment of ±5° about the nominal orbital position as may be modified by the application of this Appendix and the PDA defined for the pre-design stage;

– for a system in the *operational stage*, the PDA will be considered as being zero.

b) The stage of development to be associated with allotments in Part A and assignments in the List derived from allotments in Part A, with existing systems in Part B, with subregional systems or additional uses, is given in Table 1.

c) An administration will not be considered to be affected if the nominal orbital position associated with its allotment in the Plan or with its assignments in the List is moved within the corresponding PDA while keeping an aggregate $C/I \geq 26$ dB.

5.4 The PDA concept may be applied only:

– to provide an allotment to a new Member State ‡ of the ITU;

– in the process of conversion of an allotment into an assignment;

– to accommodate a subregional system;

– to resolve incompatibilities with existing systems (except for the implementation of additional uses);

– to resolve incompatibilities with the assignments in the List (except for the implementation of additional uses).

TABLE 1

Stage of development	**Part A allotments, subregional systems or additional uses**	**Part B**
Pre-design	Part A allotments	–
Design	Assignments for which the Bureau has received complete information under § 6.2 of Section I or § 6.43 of Section II of Article 6	Networks for which the Bureau has received complete information to start the application of Section I of Article **S9** of the Radio Regulations
Operational	Assignments for which the Bureau has received complete information under § 6.58 of Section III of Article 6 or for notification under Article 8	Networks for which the Bureau has received complete information, in order to start the application of Section II of Article **S9** or for notification under Article **S11** of the Radio Regulations

5.5 The List of Assignments to be associated with the Plan will contain:

a) assignments derived from allotments in Part A of the Plan;

b) assignments relating to existing systems in Part B of the Plan;

c) assignments resulting from the introduction of subregional systems;

d) assignments relating to additional uses.

5.6 Whenever a new assignment is entered in this List, the Bureau shall inform administrations in its weekly circular, indicating the characteristics of the assignment concerned.

ARTICLE 6

Procedures for implementation of the Plan and regulation of the fixed-satellite service in the planned bands

Section I – Procedure for conversion of an allotment into an assignment

6.1 When an administration intends to convert an allotment into an assignment employing all or part of its allotment in Part A of the Plan, it shall, not earlier than five years and not later than one year before the planned date of bringing the network into use, send to the Bureau the information specified in Annex 2.

6.2 Upon receipt of a complete notice of a frequency assignment related to that allotment, the Bureau shall examine it with respect to its conformity with Part A of the Plan.

6.3 A notice of an assignment is considered to be in conformity with Part A of the Plan if:

a) the service area is not greater than the service area in Part A of the Plan;

b) it meets the criteria of Annex 3A;

c) the orbital position corresponds to the nominal orbital position in the Plan.

6.4 A notice shall be returned to the notifying administration whenever the service area is not within a geographical area for which the notifying administration is responsible.

6.5 When the Bureau finds that the proposed assignment is in conformity with § 6.3, the Bureau shall apply the provisions of Annex 3B (Macrosegmentation Concept).

6.6 When Annex 3B has been applied successfully and the Bureau has found that the proposed assignment is compatible with Part B of the Plan in accordance with Annex 4, the Bureau shall record the assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

6.7 When the Bureau finds that the proposed assignment is in conformity with Part A of the Plan after examination using Annexes 3A and 3B but it is incompatible with Part B of the Plan, the provisions of § 6.10 shall apply.

6.8 If a notice is not in conformity with Part A of the Plan, the provisions in Section IA shall apply.

6.9 If under § 6.5 after the application of Annex 3B coordination is required, then the provisions of Section IA beginning at § 6.18 shall apply.

6.10 For the purpose of resolving the incompatibilities mentioned in § 6.7:

a) an administration responsible for an existing system or an additional use shall, depending on the stage of development of its system, take all technically and operationally possible measures to remove incompatibilities at the pre-design, design and operational stages in order to accommodate the requirements of the administration seeking to convert its allotment into an assignment;

b) an administration whose allotment is being converted into an assignment shall assist in the resolution of incompatibilities;

c) both administrations, with the assistance of the Bureau if requested, shall cooperate in reaching an equitable agreement, taking into account the respective stages of development of their systems and recognizing that a means must be found to convert the allotment into an assignment which is acceptable to both parties.

6.11 After resolution of any incompatibilities through the application of § 6.10, the Bureau shall record the assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

Section IA – Procedure for conversion of an allotment into an assignment that is not in conformity with Part A of the Plan or that does not comply with Annex 3B

6.12 The Bureau shall use this section to determine if the proposed assignment affects:

a) the allotments in the Plan;

b) the assignments which appear in the List;

c) the assignments with respect to which the Bureau has previously received information in accordance with this article.

6.13 If the proposed assignment is not in conformity with Annex 3A, the Bureau shall return the notice to the notifying administration indicating that it may take the following action:

a) modify the characteristics of its proposed assignment in order to ensure its compatibility; *or*

b) select an alternative orbital position, preferably within its PDA; *or*

c) request the assistance of the Bureau in either course of action.

6.14 After the notice is returned to the administration following the application of § 6.13, the administration may resubmit the notice and the Bureau shall apply again the provisions starting at § 6.2, with the exception of § 6.3 *c)* which is not applicable.

6.15 When the Bureau is requested to assist in the selection of an alternative orbital position for the proposed assignment, it shall endeavour to identify an orbital position which would ensure compatibility with the allotments in the Plan and the assignments in the List and shall communicate the results to the notifying administration.

6.16 If it is not possible to solve the problem mentioned in § 6.13 after having considered the possibility of finding an alternative orbital position, the concept of PDA (Annex 5) shall be used by the notifying administration or by the Bureau, if its assistance is requested.

6.17 When § 6.16 has been applied successfully, the provisions of § 6.5 of Section I shall be applied.

6.18 If the provisions of Annex 3B are not met, the Bureau shall then identify affected administrations having assignments in the List by using the criteria of Annex 4.

6.19 If no administrations are affected under § 6.18, the Bureau shall record the assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

6.20 If administrations are affected under § 6.18, the administration responsible for the proposed assignment shall seek the agreement of the affected administrations using the techniques described in Annex 6.

6.21 When agreement is reached, the administration responsible shall advise the Bureau which shall modify the orbital position and PDA in the Plan, if necessary, and shall record the

assignment in the List with a special symbol. The administration shall then notify the assignment in accordance with Article 8.

6.22 The special symbol referred to in § 6.21 shall represent an undertaking by the administration responsible for the proposed assignment that it will accommodate, if necessary, future conforming assignments made under § 6.6.

6.23 When no agreement is reached under § 6.20, the notice shall be returned.

Section IB – Procedure for recording in the List of the existing systems contained in Part B of the Plan

6.24 The Bureau shall use the method of Annex 4 to determine whether the proposed assignment affects:

a) the allotments in Part A;

b) the existing systems in Part B[2];

c) the assignments which appear in the List;

d) the assignments with respect to which the Bureau has previously received information in accordance with this Article.

6.25 Assignments for networks contained in Part B of the Plan for which notices for recording in the Master Register were received by the Bureau prior to 29 August 1988 and recorded subsequently in the MIFR will be entered in the List. However, for notices received after 29 August 1988, the assignments will be entered in the List if the notified characteristics are identical to those contained in Part B of the Plan.

6.26 If, under § 6.24, no allotments or assignments are affected, the Bureau shall publish the results of its calculations in a special section of the weekly circular and shall enter the proposed assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

6.27 If, under § 6.24, allotments or assignments are affected[3], the Bureau shall return the notice to the notifying administration indicating that it may take the following action:

a) modify the characteristics of its proposed assignment in order to ensure its compatibility; *or*

b) select an alternative orbital position and proceed in accordance with § 6.24; *or*

c) request the assistance of the Bureau in either course of action.

6.28 After the notice is returned to the administration following application of § 6.24, the administration may resubmit the notice and the Bureau shall apply again § 6.24 to § 6.27.

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[2] Administrations with networks in Part B shall continue to apply the provisions of Section II of Article **S9** with respect to other networks listed in Part B.

[3] Incompatibility between assignments in Part B shall be disregarded whenever an agreement under the provisions of Section II of Article **S9** was obtained.

6.29 For existing systems in Part B of the Plan the provisions of Nos. **S11.44** and **S11.48** of the Radio Regulations shall be applied.

6.30 When the Bureau is requested to assist in the selection of an alternative orbital position for the proposed assignment, it shall endeavour to identify an orbital position which would ensure compatibility with the allotments in the Plan and the assignments in the List and shall communicate the results to the notifying administration.

6.31 If it is not possible to solve the problem of incompatibility mentioned in § 6.27 after having considered the possibility of finding an alternative orbital position, the concept of PDA shall be used (see § 5.3 of Article 5) by the notifying administration or by the Bureau, if its assistance is requested.

6.32 If § 6.31 has been successfully applied, the Bureau shall use the method of Annex 4 as in § 6.24.

6.33 If § 6.31 and § 6.32 have been successfully applied, the Bureau shall publish the results of its calculations and the modified orbital positions in a special section of the weekly circular.

6.34 If, within sixty days of the weekly circular mentioned in § 6.33 the Bureau receives no comments, it shall be deemed that there are no objections to the proposed relocations and the Bureau shall record the assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

6.35 Comments under § 6.34, if any, shall be limited to the case of an administration believing that the agreed protection criteria have not been met or to the case in which the administration envisages problems in recoordinating any satellite network under consideration. If such comments are received the Bureau shall initiate the appropriate action to resolve the problem.

6.36 In the event of an unsuccessful application of § 6.31 and § 6.32, the provisions of § 6.37 shall apply (with respect to incompatibilities with allotments and assignments derived from allotments).

6.37 If it is necessary for the purpose of resolving the incompatibilities mentioned in § 6.32:

a) the administration responsible for an existing system shall, depending on the stage of development of its system, take all technically and operationally possible measures to remove incompatibilities;

b) an administration whose allotment or assignment is being affected shall assist in the resolution of incompatibilities;

c) both administrations, with the assistance of the Bureau if requested, shall cooperate in reaching an equitable agreement, taking into account the respective stages of development of their systems.

Section II – Procedure for the introduction of a subregional system

6.38 When a group of administrations intends to bring into use a subregional system it shall select one or more orbital positions for the system, preferably from the national allotments concerned, and send details of the assignment of the proposed network to the Bureau, not earlier than five years and not later than one year before the planned date of bringing into use. For this purpose, the administrations shall designate one among them to act on their behalf in the application of the provisions of this Appendix. The selected administration shall be known as the notifying administration.

6.39 All or part of the national allotments used by the subregional system shall be suspended for the period of operation of this subregional system unless it can be used in a way that does not affect allotments in the Plan or assignments made in accordance with the procedures associated with the Plan.

6.40 Suspended national allotments (see § 6.39) shall continue to enjoy the same protection as that afforded to other allotments in the Plan which are not suspended, for use in the event of cessation of the subregional system.

6.41 When determining which administrations are affected by subregional systems, the mutual interference between the subregional system and its members' suspended national allotments shall not be taken into account for the period of the life of the subregional system.

6.42 In determining which administrations are affected, the interference caused by either the subregional system or the suspended allotments as specified in § 6.39 shall be taken into account, but not both at the same time in view of their respective implementation schedules.

6.43 Upon receipt of a complete (Annex 2) notice relating to the proposed assignment, the Bureau shall use the method of Annex 4 to determine whether the proposed assignment affects:

a) the allotments in the Plan;

b) the assignments which appear in the List;

c) the assignments for which the Bureau has previously received complete information in accordance with this Article.

6.44 In the event of a favourable finding with regard to compatibility, the Bureau shall enter the proposed assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

6.45 In the event of an unfavourable finding with regard to compatibility, the Bureau shall return the notice to the notifying administration, indicating that it may take the following action:

a) modify the characteristics of its proposed assignment in order to ensure its compatibility; *or*

b) select an alternative orbital position and proceed in accordance with § 6.38; *or*

c) request the assistance of the Bureau in either course of action.

6.46 After the notice is returned to the administration following application of § 6.43, the administration may resubmit the notice and the Bureau shall apply again § 6.43 to § 6.45.

6.47 When the Bureau is requested to assist in the selection of an alternative orbital position for the proposed assignment, it shall endeavour to identify an orbital position which would ensure compatibility with the allotments in the Plan and the assignments in the List and shall communicate the results to the notifying administration.

6.48 If it is not possible to solve the problem of incompatibility mentioned in § 6.45 after having considered the possibility of finding an alternative orbital position, the concept of PDA shall be used (see § 5.3 of Article 5) by the notifying administration or by the Bureau, if its assistance is requested.

6.49 In the event of a successful application of § 6.48, the Bureau shall publish the result of its calculations and the modified orbital locations in a special section of the weekly circular.

6.50 If, within sixty days from the date of the weekly circular mentioned in § 6.49, the Bureau receives no comments, it shall be deemed that there are no objections to the proposed solution and the proposed assignment shall be recorded in the List. The administration shall then notify the assignment in accordance with Article 8. Comments, if any, shall be limited to the case of an administration believing that the agreed protection criteria have not been met. If it receives such comments, the Bureau shall initiate the appropriate action to resolve the matter.

6.51 In the event of an unsuccessful application of § 6.48, § 6.49 and § 6.50, the Bureau shall return the notice to the notifying administration.

6.52 If an administration withdraws from a subregional system, it shall inform the Bureau. The Bureau shall take account of this withdrawal when applying the provisions relating to the compatibility of new assignments.

6.53 If an administration which has withdrawn from a subregional system wishes to implement a national system, and is unable to satisfy the condition of § 6.39 for the use of all or part of its allotment, it may proceed under the provisions of Section III of this Article relating to additional uses for the allotment or part of the allotment, as appropriate.

6.54 When a subregional system is terminated by the participating administrations, the notifying administration shall inform the Bureau as early as possible and the Bureau shall:

a) publish this information in a special section of its weekly circular;

b) cancel all frequency assignments in the List relating to that system;

c) modify Part A of the Plan to indicate that the corresponding national allotments are no longer suspended.

Section III – Supplementary provisions applicable to additional uses in the planned bands

6.55 These bands are used for the fixed-satellite service Plan and their use in accordance with this section should be avoided if possible. Administrations are urged to use other available bands.

6.56 An administration, or one acting on behalf of a group of administrations, may apply the procedure of this Section for an additional use as defined in Article 2, provided that the proposed assignments have a maximum period of validity of 15 years and will not, except if agreed to by the administrations affected, require any displacement of the orbital position of an allotment in Part A of the Plan or the orbital position of an assignment in the List, nor be incompatible with:

a) the allotments in the Plan;

b) the assignments in the List;

c) the assignments for which the Bureau has previously received information in accordance with this Article.

6.57 For this purpose it shall, not earlier than five years and not later than one year before the planned date of bringing the related assignment into use, send the information specified in Annex 2 to the Bureau.

6.58 Upon receipt of a complete notice, the Bureau shall examine it to ensure its compliance with § 6.56 and in the event of non-compliance the notice shall be returned to the notifying administration.

6.59 If the Bureau finds that the notice complies with the provisions of § 6.56 it shall enter the assignment in the List. The administration shall then notify the assignment in accordance with Article 8.

6.60 The provisions of this section shall not be applied before one year from the date of entry into force of this Plan.

ARTICLE 7

Procedure for the addition of a new allotment to the Plan for a new Member State ‡ of the Union

7.1 The administration of a country which has joined the Union as a new Member State ‡ shall obtain a national allotment in Part A of the Plan by the following procedure.

7.2 The administration shall submit its request for an allotment to the Bureau, with the following information:

a) the geographical coordinates of not more than 10 test points for determining the minimal ellipse to cover its national territory;

b) the height above sea level of each of its test points and the rain zone or zones;

c) any special requirement, other than a fixed orbital position, which is to be taken into account to the extent practicable.

7.3 Upon receipt of the complete information (mentioned in § 7.2 above), the Bureau shall find an appropriate orbital position, if necessary using the PDA concept, and shall enter the national allotment of the new Member State ‡ of the Union in Part A of the Plan.

7.4 For this purpose the Bureau shall consult, and if necessary seek the agreement of, any administrations that may be affected.

ARTICLE 8

Procedure for notification and recording in the Master Register of assignments in the planned bands for the fixed-satellite service

8.1 Any assignment for which the relevant procedure of Article 6 has been successfully applied shall be notified to the Bureau in accordance with Article **S11** of the Radio Regulations.

8.2 Upon reception by the Bureau of a complete notice under Article **S11**, a PDA of zero degrees (operational stage) shall be associated with this assignment.

8.3 Such an assignment shall not be subject to the procedures for advance publication and coordination contained in Sections I and II of Article **S9** of the Radio Regulations[4]. Consequently, the provisions of Article **S11** of the Radio Regulations shall continue to be applicable except with regard to No. **S11.32** and related provisions.

8.4 No provision of this Appendix shall be considered as modifying the requirements of Article **S9** of the Radio Regulations relating to coordination between the fixed-satellite service and stations of terrestrial services sharing the planned bands on an equal primary basis.

ARTICLE 9

General provisions

9.1 Part A of the Plan is limited to national systems providing a domestic service. Administrations may, however, in accordance with the provisions of Section II of Article 6, use all or part of their allotments to form a subregional system.

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[4] For existing systems in Part B of the Plan, see Section IB of Article 6.

9.2 The existing systems listed in Part B of the Plan may continue in operation for a maximum period of 20 years from the date of entry into force of this Appendix.

ARTICLE 10

Plan for the fixed-satellite service in the frequency bands 4 500-4 800 MHz, 6 725-7 025 MHz, 10.70-10.95 GHz, 11.20-11.45 GHz and 12.75-13.25 GHz [5]

A.1 COLUMN HEADINGS OF PART A OF THE PLAN

Col. 1 *Beam identification* (Column 1 contains the symbol designating the country or the geographical area taken from Table B1 of the Preface to the International Frequency List)

Col. 2 *Nominal orbital position*, in degrees and tenths of a degree

Col. 3 *Service arc* (western and eastern limits in degrees and tenths of a degree)[6]

Col. 4 *Predetermined arc* (western and eastern limits in degrees and tenths of a degree)

Col. 5 *Longitude of the boresight*, in degrees and tenths of a degree

Col. 6 *Latitude of the boresight*, in degrees and tenths of a degree

Col. 7 *Major axis of the elliptical cross-section half-power beam*, in degrees and tenths of a degree

Col. 8 *Minor axis of the elliptical cross-section half-power beam*, in degrees and tenths of a degree

Col. 9 *Orientation of the ellipse* determined as follows: in a plane normal to the beam axis, the direction of the major axis of the ellipse is defined by the angle measured anticlockwise from a line parallel to the equatorial plane to the major axis of the ellipse, to the nearest degree

Col. 10 Earth station *e.i.r.p.* density (dB(W/Hz))[7]

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[5] The Plan has been prepared with a view to assuring for each allotment an aggregate C/I ratio of at least 26 dB.

[6] The service arc indicated in column 3 of Part A of the Plan represents that segment of the GSO which is common to all individual service arcs of each test point for its minimum elevation angle as given in Annex 1, § 1.3 of this Appendix.

[7] The A, B, C, D parameters associated with these columns were published in ex-IFRB Circular-letter No. 827 of 2 July 1990.

Col. 11 Satellite *e.i.r.p.* density (dB(W/Hz))[7]

Col. 12 *Remarks*

A.2 TEXT FOR SYMBOLS IN REMARKS COLUMN OF THE PLAN

1 Fast roll-off space station transmitting and receiving antenna.

2 This allotment will use an earth station receiving and transmitting antenna side-lobe pattern that will conform to $29 - 25 \log \theta$.

3 This allotment will use an earth station receiving antenna side-lobe pattern that will conform to $29 - 25 \log \theta$.

4 The Administration of Luxembourg (LUX) agreed to protect the national allotment SYR0000 (SYR) to a single entry (C/I) ratio of 30 dB against the interference from the beam LUXGDL62.

5 Owing to the mountainous areas within the country, the minimum elevation angle shall not be reduced below 20° when applying the predetermined arc concept.

NOTE BY THE SECRETARIAT *(applicable when an asterisk (*) appears in column 12)* – It is to be noted that this beam is intended to be implemented as part of a multi-beam network, operating from a single orbital location. Within any multi-beam network, the beams are the responsibility of a single administration, hence interference between them has not been taken into account during the Conference. The number which appears in the alphanumeric code that follows the asterisk serves to identify the multi-beam network concerned.

[7] The A, B, C, D parameters associated with these columns were published in ex-IFRB Circular-letter No. 827 of 2 July 1990.

4 500-4 800 MHz, 6 725-7 025 MHz

1	2	3		4		5	6	7	8	9	10	11	12
ABW00000	−98.2	−119.4	−18.9	−108.2	−88.2	−69.1	12.4	1.6	1.6	90.0	−7.5	−41.4	
ADL00000	113.0	113.0	114.3	113.0	114.3	140.0	−66.7	1.6	1.6	90.0	−7.5	−41.3	*/MB1
AFG00000	48.0	42.3	95.8	42.3	58.0	66.4	33.9	2.2	1.6	15.0	−7.5	−39.4	
AFS00000	71.0	−25.8	84.2	61.0	81.0	27.2	−30.1	5.3	1.6	128.0	−5.7	−38.6	
AGL00000	−36.1	−37.2	74.1	−37.2	−26.1	15.9	−12.4	2.4	1.6	78.0	−7.5	−39.1	
ALB00000	2.6	−29.9	69.8	−7.4	12.6	20.0	41.1	1.6	1.6	90.0	−7.5	−41.4	
ALG00000	−33.5	−33.5	38.4	−33.5	−23.5	1.6	27.8	3.3	2.2	133.0	−6.5	−38.9	
ALS00000	−159.0	−169.8	−158.2	−169.0	−158.2	−158.6	57.5	6.3	1.6	1.0	−5.8	−38.8	*/MB2
AND00000	−41.0	−48.6	51.7	−48.6	−31.0	1.5	42.5	1.6	1.6	90.0	−7.5	−41.4	
ARG00000	−51.0	−58.4	−51.0	−58.4	−51.0	−62.0	−33.6	4.8	2.9	93.0	−0.4	−38.1	*/MB3
ARGINSUL	−51.0	−58.4	−51.0	−58.4	−51.0	−60.0	−57.5	3.6	1.6	154.0	−7.5	−38.5	*/MB3
ARS00000	52.0	20.1	60.0	42.0	60.0	45.7	23.1	3.7	2.6	153.0	−6.6	−39.3	
ASCSTHTC	−37.1	−38.5	−27.1	−38.5	−27.1	−11.8	−19.6	5.6	1.8	77.0	−5.9	−39.0	*/MB4
ATG00000	−77.7	−112.2	−11.4	−87.7	−67.7	−61.8	17.0	1.6	1.6	90.0	−7.5	−41.8	
ATN00000	−5.2	−50.1	1.9	−15.2	1.9	−65.6	15.1	1.6	1.6	90.0	−7.5	−38.9	*/MB5
AUS00001	144.1	122.4	148.1	134.1	148.1	134.3	−24.5	6.6	5.3	146.0	4.0	−38.2	*/MB6
AUS00002	144.1	122.4	148.1	134.1	148.1	163.6	−30.5	1.6	1.6	90.0	−7.5	−39.5	*/MB6
AUS00003	144.1	122.4	148.1	134.1	148.1	101.5	−11.1	1.6	1.6	90.0	−7.5	−40.5	*/MB6
AUS00004	144.1	122.4	148.1	134.1	148.1	159.0	−54.5	1.6	1.6	90.0	−7.5	−41.6	*/MB6
AUS00005	144.1	122.4	148.1	134.1	148.1	110.4	−66.3	1.6	1.6	90.0	−7.5	−41.3	*/MB6
AUT00000	−2.6	−18.6	46.4	−12.6	7.4	13.2	47.5	1.6	1.6	90.0	−7.5	−40.8	2
AZR00000	−7.9	−41.9	6.7	−17.9	2.1	−28.0	38.7	1.6	1.6	90.0	−7.5	−41.1	*/MB7
B 00001	−65.0	−70.0	−60.1	−70.0	−60.1	−62.6	−6.0	4.1	4.0	43.0	−0.4	−38.7	
B 00002	−61.1	−70.0	−60.1	−70.0	−60.1	−45.4	−6.3	4.6	4.1	152.0	0.2	−38.6	
B 00003	−68.7	−70.0	−60.1	−70.0	−60.1	−50.0	−20.9	4.3	3.0	60.0	−1.3	−38.5	
BAH00000	−74.3	−121.1	−32.2	−84.3	−64.3	−75.8	24.0	1.6	1.6	133.0	−7.5	−39.4	
BDI00000	−2.2	−30.5	90.4	−12.2	7.8	29.9	−3.4	1.6	1.6	90.0	−7.5	−41.6	
BEL00000	52.7	−53.6	62.0	42.7	62.0	5.2	50.6	1.6	1.6	90.0	−7.5	−41.2	
BEN00000	−30.6	−40.2	44.7	−40.2	−20.6	2.3	9.3	1.6	1.6	90.0	−7.5	−39.9	
BERCAYMS	−37.1	−38.5	−27.1	−38.5	−27.1	−68.6	22.5	3.7	2.3	41.0	−3.5	−38.2	*/MB4
BFA00000	10.2	−54.6	46.2	0.2	20.2	−1.4	12.2	1.7	1.6	24.0	−7.5	−39.5	
BGD00000	133.0	44.6	135.5	123.0	135.5	90.2	24.0	1.6	1.6	90.0	−7.5	−40.3	
BHR00000	20.4	−18.6	119.8	10.4	30.4	50.6	26.1	1.6	1.6	90.0	−7.5	−41.9	
BLZ00000	−90.8	−138.4	−38.7	−100.8	−80.8	−88.6	17.2	1.6	1.6	90.0	−7.5	−41.6	
BOL00000	−35.0	−97.3	−23.2	−45.0	−25.0	−64.4	−17.1	2.7	1.7	129.0	−5.4	−38.6	
BOT00000	19.9	−41.7	89.9	9.9	29.9	24.0	−21.8	1.6	1.6	90.0	−7.5	−40.0	
BRB00000	−29.8	−110.8	−8.4	−39.8	−19.8	−59.6	13.2	1.6	1.6	90.0	−7.5	−41.6	
BRM00000	110.8	57.6	131.0	100.8	120.8	97.0	18.9	3.2	1.6	88.0	−5.1	−38.7	
BRU00000	157.3	71.5	157.7	147.3	157.7	114.6	4.5	1.6	1.6	90.0	−7.5	−40.9	
BTN00000	63.0	34.3	146.6	53.0	73.0	90.4	27.0	1.6	1.6	90.0	−7.5	−41.5	
BUL00000	50.4	−20.6	71.5	40.4	60.4	25.6	42.8	1.6	1.6	90.0	−7.5	−40.8	
CAF00000	14.8	−24.8	57.6	4.8	24.8	21.5	6.5	2.7	1.7	14.0	−6.3	−39.1	
CAN0EAST	−107.3	−108.0	−90.1	−108.0	−97.3	−76.6	50.1	5.0	1.7	154.0	−4.9	−38.3	
CAN0CENT	−111.1	−115.1	−101.0	−115.1	−101.1	−96.1	51.4	4.3	2.0	155.0	−5.5	−38.4	
CAN0WEST	−114.9	−119.0	−113.7	−119.0	−113.7	−120.1	57.4	3.1	1.9	173.0	−7.5	−38.7	
CAR00000	−159.0	−169.8	−158.2	−169.0	−158.2	173.4	4.6	10.2	2.4	175.0	6.6	−35.6	*/MB2
CBG00000	96.1	61.2	144.2	86.1	106.1	105.1	12.9	1.6	1.6	90.0	−7.5	−40.4	
CHL00000	−74.9	−96.4	−53.6	−84.9	−64.9	−82.6	−32.8	8.1	6.1	155.0	1.4	−38.4	
CHN00001	101.4	90.4	139.4	91.4	111.4	103.7	35.0	8.1	4.3	2.0	2.0	−38.3	
CHN00002	135.5	75.0	151.3	125.5	145.5	114.8	16.4	4.9	2.4	65.0	−1.5	−38.7	
CLM00000	−70.9	−110.1	−39.9	−80.9	−60.9	−74.0	5.7	4.0	2.3	121.0	−3.0	−38.9	
CLN00000	121.5	28.1	131.9	111.5	131.5	80.1	7.7	1.6	1.6	90.0	−7.5	−41.2	
CME00000	21.4	−27.3	51.2	11.4	31.4	12.9	6.3	2.5	1.9	84.0	−6.2	−39.0	
CNR00000	12.2	−31.1	24.2	2.2	22.2	−15.9	28.5	1.6	1.6	90.0	−7.5	−41.3	*/MB8
COG00000	−16.0	−24.7	56.5	−24.7	−6.0	14.8	−0.6	2.0	1.6	63.0	−7.0	−38.8	
COM00000	94.5	−7.3	95.5	84.5	95.5	44.1	−12.2	1.6	1.6	90.0	−7.5	−41.0	
CPV00000	−85.7	−94.7	46.5	−94.7	−75.7	−24.1	16.0	1.6	1.6	90.0	−7.5	−41.3	
CTI00000	4.6	−15.0	27.1	−5.4	14.6	−5.9	7.8	1.6	1.6	90.0	−7.5	−40.0	
CTR00000	−96.0	−125.4	−44.0	−106.0	−86.0	−85.3	8.2	1.6	1.6	90.0	−7.5	−40.2	
CUB00000	−80.6	−123.5	−36.1	−90.6	−70.6	−79.5	21.0	2.0	1.6	172.0	−7.5	−39.3	
CVA00000	58.1	−38.1	63.1	48.1	63.1	12.5	41.9	1.6	1.6	90.0	−7.5	−41.3	
CYP00000	−1.8	−21.5	87.9	−11.8	8.2	33.2	35.1	1.6	1.6	90.0	−7.5	−41.6	
CYPSBA00	56.6	44.7	59.2	46.6	59.2	32.9	34.6	1.6	1.6	90.0	−7.5	−41.7	*/MB9
D 00000	26.4	−30.4	53.1	16.4	36.4	9.7	50.7	1.6	1.6	90.0	−7.5	−40.5	
DDR00000	37.0	−26.8	51.7	27.0	47.0	12.6	51.4	1.6	1.6	90.0	−7.5	−40.8	3
DJI00000	−18.3	−28.4	113.6	−28.3	−8.3	42.6	11.7	1.6	1.6	90.0	−7.5	−41.3	
DMA00000	−69.6	−112.1	−10.5	−79.6	−59.6	−61.3	15.3	1.6	1.6	90.0	−7.5	−41.8	
DNK00001	32.2	−40.8	62.2	22.2	42.2	11.6	56.0	1.6	1.6	90.0	−7.5	−40.9	

4 500-4 800 MHz, 6 725-7 025 MHz

1	2	3		4		5	6	7	8	9	10	11	12
DNK00002	–49.0	–50.0	–43.1	–50.0	–43.1	12.5	56.3	1.6	1.6	90.0	–7.5	–40.6	*/MB10
DNK00FAR	–49.0	–50.0	–43.1	–50.0	–43.1	–7.2	61.7	1.6	1.6	90.0	–7.5	–41.1	*/MB10
DOM00000	–85.4	–120.3	–20.5	–95.4	–75.4	–70.4	18.7	1.6	1.6	90.0	–7.5	–41.7	
E 00002	12.2	–31.1	24.2	2.2	22.2	–3.0	39.9	2.1	1.6	8.0	–7.5	–39.3	*/MB8
EGY00000	68.5	–10.3	69.5	58.5	69.5	30.3	26.2	2.3	1.6	54.0	–7.5	–39.2	
EQA00000	–104.0	–104.0	–94.1	–104.0	–94.1	–83.1	–1.4	3.1	1.6	174.0	–5.7	–38.9	
ETH00000	57.5	–4.0	85.0	47.5	67.5	40.6	10.3	2.8	2.8	64.0	–7.3	–39.4	
F 00000	0.9	–13.9	5.7	–9.1	5.7	3.1	45.9	2.1	1.6	168.0	–7.5	–39.0	*/MB11
FJI00000	148.8	128.2	–131.1	138.8	158.8	178.5	–17.2	1.6	1.6	90.0	–7.5	–41.5	
FLKSTGGL	–37.1	–38.5	–27.1	–38.5	–27.1	–46.8	–59.6	3.7	1.6	170.0	–7.5	–38.8	*/MB4
FNL00000	46.8	7.1	46.8	36.8	46.8	23.8	64.3	1.6	1.6	90.0	–7.5	–39.3	
G 00000	–37.1	–38.5	–27.1	–38.5	–27.1	–4.1	53.9	1.6	1.6	151.0	–7.5	–39.0	*/MB4
GAB00000	38.8	–29.2	52.0	28.8	48.8	11.7	–0.7	1.6	1.6	90.0	–7.5	–39.8	
GDL00000	0.9	–13.9	5.7	–9.1	5.7	–61.9	16.3	1.6	1.6	90.0	–7.5	–40.0	*/MB11
GDL00002	–115.9	–123.2	–81.2	–123.2	–105.9	–61.8	16.4	1.6	1.6	90.0	–7.5	–40.3	*/MB13
GHA00000	16.0	–41.7	39.3	6.0	26.0	–1.3	7.7	1.6	1.6	90.0	–7.5	–39.7	
GIB00000	56.6	44.7	59.2	46.6	59.2	–5.4	36.1	1.6	1.6	90.0	–7.5	–40.9	*/MB9
GMB00000	–34.0	–77.3	44.5	–44.0	–24.0	–16.4	13.4	1.6	1.6	90.0	–7.5	–42.1	
GNB00000	40.0	–76.5	45.7	30.0	45.7	–15.4	12.0	1.6	1.6	90.0	–7.5	–41.3	
GNE00000	–32.3	–32.8	53.8	–32.8	–22.3	10.5	1.7	1.6	1.6	90.0	–7.5	–40.9	
GRC00000	16.6	–8.9	56.8	6.6	26.6	24.7	38.3	1.7	1.6	160.0	–7.5	–39.3	
GRD00000	–32.8	–113.0	–10.2	–42.8	–22.8	–61.6	12.0	1.6	1.6	90.0	–7.5	–41.6	
GRL00000	–49.0	–50.0	–43.1	–50.0	–43.1	–42.9	68.6	2.3	1.6	174.0	–7.5	–38.6	*/MB10
GTM00000	–135.7	–139.3	–41.4	–139.3	–125.7	–90.5	15.5	1.6	1.6	90.0	–7.5	–40.5	
GUF00000	0.9	–13.9	5.7	–9.1	5.7	–53.2	4.3	1.6	1.6	90.0	–7.2	–40.0	*/MB11
GUF00002	–115.9	–123.2	–81.2	–123.2	–105.9	–53.3	4.3	1.6	1.6	90.0	–6.5	–39.4	*/MB13
GUI00000	27.5	–51.8	33.8	17.5	33.8	–10.9	10.2	1.6	1.6	90.0	–7.5	–39.8	
GUMMRA00	–159.0	–169.8	–158.2	–169.0	–158.2	145.4	16.7	1.7	1.6	79.0	–7.3	–38.3	*/MB2
GUY00000	–24.1	–100.1	–18.3	–34.1	–18.3	–59.2	4.7	1.6	1.6	90.0	–7.5	–39.4	
HKG00000	56.6	44.7	59.2	46.6	59.2	114.5	22.4	1.6	1.6	90.0	–7.5	–40.6	*/MB9
HND00000	–76.2	–123.8	–48.1	–86.2	–66.2	–86.1	15.4	1.6	1.6	90.0	–7.5	–40.0	
HNG00000	–6.6	–22.2	62.4	–16.6	3.4	19.4	47.4	1.6	1.6	90.0	–7.5	–41.0	2
HOL00000	–5.2	–50.1	1.9	–15.2	1.9	5.4	52.4	1.6	1.6	90.0	–7.5	–41.4	*/MB5
HTI00000	–92.0	–122.9	–23.1	–102.0	–82.0	–73.0	18.8	1.6	1.6	90.0	–7.5	–41.7	
HWA00000	–159.0	–169.8	–158.2	–169.0	–158.2	–157.6	20.7	1.6	1.6	90.0	–7.5	–40.2	*/MB2
HWL00000	–159.0	–169.8	–158.2	–169.0	–158.2	–176.6	0.1	1.6	1.6	90.0	–7.5	–41.8	*/MB2
I 00000	–28.1	–32.9	54.1	–32.9	–18.1	11.3	40.9	2.1	1.6	141.0	–7.5	–38.9	
IND00000	74.0	51.3	116.4	64.0	84.0	82.7	18.9	6.2	4.9	120.0	2.4	–38.5	
INS00000	115.4	101.1	135.0	105.4	125.4	117.6	–1.8	9.4	4.3	170.0	3.9	–38.6	
IRL00000	–31.0	–41.0	25.7	–41.0	–21.0	–8.2	53.2	1.6	1.6	90.0	–7.5	–41.1	
IRN00000	25.0	20.1	50.0	20.1	35.0	54.3	33.0	3.7	1.6	143.0	–7.5	–39.0	
IRQ00000	66.4	5.1	82.5	56.4	76.4	44.3	33.1	1.6	1.6	90.0	–7.5	–39.4	
ISL00000	–35.4	–53.0	14.8	–45.4	–25.4	–18.2	64.9	1.6	1.6	90.0	–7.5	–40.5	
ISR00000	73.0	–8.0	78.4	63.0	78.4	35.0	31.3	1.6	1.6	90.0	–7.5	–41.0	
J 00000	152.5	94.4	170.9	142.5	162.5	140.4	30.4	5.7	3.7	15.0	–0.2	–38.5	
JAR00000	–159.0	–169.8	–158.2	–169.0	–158.2	–160.0	–0.4	1.6	1.6	90.0	–7.5	–41.9	*/MB2
JMC00000	–108.6	–127.5	–27.8	–118.6	–98.6	–77.6	18.2	1.6	1.6	90.0	–7.5	–41.5	
JON00000	–159.0	–169.8	–158.2	–169.0	–158.2	–168.5	17.0	1.6	1.6	90.0	–7.5	–42.2	*/MB2
JOR00000	81.8	–28.8	102.9	71.8	91.8	36.7	31.3	1.6	1.6	90.0	–7.5	–40.9	
KEN00000	78.2	–10.4	86.3	68.2	86.3	38.4	0.8	2.1	1.6	95.0	–7.5	–39.3	
KER00000	113.0	113.0	114.3	113.0	114.3	69.3	–43.9	1.9	1.6	169.0	–7.5	–38.7	*/MB1
KIR00000	150.0	120.6	–134.6	140.0	160.0	173.0	1.0	1.6	1.6	90.0	–7.5	–41.8	
KOR00000	116.2	83.0	169.6	106.2	126.2	127.7	36.2	1.6	1.6	90.0	–7.5	–40.5	
KRE00000	145.0	110.1	150.0	135.0	150.0	127.8	39.8	1.6	1.6	90.0	–7.5	–39.6	
KWT00000	30.8	–20.2	115.3	20.8	40.8	47.7	29.1	1.6	1.6	90.0	–7.5	–41.9	1, 2
LAO00000	142.0	56.6	149.9	132.0	149.9	104.1	18.1	1.6	1.6	90.0	–7.5	–39.1	
LBN00000	91.0	–31.6	103.2	81.0	101.0	35.8	33.8	1.6	1.6	90.0	–7.5	–41.3	
LBR00000	–41.8	–50.4	35.5	–50.4	–31.8	–8.9	6.5	1.6	1.6	90.0	–7.5	–40.4	
LBY00000	28.5	–19.2	54.9	18.5	38.5	19.0	25.9	3.0	2.7	165.0	–6.8	–39.2	
LIE00000	7.9	–30.0	15.0	–2.1	15.0	9.5	47.2	1.6	1.6	90.0	–7.5	–41.7	
LSO00000	–18.7	–40.1	96.9	–28.7	–8.7	28.4	–29.5	1.6	1.6	90.0	–7.5	–41.5	
LUX00000	19.2	–53.9	66.1	9.2	29.2	6.2	49.7	1.6	1.6	90.0	–7.5	–41.6	
MAC00000	117.0	64.7	162.4	107.0	127.0	113.6	22.2	1.6	1.6	90.0	–7.5	–41.8	
MAU00000	92.2	8.0	107.0	82.2	102.2	57.5	–20.2	1.6	1.6	90.0	–7.5	–41.4	
MCO00000	40.5	–41.8	56.6	30.5	50.5	7.4	43.7	1.6	1.6	90.0	–7.5	–41.3	
MDG00000	16.9	10.4	81.1	10.4	26.9	46.6	–18.7	2.6	1.6	66.0	–5.4	–38.6	
MDR00000	–7.9	–41.9	6.7	–17.9	2.1	–16.2	31.6	1.6	1.6	90.0	–7.5	–41.7	*/MB7
MDW00000	–159.0	–169.8	–158.2	–169.0	–158.2	–177.4	28.2	1.6	1.6	90.0	–7.5	–42.0	*/MB2
MEX00000	–113.0	–136.1	–61.0	–123.0	–103.0	–103.6	23.3	5.8	2.4	161.0	–2.6	–38.8	

4 500-4 800 MHz, 6 725-7 025 MHz

1	2	3		4		5	6	7	8	9	10	11	12
MLA00000	78.5	76.4	143.2	76.4	88.5	108.2	4.7	3.2	1.6	0.0	−4.2	−38.4	
MLD00000	117.6	21.1	124.9	107.6	124.9	73.4	2.5	2.2	1.6	88.0	−7.5	−38.7	
MLI00000	−1.3	−59.9	43.3	−11.3	8.7	−3.9	17.6	3.3	2.5	21.0	−5.5	−39.2	
MLT00000	5.6	−39.8	68.5	−4.4	15.6	14.4	35.9	1.6	1.6	90.0	−7.5	−41.8	
MNG00000	113.6	60.4	148.9	103.6	123.6	103.8	46.8	3.6	1.6	3.0	−7.5	−38.9	
MOZ00000	88.6	−10.6	90.6	78.6	90.6	35.6	−17.2	3.1	1.6	98.0	−5.6	−38.3	
MRC00000	33.0	−50.5	37.5	23.0	37.5	−8.9	27.9	3.4	1.6	45.0	−7.5	−38.8	
MRL00000	−159.0	−169.8	−158.2	−169.0	−158.2	175.3	8.7	2.3	1.6	94.0	−6.5	−38.8	*/MB2
MTN00000	−22.8	−72.8	44.2	−32.8	−12.8	−10.3	19.8	2.5	2.4	76.0	−7.5	−39.4	
MWI00000	30.3	−25.0	93.7	20.3	40.3	34.1	−13.3	1.6	1.6	90.0	−7.5	−40.0	
MYT00000	0.9	−13.9	5.7	−9.1	5.7	45.2	−12.8	1.6	1.6	90.0	−7.5	−41.2	*/MB11
NCG00000	−84.4	−124.4	−45.9	−94.4	−74.4	−84.9	12.9	1.6	1.6	90.0	−7.5	−40.6	
NCL00000	113.0	113.0	114.3	113.0	114.3	165.8	−21.4	1.6	1.6	90.0	−7.5	−40.6	*/MB1
NGR00000	−38.5	−54.5	64.6	−48.5	−28.5	7.5	17.2	2.1	1.7	100.0	−7.5	−38.9	
NIG00000	42.5	−29.6	49.6	32.5	49.6	8.0	9.9	2.5	1.6	47.0	−5.6	−38.5	
NMB00000	13.4	−45.4	82.5	3.4	23.4	18.5	−21.0	2.7	2.6	155.0	−7.5	−39.5	
NOR00000	3.9	2.9	29.1	2.9	13.9	11.7	64.6	2.0	1.6	17.0	−7.5	−38.7	
NPL00000	123.3	30.3	137.6	113.3	133.3	84.4	28.0	1.6	1.6	90.0	−7.5	−40.8	
NRU00000	146.0	114.5	−140.7	136.0	156.0	166.9	−0.5	1.6	1.6	90.0	−7.5	−41.8	
NZL00001	152.0	150.9	175.0	150.9	162.0	170.9	−44.8	5.4	1.6	49.0	−5.3	−38.1	*/MB14
NZL00002	152.0	150.9	175.0	150.9	162.0	−165.4	−13.2	2.7	2.0	82.0	−5.2	−38.3	*/MB14
OCE00000	−115.9	−123.2	−81.2	−123.2	−105.9	−141.9	−16.1	3.5	2.4	139.0	−5.0	−38.9	*/MB13
OMA00000	104.0	−9.8	122.2	94.0	114.0	55.1	21.6	1.9	1.6	61.0	−7.5	−39.2	5
PAK00000	56.0	34.1	62.0	46.0	62.0	69.9	29.8	3.0	2.0	22.0	−7.2	−39.0	
PHL00000	89.6	83.0	159.8	83.0	99.6	121.3	11.4	3.3	1.6	101.0	−4.2	−38.4	
PLM00000	−159.0	−169.8	−158.2	−169.0	−158.2	−161.4	7.0	1.6	1.6	90.0	−7.5	−41.9	*/MB2
PNG00000	154.1	114.2	−176.5	144.1	164.1	148.4	−6.6	3.3	2.3	167.0	−4.1	−39.0	
PNR00000	−79.2	−120.0	−40.4	−89.2	−69.2	−80.2	8.5	1.6	1.6	90.0	−7.5	−40.4	
POL00000	14.2	−14.8	56.4	4.2	24.2	19.3	52.0	1.6	1.6	90.0	−7.5	−40.2	
POR00000	−7.9	−41.9	6.7	−17.9	2.1	−8.0	39.7	1.6	1.6	90.0	−7.5	−41.2	*/MB7
PRG00000	−81.5	−90.4	−23.2	−90.4	−71.5	−58.7	−23.1	1.6	1.6	90.0	−7.5	−39.1	
PRU00000	−89.9	−120.4	−38.2	−99.9	−79.9	−74.2	−8.4	3.6	2.4	111.0	−3.3	−38.7	
PTC00000	−62.0	−62.6	−58.5	−62.6	−58.5	−130.1	−25.1	1.6	1.6	90.0	−7.5	−41.2	
QAT00000	8.3	−16.9	120.0	−1.7	18.3	51.6	25.4	1.6	1.6	90.0	−7.5	−41.6	
REU00000	0.9	−13.9	5.7	−9.1	5.7	55.6	−21.1	1.6	1.6	90.0	−7.5	−40.7	*/MB11
REU00002	113.0	113.0	114.3	113.0	114.3	55.6	−21.1	1.6	1.6	90.0	−7.5	−40.6	*/MB1
ROU00000	31.0	−1.0	51.0	21.0	41.0	25.0	46.3	1.6	1.6	90.0	−7.5	−39.6	
RRW00000	6.8	−30.9	90.8	−3.2	16.8	29.7	−1.9	1.6	1.6	90.0	−7.5	−41.9	
S 00000	11.2	−7.0	47.1	1.2	21.2	16.7	60.9	1.6	1.6	90.0	−7.5	−40.2	
SCN00000	−88.8	−113.2	−12.6	−98.8	−78.8	−62.9	17.3	1.6	1.6	90.0	−7.5	−41.6	
SDN00001	1.4	−7.0	15.0	−7.0	11.4	29.3	10.3	3.0	1.9	131.0	−7.2	−39.0	*/MB15
SDN00002	1.4	−7.0	15.0	−7.0	11.4	29.4	16.7	2.6	2.4	171.0	−7.5	−39.3	*/MB15
SEN00000	−48.4	−64.4	34.3	−58.4	−38.4	−14.0	14.1	1.6	1.6	90.0	−7.5	−40.3	
SEY00000	96.5	3.1	107.7	86.5	106.5	55.4	−4.5	1.6	1.6	90.0	−7.5	−41.3	
SLM00000	147.5	120.4	−161.7	137.5	157.5	159.0	−9.1	1.6	1.6	90.0	−7.5	−39.5	
SLV00000	−130.5	−130.5	−47.5	−130.5	−120.5	−89.0	13.7	1.6	1.6	90.0	−7.5	−40.9	
SMA00000	−159.0	−169.8	−158.2	−169.0	−158.2	−170.7	−14.2	1.6	1.6	90.0	−7.5	−42.2	*/MB2
SMO00000	−125.5	137.5	−121.7	−135.5	−121.7	−172.1	−13.7	1.6	1.6	90.0	−7.5	−41.1	
SMR00000	23.0	−36.4	61.4	13.0	33.0	12.5	43.9	1.6	1.6	90.0	−7.5	−41.7	
SNG00000	98.1	60.6	147.1	88.1	108.1	103.9	1.3	1.6	1.6	90.0	−7.5	−41.6	
SOM00000	98.4	−20.0	102.7	88.4	102.7	46.0	6.3	3.1	1.6	72.0	−7.5	−38.8	
SPM00000	0.9	−13.9	5.7	−9.1	5.7	−56.4	47.0	1.6	1.6	90.0	−7.5	−40.9	*/MB11
SRL00000	−51.8	−63.8	40.0	−61.8	−41.8	−11.9	8.5	1.6	1.6	90.0	−7.5	−41.4	
STP00000	31.4	−45.4	59.4	21.4	41.4	7.0	1.0	1.6	1.6	90.0	−7.5	−41.7	
SUI00000	−9.2	−20.0	35.0	−19.2	0.8	8.2	46.5	1.6	1.6	90.0	−7.5	−41.3	2
SUR00000	−77.0	−97.0	−15.0	−87.0	−67.0	−55.6	3.9	1.6	1.6	90.0	−7.5	−40.7	
SWZ00000	29.0	−26.8	89.2	19.0	39.0	31.3	−26.4	1.6	1.6	90.0	−7.5	−42.0	
SYR00000	18.7	10.1	70.0	10.1	28.7	38.6	35.3	1.6	1.6	90.0	−7.5	−40.8	
TCD00000	−10.5	−36.5	67.5	−20.5	−0.5	18.4	15.6	3.5	1.6	97.0	−6.8	−39.0	
TCH00000	−12.7	−21.3	54.4	−21.3	−2.7	17.3	49.6	1.6	1.6	90.0	−7.5	−40.0	2
TGO00000	−21.1	−41.0	43.4	−31.1	−11.1	0.8	8.6	1.6	1.6	90.0	−7.5	−40.4	
THA00000	120.6	58.6	137.2	110.6	130.6	100.9	12.8	2.8	1.6	83.0	−5.6	−38.8	
TON00000	−128.0	135.7	−126.0	−138.0	−126.0	−175.2	−21.2	1.6	1.6	90.0	−7.5	−41.0	
TRD00000	−73.4	−112.3	−9.9	−83.4	−63.4	−61.1	10.8	1.6	1.6	90.0	−7.5	−41.8	
TUN00000	−4.1	−29.0	48.4	−14.1	5.9	9.4	33.5	1.6	1.6	90.0	−7.5	−40.3	
TUR00000	9.4	7.1	61.6	7.1	19.4	34.1	38.9	2.8	1.6	171.0	−7.5	−38.9	
TUV00000	158.0	127.3	−129.0	148.0	168.0	179.2	−8.5	1.6	1.6	90.0	−7.5	−41.8	
TZA00000	69.5	−21.3	91.4	59.5	79.5	35.4	−5.9	2.4	1.6	117.0	−7.5	−39.3	

4 500-4 800 MHz, 6 725-7 025 MHz

1	2	3		4		5	6	7	8	9	10	11	12
UAE00000	70.4	–12.7	120.3	60.4	80.4	53.8	24.9	1.6	1.6	90.0	–7.5	–41.1	
UGA00000	32.0	–27.2	91.6	22.0	42.0	32.2	0.9	1.6	1.6	90.0	–7.5	–40.3	
URG00000	–86.1	–108.9	–3.5	–96.1	–76.1	–56.3	–33.7	1.6	1.6	90.0	–7.5	–40.7	
URS00001	61.0	56.7	65.4	56.7	65.4	57.6	48.3	7.5	3.5	178.0	–1.1	–38.3	
URS00002	88.1	87.7	98.0	87.7	98.0	94.8	48.6	7.5	3.5	175.0	1.5	–38.3	
URS00003	138.5	138.5	140.6	138.5	140.6	134.9	52.6	7.5	3.5	5.0	–1.1	–38.3	
USA00000	–101.0	–130.3	–63.5	–111.0	–91.0	–93.9	36.8	8.2	3.6	172.0	1.2	–38.4	*/MB16
USAVIPRT	–101.0	–130.3	–63.5	–111.0	–91.0	–64.5	17.8	1.6	1.6	90.0	–7.5	–41.4	*/MB16
VCT00000	–93.1	–112.3	–9.9	–103.1	–83.1	–61.1	13.2	1.6	1.6	90.0	–7.5	–41.5	
VEN00001	–82.7	–102.5	–24.7	–92.7	–72.7	–66.4	6.8	2.8	2.1	142.0	–4.9	–38.9	*/MB17
VEN00002	–82.7	–102.5	–24.7	–92.7	–72.7	–63.6	15.7	1.6	1.6	90.0	–7.5	–41.7	*/MB17
VTN00000	107.0	85.1	125.0	97.0	117.0	108.5	14.2	3.6	2.6	139.0	–2.9	–38.8	
VUT00000	150.7	127.4	–152.4	140.7	160.7	168.4	–17.2	1.6	1.6	90.0	–7.5	–40.3	
WAK00000	–159.0	–169.8	–158.2	–169.0	–158.2	166.5	19.2	1.6	1.6	90.0	–7.5	–41.9	*/MB2
WAL00000	113.0	113.0	114.3	113.0	114.3	–177.1	–13.8	1.6	1.6	90.0	–6.9	–39.8	*/MB1
YEM00000	27.0	–24.3	113.2	17.0	37.0	44.2	15.1	1.6	1.6	90.0	–7.5	–41.4	
YMS00000	108.0	–16.4	114.4	98.0	114.4	49.9	14.8	1.6	1.6	90.0	–7.5	–39.7	
YUG00000	43.1	–25.8	60.2	33.1	53.1	18.7	44.4	1.6	1.6	90.0	–7.5	–40.5	2
ZAI00000	51.0	–23.6	62.6	41.0	61.0	24.4	–4.6	3.9	3.5	92.0	–0.5	–38.4	
ZMB00000	39.6	–27.9	82.5	29.6	49.6	27.9	–12.8	2.4	1.6	26.0	–7.5	–39.6	
ZWE00000	65.6	–27.0	85.5	55.6	75.6	30.0	–18.9	1.6	1.6	90.0	–7.5	–39.9	

10.70-10.95 GHz, 11.20-11.45 GHz, 12.75-13.25 GHz

1	2	3		4		5	6	7	8	9	10	11	12
ABW00000	–98.2	–119.4	–18.9	–108.2	–88.2	–69.1	12.4	0.8	0.8	90.0	–5.5	–25.8	
ADL00000	113.0	113.0	114.3	113.0	114.3	140.0	–66.7	0.8	0.8	90.0	–9.3	–31.9	*/MB1
AFG00000	48.0	42.3	95.8	42.3	58.0	66.4	33.9	2.2	1.3	15.0	–3.2	–29.2	
AFS00000	71.0	–25.8	84.2	61.0	81.0	27.2	–30.1	5.3	1.4	128.0	4.2	–26.7	
AGL00000	–36.1	–37.2	74.1	–37.2	–26.1	15.9	–12.4	2.4	1.4	78.0	2.0	–25.9	
ALB00000	2.6	–29.9	69.8	–7.4	12.6	20.0	41.1	0.8	0.8	90.0	–7.7	–28.2	
ALG00000	–33.5	–33.5	38.4	–33.5	–23.5	1.6	27.8	3.3	2.2	133.0	4.3	–26.6	
ALS00000	–159.0	–169.8	–158.2	–169.0	–158.2	–158.6	57.5	6.3	1.5	1.0	2.5	–28.7	*/MB2
AND00000	–41.0	–48.6	51.7	–48.6	–31.0	1.5	42.5	0.8	0.8	90.0	–9.3	–30.0	
ARG00000	–51.0	–58.4	–51.0	–58.4	–51.0	–62.0	–33.6	4.8	2.9	93.0	10.3	–21.9	*/MB3
ARGINSUL	–51.0	–58.4	–51.0	–58.4	–51.0	–60.0	–57.5	3.6	1.3	154.0	–0.5	–28.6	*/MB3
ARS00000	52.0	20.1	60.0	42.0	60.0	45.7	23.1	3.7	2.6	153.0	1.7	–29.4	
ASCSTHTC	–37.1	–38.5	–27.1	–38.5	–27.1	–11.8	–19.6	5.6	1.8	77.0	3.0	–28.6	*/MB4
ATG00000	–77.7	–112.2	–11.4	–87.7	–67.7	–61.8	17.0	0.8	0.8	90.0	–6.3	–27.1	
ATN00000	–5.2	–50.1	1.9	–15.2	1.9	–65.6	15.1	1.3	1.0	58.0	–0.2	–22.3	*/MB5
AUS00001	144.1	122.4	148.1	134.1	148.1	134.3	–24.5	6.6	5.3	146.0	14.3	–22.1	*/MB6
AUS00002	144.1	122.4	148.1	134.1	148.1	163.6	–30.5	1.6	1.0	15.0	–2.0	–26.5	*/MB6
AUS00003	144.1	122.4	148.1	134.1	148.1	101.5	–11.1	1.1	1.0	15.0	–6.0	–28.5	*/MB6
AUS00004	144.1	122.4	148.1	134.1	148.1	159.0	–54.5	0.8	0.8	90.0	–9.3	–32.3	*/MB6
AUS00005	144.1	122.4	148.1	134.1	148.1	110.4	–66.3	0.8	0.8	90.0	–9.3	–31.8	*/MB6
AUT00000	–2.6	–18.6	46.4	–12.6	7.4	13.2	47.5	0.8	0.8	90.0	–7.2	–27.2	2
AZR00000	–7.9	–41.9	6.7	–17.9	2.1	–28.0	38.7	0.8	0.8	90.0	–7.8	–27.9	*/MB7
B 00001	–65.0	–70.0	–60.1	–70.0	–60.1	–62.6	–6.0	4.1	4.0	43.0	10.7	–22.4	
B 00002	–61.1	–70.0	–60.1	–70.0	–60.1	–45.4	–6.3	4.6	4.1	152.0	11.3	–22.4	
B 00003	–68.7	–70.0	–60.1	–70.0	–60.1	–50.0	–20.9	4.3	3.0	60.0	9.8	–22.2	
BAH00000	–74.3	–121.1	–32.2	–84.3	–64.3	–75.8	24.0	1.6	1.0	133.0	0.1	–24.5	
BDI00000	–2.2	–30.5	90.4	–12.2	7.8	29.9	–3.4	0.8	0.8	90.0	–9.3	–29.9	
BEL00000	52.7	–53.6	62.0	42.7	62.0	5.2	50.6	0.8	0.8	90.0	–9.3	–30.2	
BEN00000	–30.6	–40.2	44.7	–40.2	–20.6	2.3	9.3	1.2	1.0	89.0	–1.2	–23.0	
BERCAYMS	–37.1	–38.5	–27.1	–38.5	–27.1	–68.6	22.5	3.7	2.3	41.0	8.3	–21.9	*/MB4
BFA00000	10.2	–54.6	46.2	0.2	20.2	–1.4	12.2	1.7	1.0	24.0	0.3	–25.0	
BGD00000	133.0	44.6	135.5	123.0	135.5	90.2	24.0	0.8	0.8	90.0	–3.0	–21.9	
BHR00000	20.4	–18.6	119.8	10.4	30.4	50.6	26.1	0.8	0.8	90.0	–9.3	–32.2	
BLZ00000	–90.8	–138.4	–38.7	–100.8	–80.8	–88.6	17.2	0.8	0.8	90.0	–5.6	–26.6	
BOL00000	–35.0	–97.3	–23.2	–45.0	–25.0	–64.4	–17.1	2.7	1.7	129.0	5.2	–22.5	
BOT00000	19.9	–41.7	89.9	9.9	29.9	24.0	–21.8	1.5	1.5	94.0	–5.1	–30.0	
BRB00000	–29.8	–110.8	–8.4	–39.8	–19.8	–59.6	13.2	0.8	0.8	90.0	–6.1	–26.4	
BRM00000	110.8	57.6	131.0	100.8	120.8	97.0	18.9	3.2	1.6	88.0	5.5	–22.5	
BRU00000	157.3	71.5	157.7	147.3	157.7	114.6	4.5	0.8	0.8	90.0	–6.0	–24.9	
BTN00000	63.0	34.3	146.6	53.0	73.0	90.4	27.0	0.8	0.8	90.0	–9.3	–29.3	
BUL00000	50.4	–20.6	71.5	40.4	60.4	25.6	42.8	0.8	0.8	90.0	–6.9	–27.0	

10.70-10.95 GHz, 11.20-11.45 GHz, 12.75-13.25 GHz

1	2	3		4		5	6	7	8	9	10	11	12
CAF00000	14.8	−24.8	57.6	4.8	24.8	21.5	6.5	2.7	1.7	14.0	4.7	−22.8	
CAN0EAST	−107.3	−108.0	−90.1	−108.0	−97.3	−76.6	50.1	5.0	1.7	154.0	7.1	−25.0	
CAN0CENT	−111.1	−115.1	−101.0	−115.1	−101.1	−96.1	51.4	4.3	2.0	155.0	4.8	−26.7	
CAN0WEST	−114.9	−119.0	−113.7	−119.0	−113.7	−120.1	57.4	3.1	1.9	173.0	0.3	−28.7	
CAR00000	−159.0	−169.8	−158.2	−169.0	−158.2	173.4	4.6	10.2	2.4	175.0	13.9	−21.0	*/MB2
CBG00000	96.1	61.2	144.2	86.1	106.1	105.1	12.9	1.2	1.0	35.0	−1.6	−23.2	
CHL00000	−74.9	−96.4	−53.6	−84.9	−64.9	−82.6	−32.8	8.1	6.1	155.0	9.9	−28.4	
CHN00001	101.4	90.4	139.4	91.4	111.4	103.7	35.0	8.1	4.3	2.0	14.5	−23.2	
CHN00002	135.5	75.0	151.3	125.5	145.5	114.8	16.4	4.9	2.4	65.0	9.1	−22.5	
CLM00000	−70.9	−110.1	−39.9	−80.9	−60.9	−74.0	5.7	4.0	2.3	121.0	8.0	−22.6	
CLN00000	121.5	28.1	131.9	111.5	131.5	80.1	7.7	0.8	0.8	90.0	−5.6	−24.8	
CME00000	21.4	−27.3	51.2	11.4	31.4	12.9	6.3	2.5	1.9	84.0	4.8	−22.7	
CNR00000	12.2	−31.1	24.2	2.2	22.2	−15.9	28.5	0.8	0.8	90.0	−9.3	−29.2	*/MB8
COG00000	−16.0	−24.7	56.5	−24.7	−6.0	14.8	−0.6	2.0	1.1	63.0	1.6	−22.7	
COM00000	94.5	−7.3	95.5	84.5	95.5	44.1	−12.2	0.8	0.8	90.0	−5.8	−24.7	
CPV00000	−85.7	−94.7	46.5	−94.7	−75.7	−24.1	16.0	0.8	0.8	90.0	−9.3	−30.4	
CTI00000	4.6	−15.0	27.1	−5.4	14.6	−5.9	7.8	1.4	1.2	66.0	0.0	−23.1	
CTR00000	−96.0	−125.4	−44.0	−106.0	−86.0	−85.3	8.2	1.3	1.0	64.0	−1.2	−23.2	
CUB00000	−80.6	−123.5	−36.1	−90.6	−70.6	−79.5	21.0	2.0	1.0	172.0	1.0	−24.6	
CVA00000	58.1	−38.1	63.1	48.1	63.1	12.5	41.9	0.8	0.8	90.0	−8.4	−28.8	
CYP00000	−1.8	−21.5	87.9	−11.8	8.2	33.2	35.1	0.8	0.8	90.0	−9.3	−29.8	
CYPSBA00	56.6	44.7	59.2	46.6	59.2	32.9	34.6	0.8	0.8	90.0	−9.3	−30.2	*/MB9
D 00000	26.4	−30.4	53.1	16.4	36.4	9.7	50.7	1.1	1.0	41.0	−6.8	−28.7	
DDR00000	37.0	−26.8	51.7	27.0	47.0	12.6	51.4	0.8	0.8	90.0	−8.4	−28.2	
DJI00000	−18.3	−28.4	113.6	−28.3	−8.3	42.6	11.7	0.8	0.8	90.0	−9.3	−30.5	
DMA00000	−69.6	−112.1	−10.5	−79.6	−59.6	−61.3	15.3	0.8	0.8	90.0	−6.4	−27.3	
DNK00001	32.2	−40.8	62.2	22.2	42.2	11.6	56.0	0.8	0.8	90.0	−9.3	−29.0	
DNK00002	−49.0	−50.0	−43.1	−50.0	−43.1	12.5	56.3	0.8	0.8	90.0	−7.3	−27.7	*/MB10
DNK00FAR	−49.0	−50.0	−43.1	−50.0	−43.1	−7.2	61.7	0.8	0.8	90.0	−9.3	−29.5	*/MB10
DOM00000	−85.4	−120.3	−20.5	−95.4	−75.4	−70.4	18.7	0.8	0.8	90.0	−6.3	−27.1	
E 00002	12.2	−31.1	24.2	2.2	22.2	−3.0	39.9	2.1	1.2	8.0	−1.8	−27.8	*/MB8
EGY00000	68.5	−10.3	69.5	58.5	69.5	30.3	26.2	2.3	1.5	54.0	−1.8	−28.8	
EQA00000	−104.0	−104.0	−94.1	−104.0	−94.1	−83.1	−1.4	3.1	1.4	174.0	4.7	−22.7	
ETH00000	57.5	−4.0	85.0	47.5	67.5	40.6	10.3	2.8	2.8	64.0	2.0	−28.6	
F 00000	0.9	−13.9	5.7	−9.1	5.7	3.1	45.9	2.1	1.1	168.0	−0.2	−26.3	*/MB11
FJI00000	148.8	128.2	−131.1	138.8	158.8	178.5	−17.2	0.8	0.8	90.0	−6.1	−26.2	
FLKSTGGL	−37.1	−38.5	−27.1	−38.5	−27.1	−46.8	−59.6	3.7	1.4	170.0	0.0	−28.7	*/MB4
FNL00000	46.8	7.1	46.8	36.8	46.8	23.8	64.3	1.5	1.0	23.0	−5.3	−28.6	
G 00000	−37.1	−38.5	−27.1	−38.5	−27.1	−4.1	53.9	1.6	1.0	151.0	−3.8	−27.8	*/MB4
GAB00000	38.8	−29.2	52.0	28.8	48.8	11.7	−0.7	1.4	1.1	79.0	−0.6	−23.0	
GDL00000	0.9	−13.9	5.7	−9.1	5.7	−61.9	16.3	0.8	0.8	90.0	−4.2	−23.1	*/MB11
GDL00002	−115.9	−123.2	−81.2	−123.2	−105.9	−61.8	16.4	0.8	0.8	90.0	−3.7	−22.7	*/MB13
GHA00000	16.0	−41.7	39.3	6.0	26.0	−1.3	7.7	1.5	1.1	90.0	−0.1	−23.0	
GIB00000	56.6	44.7	59.2	46.6	59.2	−5.4	36.1	0.8	0.8	90.0	−5.9	−27.0	*/MB9
GMB00000	−34.0	−77.3	44.5	−44.0	−24.0	−16.4	13.4	0.8	0.8	90.0	−9.3	−31.0	
GNB00000	40.0	−76.5	45.7	30.0	45.7	−15.4	12.0	0.8	0.8	90.0	−8.3	−28.8	
GNE00000	−32.3	−32.8	53.8	−32.8	−22.3	10.5	1.7	0.8	0.8	90.0	−5.9	−24.9	
GRC00000	16.6	−8.9	56.8	6.6	26.6	24.7	38.3	1.7	1.0	160.0	−1.8	−26.6	
GRD00000	−32.8	−113.0	−10.2	−42.8	−22.8	−61.6	12.0	0.8	0.8	90.0	−6.2	−26.5	
GRL00000	−49.0	−50.0	−43.1	−50.0	−43.1	−42.9	68.6	2.3	1.0	174.0	−2.4	−27.8	*/MB10
GTM00000	−135.7	−139.3	−41.4	−139.3	−125.7	−90.5	15.5	0.8	0.8	90.0	−3.3	−22.2	
GUF00000	0.9	−13.9	5.7	−9.1	5.7	−53.2	4.3	0.8	0.8	90.0	−4.6	−23.6	*/MB11
GUF00002	−115.9	−123.2	−81.2	−123.2	−105.9	−53.3	4.3	0.8	0.8	90.0	−4.4	−23.4	*/MB13
GUI00000	27.5	−51.8	33.8	17.5	33.8	−10.9	10.2	1.3	1.1	104.0	−0.6	−22.9	
GUMMRA00	−159.0	−169.8	−158.2	−169.0	−158.2	145.4	16.7	1.7	1.0	79.0	0.9	−22.2	*/MB2
GUY00000	−24.1	−100.1	−18.3	−34.1	−18.3	−59.2	4.7	1.4	1.0	94.0	−0.5	−22.8	
HKG00000	56.6	44.7	59.2	46.6	59.2	114.5	22.4	0.8	0.8	90.0	−5.6	−24.5	*/MB9
HND00000	−76.2	−123.8	−48.1	−86.2	−66.2	−86.1	15.4	1.4	1.0	26.0	−0.9	−23.1	
HNG00000	−6.6	−22.2	62.4	−16.6	3.4	19.4	47.4	0.8	0.8	90.0	−7.9	−28.1	2
HOL00000	−5.2	−50.1	1.9	−15.2	1.9	5.4	52.4	0.8	0.8	90.0	−9.3	−30.8	*/MB5
HTI00000	−92.0	−122.9	−23.1	−102.0	−82.0	−73.0	18.8	0.8	0.8	90.0	−6.2	−26.9	
HWA00000	−159.0	−169.8	−158.2	−169.0	−158.2	−157.6	20.7	1.2	1.0	157.0	−1.3	−23.1	*/MB2
HWL00000	−159.0	−169.8	−158.2	−169.0	−158.2	−176.6	0.1	0.8	0.8	90.0	−6.4	−27.4	*/MB2
I 00000	−28.1	−32.9	54.1	−32.9	−18.1	11.3	40.9	2.1	1.0	141.0	−0.7	−26.4	
IND00000	74.0	51.3	116.4	64.0	84.0	82.7	18.9	6.2	4.9	120.0	13.5	−22.2	
INS00000	115.4	101.1	135.0	105.4	125.4	117.6	−1.8	9.4	4.3	170.0	14.6	−22.4	
IRL00000	−31.0	−41.0	25.7	−41.0	−21.0	−8.2	53.2	0.8	0.8	90.0	−9.3	−29.3	
IRN00000	25.0	20.1	50.0	20.1	35.0	54.3	33.0	3.7	1.5	143.0	2.0	−27.5	
IRQ00000	66.4	5.1	82.5	56.4	76.4	44.3	33.1	1.6	1.3	178.0	−3.1	−28.0	

10.70-10.95 GHz, 11.20-11.45 GHz, 12.75-13.25 GHz

1	2	3		4		5	6	7	8	9	10	11	12
ISL00000	−35.4	−53.0	14.8	−45.4	−25.4	−18.2	64.9	0.8	0.8	90.0	−7.6	−27.4	
ISR00000	73.0	−8.0	78.4	63.0	78.4	35.0	31.3	0.8	0.8	90.0	−5.5	−26.3	
J 00000	152.5	94.4	170.9	142.5	162.5	140.4	30.4	5.7	3.7	15.0	12.0	−22.8	
JAR00000	−159.0	−169.8	−158.2	−169.0	−158.2	−160.0	−0.4	0.8	0.8	90.0	−6.6	−27.5	*/MB2
JMC00000	−108.6	−127.5	−27.8	−118.6	−98.6	−77.6	18.2	0.8	0.8	90.0	−6.0	−25.9	
JON00000	−159.0	−169.8	−158.2	−169.0	−158.2	−168.5	17.0	0.8	0.8	90.0	−9.3	−32.5	*/MB2
JOR00000	81.8	−28.8	102.9	71.8	91.8	36.7	31.3	0.8	0.8	90.0	−8.8	−28.5	
KEN00000	78.2	−10.4	86.3	68.2	86.3	38.4	0.8	2.1	1.3	95.0	−1.2	−27.6	
KER00000	113.0	113.0	114.3	113.0	114.3	69.3	−43.9	1.9	1.6	169.0	−1.3	−27.8	*/MB1
KIR00000	150.0	120.6	−134.6	140.0	160.0	173.0	1.0	0.8	0.8	90.0	−6.3	−27.1	
KOR00000	116.2	83.0	169.6	106.2	126.2	127.7	36.2	1.3	1.0	4.0	−3.4	−26.7	
KRE00000	145.0	110.1	150.0	135.0	150.0	127.8	39.8	1.4	1.0	14.0	−0.3	−23.3	
KWT00000	30.8	−20.2	115.3	20.8	40.8	47.7	29.1	0.8	0.8	90.0	−9.3	−31.6	1, 2
LAO00000	142.0	56.6	149.9	132.0	149.9	104.1	18.1	1.5	1.0	101.0	0.2	−22.6	
LBN00000	91.0	−31.6	103.2	81.0	101.0	35.8	33.8	0.8	0.8	90.0	−9.3	−30.5	
LBR00000	−41.8	−50.4	35.5	−50.4	−31.8	−8.9	6.5	0.8	0.8	90.0	−3.1	−22.1	
LBY00000	28.5	−19.2	54.9	18.5	38.5	19.0	25.9	3.0	2.7	165.0	3.1	−27.8	
LIE00000	7.9	−30.0	15.0	−2.1	15.0	9.5	47.2	0.8	0.8	90.0	−9.3	−31.2	
LSO00000	−18.7	−40.1	96.9	−28.7	−8.7	28.4	−29.5	0.8	0.8	90.0	−9.3	−31.1	
LUX00000	19.2	−53.9	66.1	9.2	29.2	6.2	49.7	0.8	0.8	90.0	−9.3	−31.6	
MAC00000	117.0	64.7	162.4	107.0	127.0	113.6	22.2	0.8	0.8	90.0	−6.3	−27.1	
MAU00000	92.2	8.0	107.0	82.2	102.2	57.5	−20.2	0.8	0.8	90.0	−6.0	−25.6	
MCO00000	40.5	−41.8	56.6	30.5	50.5	7.4	43.7	0.8	0.8	90.0	−7.1	−27.8	
MDG00000	16.9	10.4	81.1	10.4	26.9	46.6	−18.7	2.6	1.0	66.0	2.5	−22.5	
MDR00000	−7.9	−41.9	6.7	−17.9	2.1	−16.2	31.6	0.8	0.8	90.0	−9.3	−30.5	*/MB7
MDW00000	−159.0	−169.8	−158.2	−169.0	−158.2	−177.4	28.2	0.8	0.8	90.0	−9.3	−32.2	*/MB2
MEX00000	−113.0	−136.1	−61.0	−123.0	−103.0	−103.6	23.3	5.8	2.4	161.0	10.0	−23.7	
MLA00000	78.5	76.4	143.2	76.4	88.5	108.2	4.7	3.2	1.4	0.0	5.0	−22.3	
MLD00000	117.6	21.1	124.9	107.6	124.9	73.4	2.5	2.2	0.8	88.0	1.0	−22.4	
MLI00000	−1.3	−59.9	43.3	−11.3	8.7	−3.9	17.6	3.3	2.5	21.0	7.2	−24.8	
MLT00000	5.6	−39.8	68.5	−4.4	15.6	14.4	35.9	0.8	0.8	90.0	−9.3	−30.4	
MNG00000	113.6	60.4	148.9	103.6	123.6	103.8	46.8	3.6	1.1	3.0	0.6	−27.6	
MOZ00000	88.6	−10.6	90.6	78.6	90.6	35.6	−17.2	3.1	1.1	98.0	4.1	−22.0	
MRC00000	33.0	−50.5	37.5	23.0	37.5	−8.9	27.9	3.4	1.0	45.0	0.4	−27.0	
MRL00000	−159.0	−169.8	−158.2	−169.0	−158.2	175.3	8.7	2.3	1.4	94.0	3.6	−22.6	*/MB2
MTN00000	−22.8	−72.8	44.2	−32.8	−12.8	−10.3	19.8	2.5	2.4	76.0	1.0	−28.4	
MWI00000	30.3	−25.0	93.7	20.3	40.3	34.1	−13.3	1.6	1.0	101.0	−5.8	−29.3	
MYT00000	0.9	−13.9	5.7	−9.1	5.7	45.2	−12.8	0.8	0.8	90.0	−5.9	−24.9	*/MB11
NCG00000	−84.4	−124.4	−45.9	−94.4	−74.4	−84.9	12.9	1.1	1.0	16.0	−1.9	−23.1	
NCL00000	113.0	113.0	114.3	113.0	114.3	165.8	−21.4	0.8	0.8	90.0	−5.0	−23.9	*/MB1
NGR00000	−38.5	−54.5	64.6	−48.5	−28.5	7.5	17.2	2.1	1.7	100.0	0.3	−27.3	
NIG00000	42.5	−29.6	49.6	32.5	49.6	8.0	9.9	2.5	1.6	47.0	4.3	−22.4	
NMB00000	13.4	−45.4	82.5	3.4	23.4	18.5	−21.0	2.7	2.6	155.0	0.2	−29.6	
NOR00000	3.9	2.9	29.1	2.9	13.9	11.7	64.6	2.0	1.0	17.0	−2.9	−27.7	
NPL00000	123.3	30.3	137.6	113.3	133.3	84.4	28.0	0.8	0.8	90.0	−6.3	−26.6	
NRU00000	146.0	114.5	−140.7	136.0	156.0	166.9	−0.5	0.8	0.8	90.0	−6.3	−27.2	
NZL00001	152.0	150.9	175.0	150.9	162.0	170.9	−44.8	5.4	1.0	49.0	2.9	−26.5	*/MB14
NZL00002	152.0	150.9	175.0	150.9	162.0	−165.4	−13.2	2.7	2.0	82.0	6.3	−22.0	*/MB14
OCE00000	−115.9	−123.2	−81.2	−123.2	−105.9	−141.9	−16.1	3.5	2.4	139.0	7.7	−24.2	*/MB13
OMA00000	104.0	−9.8	122.2	94.0	114.0	55.1	21.6	1.9	1.0	61.0	−5.1	−29.3	5
PAK00000	56.0	34.1	62.0	46.0	62.0	69.9	29.8	3.0	2.0	22.0	4.6	−25.7	
PHL00000	89.6	83.0	159.8	83.0	99.6	121.3	11.4	3.3	1.5	101.0	5.7	−22.3	
PLM00000	−159.0	−169.8	−158.2	−169.0	−158.2	−161.4	7.0	0.8	0.8	90.0	−6.7	−27.6	*/MB2
PNG00000	154.1	114.2	−176.5	144.1	164.1	148.4	−6.6	3.3	2.3	167.0	6.9	−22.7	
PNR00000	−79.2	−120.0	−40.4	−89.2	−69.2	−80.2	8.5	1.2	1.0	177.0	−1.5	−23.2	
POL00000	14.2	−14.8	56.4	4.2	24.2	19.3	52.0	1.3	1.0	166.0	−6.1	−28.7	
POR00000	−7.9	−41.9	6.7	−17.9	2.1	−8.0	39.7	0.8	0.8	90.0	−8.1	−28.1	*/MB7
PRG00000	−81.5	−90.4	−23.2	−90.4	−71.5	−58.7	−23.1	1.5	1.3	116.0	1.0	−22.8	
PRU00000	−89.9	−120.4	−38.2	−99.9	−79.9	−74.2	−8.4	3.6	2.4	111.0	7.8	−22.5	
PTC00000	−62.0	−62.6	−58.5	−62.6	−58.5	−130.1	−25.1	0.8	0.8	90.0	−9.3	−31.5	
QAT00000	8.3	−16.9	120.0	−1.7	18.3	51.6	25.4	0.8	0.8	90.0	−9.3	−31.5	
REU00000	0.9	−13.9	5.7	−9.1	5.7	55.6	−21.1	0.8	0.8	90.0	−5.6	−24.6	*/MB11
REU00002	113.0	113.0	114.3	113.0	114.3	55.6	−21.1	0.8	0.8	90.0	−5.5	−24.5	*/MB1
ROU00000	31.0	−1.0	51.0	21.0	41.0	25.0	46.3	1.5	1.0	178.0	−4.3	−28.0	
RRW00000	6.8	−30.9	90.8	−3.2	16.8	29.7	−1.9	0.8	0.8	90.0	−9.3	−30.8	
S 00000	11.2	−7.0	47.1	1.2	21.2	16.7	60.9	1.1	1.0	30.0	−6.4	−28.6	
SCN00000	−88.8	−113.2	−12.6	−98.8	−78.8	−62.9	17.3	0.8	0.8	90.0	−6.2	−26.5	
SDN00001	1.4	−7.0	15.0	−7.0	11.4	29.3	10.3	3.0	1.9	131.0	4.7	−25.5	*/MB15
SDN00002	1.4	−7.0	15.0	−7.0	11.4	29.4	16.7	2.6	2.4	171.0	0.5	−28.9	*/MB15

10.70-10.95 GHz, 11.20-11.45 GHz, 12.75-13.25 GHz

1	2	3		4		5	6	7	8	9	10	11	12
SEN00000	−48.4	−64.4	34.3	−58.4	−38.4	−14.0	14.1	1.1	1.0	148.0	−1.4	−23.8	
SEY00000	96.5	3.1	107.7	86.5	106.5	55.4	−4.5	0.8	0.8	90.0	−6.0	−25.2	
SLM00000	147.5	120.4	−161.7	137.5	157.5	159.0	−9.1	1.5	1.0	147.0	−0.3	−23.0	
SLV00000	−130.5	−130.5	−47.5	−130.5	−120.5	−89.0	13.7	0.8	0.8	90.0	−5.9	−24.9	
SMA00000	−159.0	−169.8	−158.2	−169.0	−158.2	−170.7	−14.2	0.8	0.8	90.0	−9.3	−32.5	*/MB2
SMO00000	−125.5	137.5	−121.7	−135.5	−121.7	−172.1	−13.7	0.8	0.8	90.0	−5.7	−24.6	
SMR00000	23.0	−36.4	61.4	13.0	33.0	12.5	43.9	0.8	0.8	90.0	−9.3	−30.3	
SNG00000	98.1	60.6	147.1	88.1	108.1	103.9	1.3	0.8	0.8	90.0	−6.4	−25.4	
SOM00000	98.4	−20.0	102.7	88.4	102.7	46.0	6.3	3.1	1.0	72.0	0.1	−26.9	
SPM00000	0.9	−13.9	5.7	−9.1	5.7	−56.4	47.0	0.8	0.8	90.0	−6.3	−27.3	*/MB11
SRL00000	−51.8	−63.8	40.0	−61.8	−41.8	−11.9	8.5	0.8	0.8	90.0	−6.0	−25.4	
STP00000	31.4	−45.4	59.4	21.4	41.4	7.0	1.0	0.8	0.8	90.0	−6.2	−27.0	
SUI00000	−9.2	−20.0	35.0	−19.2	0.8	8.2	46.5	0.8	0.8	90.0	−9.3	−29.4	2
SUR00000	−77.0	−97.0	−15.0	−87.0	−67.0	−55.6	3.9	1.0	0.9	37.0	−2.7	−23.2	
SWZ00000	29.0	−26.8	89.2	19.0	39.0	31.3	−26.4	0.8	0.8	90.0	−9.3	−30.9	
SYR00000	18.7	10.1	70.0	10.1	28.7	38.6	35.3	1.1	1.0	32.0	−6.2	−28.3	4
TCD00000	−10.5	−36.5	67.5	−20.5	−0.5	18.4	15.6	3.5	1.6	97.0	5.9	−24.1	
TCH00000	−12.7	−21.3	54.4	−21.3	−2.7	17.3	49.6	1.3	1.0	166.0	−4.2	−27.4	2
TGO00000	−21.1	−41.0	43.4	−31.1	−11.1	0.8	8.6	1.1	1.0	116.0	−1.8	−23.2	
THA00000	120.6	58.6	137.2	110.6	130.6	100.9	12.8	2.8	1.6	83.0	4.9	−22.6	
TON00000	−128.0	135.7	−126.0	−138.0	−126.0	−175.2	−21.2	0.8	0.8	90.0	−5.8	−24.7	
TRD00000	−73.4	−112.3	−9.9	−83.4	−63.4	−61.1	10.8	0.8	0.8	90.0	−6.3	−27.3	
TUN00000	−4.1	−29.0	48.4	−14.1	5.9	9.4	33.5	1.3	1.0	104.0	−5.0	−28.2	
TUR00000	9.4	7.1	61.6	7.1	19.4	34.1	38.9	2.8	1.0	171.0	0.9	−26.0	
TUV00000	158.0	127.3	−129.0	148.0	168.0	179.2	−8.5	0.8	0.8	90.0	−6.2	−27.1	
TZA00000	69.5	−21.3	91.4	59.5	79.5	35.4	−5.9	2.4	1.4	117.0	−0.4	−27.8	
UAE00000	70.4	−12.7	120.3	60.4	80.4	53.8	24.9	1.1	1.0	12.0	−8.8	−30.4	
UGA00000	32.0	−27.2	91.6	22.0	42.0	32.2	0.9	1.5	1.0	70.0	−5.4	−28.9	
URG00000	−86.1	−108.9	−3.5	−96.1	−76.1	−56.3	−33.7	1.1	1.0	58.0	−5.6	−27.7	
URS00001	61.0	56.7	65.4	56.7	65.4	57.6	48.3	7.5	3.5	178.0	8.8	−26.2	
URS00002	88.1	87.7	98.0	87.7	98.0	94.8	48.6	7.5	3.5	175.0	12.4	−26.2	
URS00003	138.5	138.5	140.6	138.5	140.6	134.9	52.6	7.5	3.5	5.0	8.7	−26.2	
USA00000	−101.0	−130.3	−63.5	−111.0	−91.0	−93.9	36.8	8.2	3.6	172.0	13.7	−23.2	*/MB16
USAVIPRT	−101.0	−130.3	−63.5	−111.0	−91.0	−64.5	17.8	0.8	0.8	90.0	−6.0	−25.5	*/MB16
VCT00000	−93.1	−112.3	−9.9	−103.1	−83.1	−61.1	13.2	0.8	0.8	90.0	−6.1	−26.2	
VEN00001	−82.7	−102.5	−24.7	−92.7	−72.7	−66.4	6.8	2.8	2.1	142.0	5.8	−22.7	*/MB17
VEN00002	−82.7	−102.5	−24.7	−92.7	−72.7	−63.6	15.7	0.8	0.8	90.0	−6.2	−27.0	*/MB17
VTN00000	107.0	85.1	125.0	97.0	117.0	108.5	14.2	3.6	2.6	139.0	8.2	−22.6	
VUT00000	150.7	127.4	−152.4	140.7	160.7	168.4	−17.2	1.2	1.0	122.0	−1.5	−23.1	
WAK00000	−159.0	−169.8	−158.2	−169.0	−158.2	166.5	19.2	0.8	0.8	90.0	−9.3	−32.0	*/MB2
WAL00000	113.0	113.0	114.3	113.0	114.3	−177.1	−13.8	0.8	0.8	90.0	−5.1	−24.1	*/MB1
YEM00000	27.0	−24.3	113.2	17.0	37.0	44.2	15.1	1.0	1.0	103.0	−8.9	−30.2	
YMS00000	108.0	−16.4	114.4	98.0	114.4	49.9	14.8	1.4	1.0	53.0	−4.8	−28.0	
YUG00000	43.1	−25.8	60.2	33.1	53.1	18.7	44.4	1.1	1.0	161.0	−4.7	−27.3	
ZAI00000	51.0	−23.6	62.6	41.0	61.0	24.4	−4.6	3.9	3.5	92.0	9.9	−22.3	
ZMB00000	39.6	−27.9	82.5	29.6	49.6	27.9	−12.8	2.4	1.6	26.0	−2.1	−29.2	
ZWE00000	65.6	−27.0	85.5	55.6	75.6	30.0	−18.9	1.5	1.1	140.0	−5.1	−28.9	

B COLUMN HEADINGS OF PART B OF THE PLAN

Col. 1 *Beam identification*

Col. 2 *Administration*

Col. 3 *Space station name*

Col. 4 *Orbital position*, in degrees and hundredths of a degree East longitude

Col. 5 *Western limit of visible arc*, in degrees and tenths of a degree East longitude (if no visible arc is given, this value is that of the orbital position)

Col. 6 *Eastern limit of visible arc*, in degrees and tenths of a degree East longitude (if no visible arc is given, this value is that of the orbital position)

Col. 7 *Western limit of service arc*, in degrees and tenths of a degree East longitude

Col. 8 *Eastern limit of service arc*, in degrees and tenths of a degree East longitude

Col. 9 *Predetermined arc* (western and eastern limits in degrees and tenths of a degree)

Col. 10 *Use of 4 GHz band*
(0 = no, 1 = yes)

Col. 11 *Use of 6 GHz band*
(0 = no, 1 = yes)

Col. 12 *Use of 10-11 GHz band*
(0 = no, 1 = yes)

Col. 13 *Use of 13 GHz band*
(0 = no, 1 = yes)

Col. 14 *Satellite antenna boresight longitude*, in degrees and tenths of a degree East longitude

Col. 15 *Satellite antenna boresight latitud*e, in degrees and tenths of a degree North latitude

Col. 16 *Satellite antenna major axis beamwidth* (this is the half-power beamwidth, expressed in degrees and tenths of a degree)

Col. 17 *Satellite antenna minor axis beamwidth* (this is the half-power beamwidth, expressed in degrees and tenths of a degree)

Col. 18 *Satellite antenna major axis orientation*, in degrees and tenths of a degree anticlockwise with respect to the equatorial plane

Col. 19 *Names of other beams on the same satellite*[8]

Col. 20 *Power density* fed to transmitting earth station antenna in dB(W/Hz) averaged over the necessary bandwidth (if the network does not operate in any of the up-link frequency bands of the Plan, no value is entered)

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[8] *Note by the Secretariat (applicable when an asterisk (*) appears in column 19):* It is to be noted that this beam is intended to be implemented as part of a multi-beam network, operating from a single orbital location. Within any multi-beam network, the beams are the responsibility of a single administration, hence interference between them has not been taken into account during the Conference. The number which appears in the alphanumeric code that follows the asterisk serves to identify the multi-beam network concerned.

Col. 21 *Transmitting earth station antenna gain*, in dBi (if the network does not operate in either of the up-link frequency bands of the Plan, no value is entered)

Col. 22 *Earth station antenna side-lobe characteristic* (this is the value X to be used in the equation: $G(h) = X - 25 \log(h)$ dBi (if no value is given, it is set to 32.0 dBi))

Col. 23 *Satellite antenna gain*, in dBi (the value shown applies to both the transmitting and the receiving antennas)

Col. 24 *Satellite antenna pattern* (1 = Figure 1 of Annex 1; 2 = Figure 2 of Annex 1)

Col. 25 *Satellite receiving system noise temperature*, in kelvins (if the network does not operate in either of the up-link frequency bands of the Plan, no value is entered)

Col. 26 *Power density* fed to transmitting space station antenna, in dB(W/Hz) averaged over the necessary bandwidth (if the network does not operate in any of the down-link frequency bands of the Plan, no value is entered)

Col. 27 *Receiving earth station antenna gain*, in dBi (if the network does not operate in either of the down-link frequency bands of the Plan, no value is entered)

Col. 28 *Earth station receiving system noise temperature*, in kelvins (if the network does not operate in either of the down-link frequency bands of the Plan, no value is entered)

1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
CANMSAT0	CAN	MSAT	−106.50	−107.5	−105.4	−107.5	−105.4	−107.5	−105.4	0	0	0	1	−95.9	42.9	8.6	3.9	164		−42.0	50.7	29.0	30.0	1	725			
F EU1B1	F	EUTELSAT-1	10.00	−25.0	21.0	9.9	12.1	10.0	10.0	0	0	1	0	8.2	38.6	7.6	4.5	0				32.0	28.0	1		−68.5	63.5	200
F E12B1	F	EUTELSAT-1-2	13.00	−25.0	21.0	9.9	13.1	13.0	13.0	0	0	1	0	8.7	38.5	7.6	4.5	0				32.0	28.0	1		−68.5	63.5	200
F E13B1	F	EUTELSAT-1-3	7.00	−25.0	21.0	3.0	16.5	7.0	7.0	0	0	1	0	7.3	38.6	7.6	4.5	0				32.0	28.0	1		−68.5	63.5	200
F E14B1	F	EUTELSAT-1-4	16.00	−25.0	21.0	3.0	16.5	16.0	16.0	0	0	1	0	8.6	38.3	7.6	4.5	0				32.0	28.0	1		−68.5	63.5	200
F LSAT1	F	LSAT	−19.00	−19.1	−18.9	−19.1	−18.9	−19.0	−19.0	0	0	0	1	−4.0	50.8	1.5	1.5	90	*/MB20	−49.0	56.0	32.0	41.0	1	1000			
F LSAT2	F	LSAT	−19.00	−19.1	−18.9	−19.1	−18.9	−19.0	−19.0	0	0	0	1	5.0	47.4	1.5	1.5	90	*/MB20	−49.0	56.0	32.0	41.0	1	1000			
F LSAT3	F	LSAT	−19.00	−19.1	−18.9	−19.1	−18.9	−19.0	−19.0	0	0	0	1	14.0	44.5	1.5	1.5	90	*/MB20	−49.0	56.0	32.0	41.0	1	1000			
F LSAT4	F	LSAT	−19.00	−19.1	−18.9	−19.1	−18.9	−19.0	−19.0	0	0	0	1	15.7	62.6	1.5	1.5	90	*/MB20	−49.0	56.0	32.0	41.0	1	1000			
F LSAT5	F	LSAT	−19.00	−19.1	−18.9	−19.1	−18.9	−19.0	−19.0	0	0	0	1	−5.2	40.0	1.5	1.5	90	*/MB20	−49.0	56.0	32.0	41.0	1	1000			
INSAT-2A	IND	INSAT-IIA	83.00	20.0	140.0	70.0	95.0	83.0	83.0	1	1	0	0	81.8	23.2	5.6	4.0	54		−42.0	42.8	29.0	31.0	2	1580	−64.5	37.8	288
INSAT-2B	IND	INSAT-IIB	93.50	20.0	140.0	70.0	95.0	93.5	93.5	1	1	0	0	82.4	23.2	5.7	3.8	51		−42.0	42.8	29.0	31.0	2	1580	−64.5	37.8	288
INSAT-2C	IND	INSAT-IIC	74.00	20.0	140.0	70.0	95.0	74.0	74.0	1	1	0	0	81.3	23.3	5.3	4.1	62		−42.0	42.8	29.0	31.0	2	1580	−64.5	37.8	288
EIREB100	IRL	EIRESAT-1	−31.00	−100.0	40.0	−31.1	−30.9	−31.0	−31.0	0	0	1	1	−78.4	39.1	6.1	1.5	46	*/MB21	−49.5	42.9	29.0	39.0	2	1266	−59.8	41.4	346
EIREB200	IRL	EIRESAT-1	−31.00	−100.0	40.0	−31.1	−30.9	−31.0	−31.0	0	0	1	1	0.3	46.8	3.6	1.7	145	*/MB21	−49.5	42.9	29.0	36.7	2	1266	−59.8	41.4	346
LUXGDL41	LUX	GDL-4	−20.00	−34.0	49.0	−25.0	37.0	−20.0	−20.0	0	1	0	0	3.3	46.9	2.5	2.0	150		−52.0	54.5	29.0	36.5	2	800			
LUXGDL42	LUX	GDL-4	−20.00	−34.0	49.0	−25.0	37.0	−20.0	−20.0	0	0	1	0	2.0	46.5	3.8	2.2	172				29.0	37.5	2		−58.5	38.2	300
LUXGDL51	LUX	GDL-5	−24.40	−34.0	49.0	−25.0	37.0	−24.4	−24.4	0	1	0	0	3.2	47.2	3.1	1.6	26		−52.0	54.5	29.0	36.5	2	800			
LUXGDL52	LUX	GDL-5	−24.40	−34.0	49.0	−25.0	37.0	−24.4	−24.4	0	0	1	0	3.0	47.5	3.7	2.4	11				29.0	37.5	2		−59.5	38.2	300
LUXGDL61	LUX	GDL-6	19.20	−34.0	49.0	−25.0	37.0	19.2	19.2	0	1	0	0	3.6	45.9	3.1	1.6	30		−52.0	54.5	29.0	36.5	2	800			
LUXGDL62	LUX	GDL-6	19.20	−34.0	49.0	−25.0	37.0	19.2	19.2	0	0	1	1	4.3	47.7	4.1	2.1	21		−54.0	62.0	29.0	37.5	2	800	−58.5	38.2	300
PAKSAT01	PAK	PAKSAT I	38.00	38.0	38.0	38.0	38.0	33.0	43.0	0	0	1	0	69.3	29.8	3.2	2.1	30				32.0	40.0	1		−67.0	37.5	250
PAKSAT02	PAK	PAKSAT II	41.00	41.0	41.0	41.0	41.0	36.0	46.0	0	0	1	0	69.3	29.8	3.2	2.1	30				29.0	40.0	1		−67.0	37.5	250
PNGP1B01	PNG	PACSTAR-1	167.45			165.0	−175.0	167.5	167.5	0	1	0	0	157.0	−4.0	16.0	7.5	153	*/MB22	−55.0	51.7	29.0	26.0	2	630			
PNGP1B02	PNG	PACSTAR-1	167.45			165.0	−175.0	167.5	167.5	0	1	0	0	−162.0	18.0	2.8	2.8	90	*/MB22	−55.0	51.7	29.0	26.0	2	630			
PNGP2B01	PNG	PACSTAR-2	−175.00			159.9	−175.0	−175.0	−175.0	0	1	0	0	170.0	−6.0	16.0	7.5	172	*/MB23	−55.0	51.7	29.0	26.0	2	630			
PNGP2B02	PNG	PACSTAR-2	−175.00			159.9	−175.0	−175.0	−175.0	0	1	0	0	−155.0	24.0	2.8	2.8	90	*/MB23	−55.0	51.7	29.0	26.0	2	630			
URSEEDRN	URS	ESDRN	−160.00	−161.0	82.0	−161.0	−159.0	−160.0	−160.0	0	0	1	0	140.5	53.2	1.0	1.0	90				32.0	43.0	1		−70.0	62.0	160
URSCSDR1	URS	CSDRN	95.00	−15.0	96.0	94.0	96.0	95.0	95.0	0	0	1	0	40.6	56.2	1.0	1.0	90	*/MB24			32.0	43.0	1		−70.0	62.0	160
URSCSDR2	URS	CSDRN	95.00	−161.0	82.0	94.0	96.0	95.0	95.0	0	0	1	0	140.5	53.2	1.0	1.0	90	*/MB24			32.0	43.0	1		−70.0	62.0	160
URSWWDRN	URS	WSDRN	−16.00	−15.0	96.0	−15.0	−17.0	−16.0	−16.0	0	0	1	0	40.6	56.2	1.0	1.0	90	*/MB25			32.0	43.0	1		−70.0	62.0	160
URSCSRB1	URS	CSSRD-2	77.00	54.0	173.0	76.9	77.1	77.0	77.0	0	0	1	0	113.5	52.1	1.1	1.1	90	*/MB26			32.0	39.0	1		−70.0	62.0	160
URSCSRB2	URS	CSSRD-2	77.00	−15.0	96.0	76.9	77.1	77.0	77.0	0	0	1	0	40.8	55.7	1.1	1.1	90	*/MB26			32.0	39.0	1		−70.0	62.0	160
URSVVRB1	URS	VSSRD-2	167.00	54.0	173.0	166.9	167.1	167.0	167.0	0	0	1	0	113.5	52.1	1.1	1.1	90				32.0	39.0	1		−70.0	62.0	160
URSZZRB1	URS	ZSSRD-2	−16.00	−15.0	96.0	−16.1	−15.9	−16.0	−16.0	0	0	1	0	40.8	55.7	1.1	1.1	90	*/MB25			32.0	39.0	1		−70.0	62.0	160
URSSTAD1	URS	STATSIONAR-D1	−26.50	−28.5	−24.5	−28.5	−24.5	−26.5	−26.5	1	0	0	0	−26.5	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSSTAD2	URS	STATSIONAR-D2	−170.00	−172.0	−168.0	−172.0	−168.0	−170.0	−170.0	1	0	0	0	−170.0	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSSTAD3	URS	STATSIONAR-D3	35.00	33.0	37.0	33.0	37.0	35.0	35.0	1	0	0	0	35.0	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSSTAD4	URS	STATSIONAR-D4	45.00	43.0	47.0	43.0	47.0	45.0	45.0	1	0	0	0	45.0	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSSTAD5	URS	STATSIONAR-D5	85.40	83.0	87.0	83.0	87.0	85.4	85.4	1	0	0	0	85.0	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSSTAD6	URS	STATSIONAR-D6	128.00	126.0	130.0	126.0	130.0	128.0	128.0	1	0	0	0	128.0	0.0	17.3	17.3	90				40.4	25.0	1		−64.8	31.0	400
URSFOT-1	URS	FOTON-1	−13.50			−16.0	−12.5	−16.0	−12.5	1	0	0	0	−13.5	0.0	17.3	17.3	90				29.0	25.0	1		−72.2	49.0	500
URSFOT-2	URS	FOTON-2	80.00			79.0	82.5	80.0	80.0	1	0	0	0	80.0	0.0	17.3	17.3	90				29.0	25.0	1		−72.2	49.0	500
URSFOT-3	URS	FOTON-3	−168.00			−170.0	−167.0	−170.0	−167.0	1	0	0	0	−168.0	0.0	17.3	17.3	90				29.0	25.0	1		−72.2	49.0	500
USA13DB1	USA	USASAT-13D	−56.00			−59.0	−51.0	−56.0	−56.0	0	0	1	0	−3.0	47.0	3.7	1.0	143				29.0	39.0	2		−69.3	48.7	170
USA13EB1	USA	USASAT-13E	−58.00			−59.0	−51.0	−58.0	−58.0	0	0	1	0	−3.1	46.9	3.7	1.0	142				29.0	39.0	2		−69.3	48.7	170
USA13HB1	USA	USASAT-13H	−57.00	−69.0	−20.0	−69.0	−40.0	−62.0	−52.0	0	1	0	0	−61.5	−2.9	16.9	7.6	103	*/MB27	−48.4	49.5	29.0	25.9	2	800			
USA13HB2	USA	USASAT-13H	−57.00	−69.0	−20.0	−69.0	−57.0	−62.0	−52.0	0	1	0	0	−6.4	40.1	2.4	1.3	127	*/MB27	−48.4	49.5	29.0	25.9	2	800			
USA13HB3	USA	USASAT-13H	−57.00	−69.0	−20.0	−69.0	−57.0	−62.0	−52.0	0	0	1	0	−69.4	24.5	6.3	4.3	119	*/MB28			29.0	33.0	2		−67.4	53.0	200
USA13HB4	USA	USASAT-13H	−57.00	−69.0	−20.0	−69.0	−57.0	−62.0	−52.0	0	0	1	0	−59.4	−10.6	13.2	9.3	104	*/MB28			29.0	27.0	2		−60.4	53.0	200
USA13IB1	USA	USASAT-13I	−45.00	−69.0	−20.0	−69.0	−40.0	−45.0	−45.0	0	1	0	0	−59.6	−1.1	16.2	7.4	100	*/MB29	−48.4	49.5	29.0	25.9	2	800			
USA13IB2	USA	USASAT-13I	−45.00	−69.0	−20.0	−69.0	−40.0	−45.0	−45.0	0	1	0	0	−5.2	40.4	2.3	1.9	144	*/MB29	−48.4	49.5	29.0	25.9	2	800			
USA13IB3	USA	USASAT-13I	−45.00	−69.0	−20.0	−69.0	−40.0	−45.0	−45.0	0	0	1	0	−68.3	23.9	6.0	4.1	99	*/MB30			29.0	33.0	2		−64.4	53.0	200
USA13IB4	USA	USASAT-13I	−45.00	−69.0	−20.0	−69.0	−40.0	−45.0	−45.0	0	0	1	0	−56.2	−10.7	13.4	8.5	109	*/MB30			29.0	27.0	2		−57.4	53.0	200

ARTICLE 11

Period of validity of the provisions and associated Plan

11.1 These provisions and associated Plan have been prepared in order to guarantee in practice for all countries equitable access to the GSO and the frequency bands contained in Article 3, to meet the requirements of the fixed-satellite service for a period of at least 20 years from the date of entry into force of this Appendix.

11.2 These provisions and associated Plan shall, in any event, remain in force until their revision by a competent world administrative radio conference, convened in accordance with the relevant provisions of the Convention in force.

ANNEX 1*

Parameters used in characterizing the fixed-satellite service Plan

Section A – Technical data used in establishing the Allotment Plan and the associated provisions

1 Basic technical characteristics

The allotments in the Plan are based on a reference satellite network with the following assumptions:

1.1 Type of modulation

The Plan is independent of modulation characteristics and accessing techniques.

1.2 Carrier-to-noise ratio

The carrier-to-noise ratio (C/N) is as follows:

a) the up-link carrier-to-noise ratio is equal to 23 dB under rain fading conditions with a minimum earth station transmitter power density of −60 dB(W/Hz) averaged over the necessary bandwidth of the modulated carrier;

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* *Note by the Secretariat:* Subsequent to WARC Orb-88, certain errors have been discovered in the technical information for fast roll-off antenna patterns as contained in Appendices **S30A** and **S30B**. This technical information as corrected by the ex-IFRB derives from other relevant Conference decisions and is given in the Rule of Procedure published by the Bureau in 1994.

b) the down-link carrier-to-noise ratio is equal to 17 dB under rain fading conditions;

c) the total carrier-to-noise ratio is equal to 16 dB under rain fading conditions;

d) for the 6/4 GHz bands, the above C/Ns are exceeded for 99.95% of the year
(NOTE – The rain attenuation margin is limited to a maximum of 8 dB);

e) for the 13/10-11 GHz bands, the above C/Ns are exceeded for 99.9% of the year
(NOTE – The rain attenuation margin is limited to a maximum of 8 dB);

f) the rain attenuation model used is that described in ITU-R Report 564-3* (1986).

1.3 Earth station antenna elevation angle

The minimum elevation angle for each test point defining the service area is based on the following:

10° for climatic zones A to G;

20° for climatic zones H to L;

30° for climatic zones M and N;

40° for climatic zone P.

Administrations may select lower elevation angles for their service areas. For countries at high latitudes or with dispersed territories, in the absence of such a request, if the above values for minimum elevation angle are unobtainable, then the highest elevation angle leading to a non-zero service arc applies. In mountainous areas, the elevation angles are specified by the administrations concerned.

1.4 Interference criteria

The Plan has been prepared with a view to assuring for each allotment an aggregate carrier-to-interference ratio under free-space conditions of 26 dB or higher.

1.5 Polarization

Polarization isolation between satellite networks was not used in the development of the Allotment Plan.

1.6 Earth station characteristics

1.6.1 The diameters of the earth station antennas are:

7 m for the 6/4 GHz band;

3 m for the 13/10-11 GHz band.

* This Report is no longer in force.

1.6.2 The earth station receiving system noise temperature referred to the output of the receiving antenna is:

140 K for the 4 GHz band;

200 K for the 10-11 GHz band.

1.6.3 The earth station antenna efficiency is 70%.

1.6.4 The earth station antenna reference pattern is shown in Table 1 below. If so desired by an administration, the improved side-lobe pattern of $29 - 25 \log \varphi$ may be used.

1.6.5 In cases where the C/I ratio of 26 dB cannot be obtained, it would be appropriate for the countries concerned to agree on the use of antennas with an improved side-lobe pattern of $29 - 25 \log \varphi$ or on other suitable means so as to obtain the above ratio (see Table 1 below).

TABLE 1

$G_{max} = 10 \log [\eta(\pi D/\lambda)^2]$

	$G(\varphi) = G_{max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda}\varphi\right)^2$	for $0 < \varphi < \varphi_m$
	$G(\varphi) = G_1$	for $\varphi_m \leq \varphi < \varphi_r$
	$G(\varphi) = 32 - 25 \log \varphi$ $G(\varphi) = -10$	for $\varphi_r \leq \varphi < 48°$ for $48° \leq \varphi \leq 180°$
or	$G(\varphi) = 29 - 25 \log \varphi$ $G(\varphi) = -10$	for $\varphi_r \leq \varphi < 36.3°$ for $36.3° \leq \varphi < 180°$

where:

D = antenna diameter λ = wavelength	expressed in the same unit

φ = off-axis angle of the antenna, in degrees

G_1 = gain of the first side lobe =	$2 + 15 \log \frac{D}{\lambda}$ for $32 - 25 \log \varphi$ or $-1 + 15 \log \frac{D}{\lambda}$ for $29 - 25 \log \varphi$

$$\varphi_m = \frac{20\lambda}{D} \sqrt{G_{max} - G_1} \quad \text{(degrees)}$$

$$\varphi_r = 15.85 \left(\frac{D}{\lambda}\right)^{-0.6} \quad \text{(degrees)}$$

η = antenna efficiency

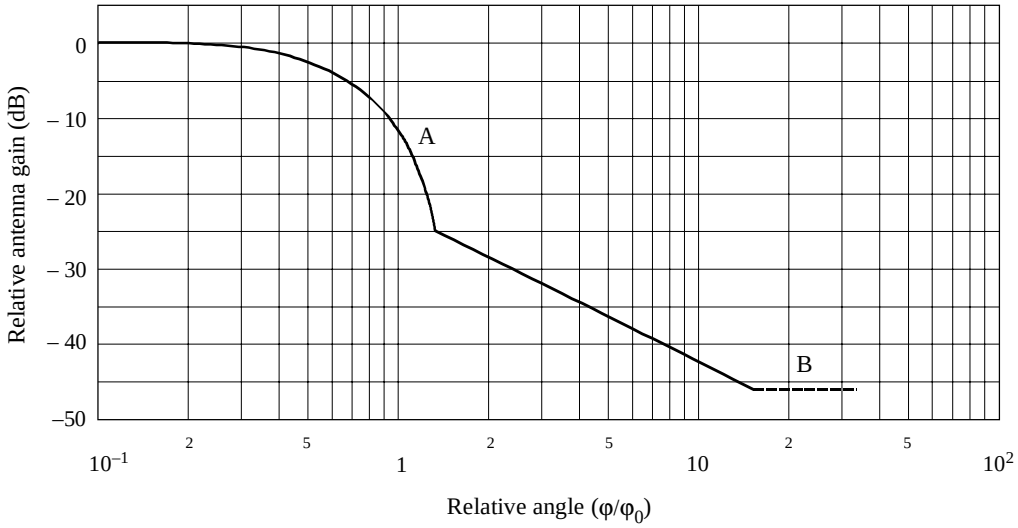
1.7 Space station characteristics

1.7.1 The Allotment Plan is based on the use of space station antennas with beams of elliptical or circular cross-section.

1.7.2 The antenna radiation characteristics are as shown in Figure 1. The fast roll-off characteristics shown in Figure 2 may be used when so specified by administrations.

FIGURE 1

Reference patterns for satellite antennas



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$G_{max} = 44.45 - 10 \log (\varphi_{01} \cdot \varphi_{02})$ dBi

Curve A: dB relative to main beam gain

$-12 (\varphi/\varphi_0)^2$ for $0 \leq (\varphi/\varphi_0) \leq 1.45$

$-(22 + 20 \log (\varphi/\varphi_0))$ for $(\varphi/\varphi_0) > 1.45$

after intersection with curve B: curve B

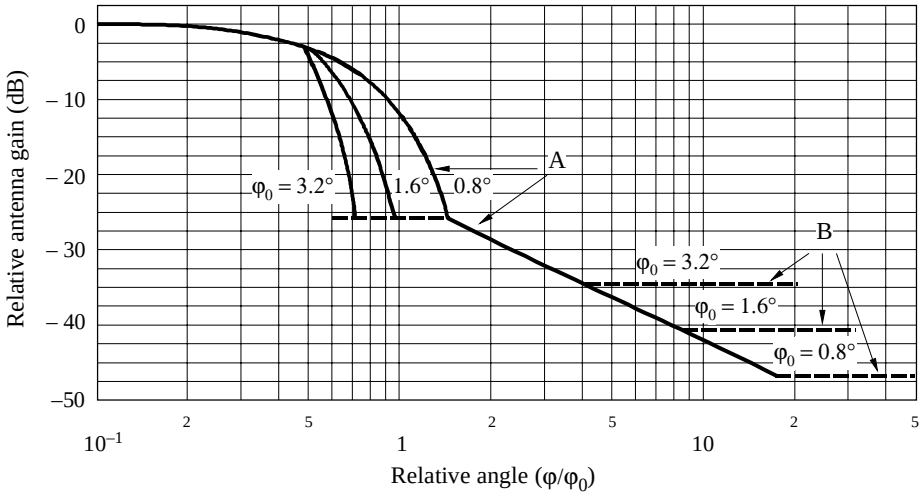
Curve B: Minus the on-axis gain (curves B in this figure illustrates the particular case of an antenna with an on-axis gain of 46 dBi).

φ_{01}, φ_{02}: Major and minor axis half-power beamwidth, respectively, of elliptical beam (degrees).

φ_0: Cross-sectional half-power beamwidth in the direction of interest (degrees)

FIGURE 2

Reference patterns for satellite antennas with roll-off in the main beam



APS30B/30BA1-02

Curve A: dB relative to main beam gain

$-12\ (\varphi/\varphi_0)^2$ for $0 \le (\varphi/\varphi_0) \le 0.5$

$-18.75\ \varphi_0^2\ (\varphi/\varphi_0 - x)^2$ for $0.5 < (\varphi/\varphi_0) \le \left(\frac{1.16}{\varphi_0} + x\right)$

-25.23 for $\left(\frac{1.16}{\varphi_0} + x\right) < (\varphi/\varphi_0) \le 1.45$

$-(22 + 20 \log (\varphi/\varphi_0))$ for $(\varphi/\varphi_0) > 1.45$

after intersection with curve B: curve B

Curve B: Minus the on-axis gain (curves A and C represent examples of three antennas having different values of φ_0 as labelled in Figure 2. The on-axis gains of these antennas are approximately 34, 40 and 46 dBi, respectively).

where:

φ = off-axis angle (degrees)

φ_0 = cross-sectional half-power beamwidth in the direction of interest (degrees)

$x = 0.5 \left(1 - \frac{0.8}{\varphi_0}\right)$, for the 13/10-11 GHz bands

$x = 0.5 \left(1 - \frac{0.6}{\varphi_0}\right)$, for the 6/4 GHz band

1.7.3 The space station receiving system noise temperature referred to the output of the receiving antenna is:

1000 K for the 6 GHz band;

1500 K for the 13 GHz band.

1.7.4 The minimum beamwidth size, in terms of the half-power beamwidth, is 1.6° for the 6/4 GHz band and 0.8° for the 13/10-11 GHz band.

1.7.5 The space station antenna efficiency is 55%.

1.7.6 The deviation of the space station antenna beam from its nominal pointing direction is limited to 0.1° in any direction. The rotation accuracy of elliptical beams is ±1.0°.

1.8 Bandwidth

The Allotment Plan is based on the carrier power averaged over the necessary bandwidth of the modulated carrier and referred to a 1 MHz bandwidth.

Section B – Generalized parameters used for determining when the assignments of a proposed satellite network are in conformity with the Plan

1 Introduction

1.1 The *A*, *B*, *C*, *D* generalized parameters specify the interference-producing capability (variables *A* and *C*) and the interference sensitivity (variables *B* and *D*) of a satellite network.

1.2 Since many different combinations of implementation parameters (such as antenna characteristics and transmitter powers) can result in a similar set of parametric values, it can be applied irrespective of the modulation characteristics and specific frequency used.

2 Calculation of the *A, B, C, D* generalized parameters

2.1 The following equations (see § 2.3 below) describe the *A*, *B*, C, *D* generalized parameters where:

A = up-link off-axis e.i.r.p. density averaged over the necessary bandwidth of the modulated carrier;

B = up-link off-axis receiver sensitivity to interfering e.i.r.p. density averaged over the necessary bandwidth of the modulated carrier;

C = down-link off-axis e.i.r.p. density averaged over the necessary bandwidth of the modulated carrier;

D = down-link off-axis receiver sensitivity to interfering e.i.r.p. density averaged over the necessary bandwidth of the modulated carrier.

2.2 In the following equations, if measured data for the antenna gains are not available, the reference antenna radiation patterns chosen under § 1.6.4 and 1.7.2 of Annex 1, Section A should be used.

2.3 The generalized parameters *A*, *B*, *C* and *D* are calculated as follows:

$$A = p_1 \cdot g_1(\theta)$$

$$B = \frac{1}{p_1 \cdot g_1 \cdot \Delta g_2(\varphi)}$$

$$C = \frac{p_3 \cdot g_3}{\Delta g_3(\varphi)}$$

$$D = \frac{g_4(\theta)}{p_3 \cdot g_3 \cdot g_4}$$

where:

(In the following, all ratios are numerical power ratios and the antenna gains are referred to an isotropic antenna.)

p_1: the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the transmitting earth station antenna (W/Hz);

g_1: the maximum gain of the earth station transmitting antenna;

$g_1(\theta)$: the earth station transmitting antenna radiation pattern;

g_2: the maximum gain of the space station receiving antenna;

$g_2(\varphi)$: the gain in the space station receiving antenna in the direction of the earth station;

$\Delta g_2(\varphi) = \frac{g_2}{g_2(\varphi)}$: discrimination of the space station receiving antenna in the direction of the earth station;

p_3: the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the space station transmitting antenna (W/Hz);

g_3: the maximum space station transmitting antenna gain;

$g_3(\varphi)$: the space station transmitting antenna gain in the direction of the earth station;

$\Delta g_3(\varphi) = \frac{g_3}{g_3(\varphi)}$: discrimination of the space station transmitting antenna in the direction of the desired earth station;

g_4: the maximum gain of the earth station receiving antenna;

$g_4(\theta)$: the earth station receiving antenna radiation pattern.

NOTE – The parameters p_1, $p_1 \cdot g_1$, $p_3 \cdot g_3$ and $p_3 \cdot g_3 \cdot g_4$ will be calculated by the Bureau and will be published in a BR circular-letter. These calculations will be made using Figure 1, Figure 2 and Table 1, as appropriate.

ANNEX 2

Basic data to be furnished in notices relating to stations in the fixed-satellite service entering the design stage using frequency bands of the Plan

1 Space station characteristics

The following information shall be supplied for both the transmitting and receiving space stations.

1.1 *Country and identification of the allotment* (for a network not derived from the Allotment Plan, give the name of the network).

1.2 *Preferred or nominal orbital position* (xxx.xx degrees east or west from the Greenwich meridian. In addition, in the case of a network not derived from the Allotment Plan, give the service arc).

1.3 Frequency bands

1.4 *Dates* proposed for bringing into use.

1.5 Identity of the space station

1.6 *Service area* as defined by the allotment in the Plan. Alternatively, the service area may be defined by a number of geographical points.

1.7 Power characteristics of the transmission

a) Maximum value of power density, in dB(W/Hz), averaged over the necessary bandwidth of the modulated carrier, supplied to the input of the antenna. (This value will be used for calculation of the *C* and *D* parameters. See Annex 1, Section B.)

b) Maximum carrier power density, in dB(W/Hz), averaged over the worst 4 kHz band, supplied to the antenna input.

c) Frequency below which signals whose peak-to-average ratio is less than 5 dB will be located.

1.8 Space station transmitting and receiving antenna characteristics

a) gain of the antenna in the direction of maximum radiation referred to an isotropic antenna (dBi);

b) boresight coordinates (xx.xx degrees north or south, yyy.yy degrees east or west from the Greenwich meridian);

c) pointing accuracy (degrees);

d) shape of the beam (elliptical, circular, or other);

e) for circular beams indicate the following:

– half-power beamwidth in degrees;

– radiation pattern;

f) for elliptical beams indicate the following:

– radiation pattern;

– rotational accuracy in degrees;

– major axis orientation in degrees anticlockwise from the Equator;

– major axis beamwidth (degrees) at the half-power points;

– minor axis beamwidth (degrees) at the half-power points;

g) for beams of other than circular or elliptical shape, indicate the following:

– gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite on to a plane perpendicular to the axis from the centre of the Earth to the satellite. The gain contours shall be drawn as isolines of the isotropic gain, at least for −2, −4, −6, −10 and −20 dB and at 10 dB intervals thereafter, as necessary, relative to the maximum antenna gain, when any of these contours is located either totally or partially anywhere within the limit of visibility of the Earth from the given geostationary satellite. The antenna gain contours shall include the effect of the planned pointing accuracy and rotational accuracy of the antenna;

– whenever practicable, a numerical equation providing the necessary information to allow the gain contours to be plotted.

1.9 Space station receiving system noise temperature (kelvins)

1.10 Station-keeping accuracy (degrees)

2 Earth station characteristics

The following information shall be supplied for both the transmit and receive earth stations.

2.1 Identity of the space station with which communication is to be established

2.2 Power characteristics of the transmission

a) Maximum value of power density, in dB(W/Hz), averaged over the necessary bandwidth of the modulated carrier, supplied to the input of the antenna. (This value will be used for calculation of the *A* and *B* parameters. See Annex 1, Section B.)

b) Maximum carrier power density, in dB(W/Hz), averaged over the worst 4 kHz band, supplied to the antenna input.

c) Frequency below which signals whose peak-to-average ratio is less than 5 dB will be located.

2.3 Earth station antenna characteristics

a) antenna gain in the direction of maximum radiation referred to an isotropic antenna (dBi);

b) half-power beamwidth in degrees (describe in detail if not symmetrical);

c) the radiation diagram(s) of the antenna (taking as a reference the direction of maximum radiation).

2.4 Earth station receiving system noise temperature (kelvins)

3 Coordination/agreement, if any.

4 Not used

5 Subregional systems

Indicate the type of system and participating administrations. If applicable, indicate the part of the national allotment proposed to be used to form the subregional system, and the notifying administration.

6 Required protection ratio

Indicate the minimum acceptable aggregate carrier-to-interference ratio, if less than 26 dB. The carrier-to-interference ratio is to be expressed in terms of the power averaged over the necessary bandwidth of the modulated wanted and interfering signals.

7 Other information, if any.

ANNEX 3A

Criteria for determining when proposed assignments are considered as being in conformity with the Plan

In this method, the generalized parameters are calculated (see Annex 1, Section B), and the results are compared with the corresponding reference set:

– If the calculated *A*, *B*, *C* and *D* values are less than or equal to the relevant reference set, then the use of the assignment is considered to be in conformity with the Plan.

– If the calculated values of *A* or *C* are greater than the relevant reference set, the use of the assignment is considered not to be in conformity with the Plan.

– If the calculated values of *B* or *D* are greater than the relevant reference set, the assignment is protected only to the level of the relevant reference set.

ANNEX 3B

Macrosegmentation concept

In this method, an administration shall not be required to coordinate if, in addition to meeting the conditions of Annex 3A, the proposed frequency assignments are ordered in such a way that the upper 60% of each allotment band is used for high-density carriers and the lower 40% for low-density carriers.

For the purposes of this annex, the term “high-density carriers” shall be used for those carriers whose ratio of power spectral density peak (averaged over the worst 4 kHz) to average (defined over the necessary bandwidth of the modulated carrier) is greater than 5 dB; and the term “low-density carriers” shall be used for those for which this ratio is less than 5 dB.

ANNEX 4

Limits for determining whether an allotment or an assignment made in accordance with the provisions of Appendix S30B is considered to be affected

An allotment shall be considered as being affected by another administration if, at its nominal orbital position within the predetermined arc, the calculated single-entry carrier-to-interference ratio is less than or equal to 30 dB, or the calculated value, based on the Plan, due to that other administration (whichever is the lower), at any test point within the service area of the interfered-with satellite network. The single-entry carrier-to-interference ratio is calculated using the method in Appendix 1 to this Annex.

An assignment shall be considered affected by a signal whose peak-to-average ratio (k) exceeds 5 dB in that portion of the spectrum which has been defined for low-density carrier usage, as identified in Annex 3B, if the single-entry carrier-to-interference ratio, calculated on the basis of power density averaged over the necessary bandwidth of the desired carrier, falls below:

$$25 + k \text{ (dB)}$$

Even if the single-entry carrier-to-interference ratio is above 30 dB (or the calculated value based on the Plan due to that other administration, whichever value is lower), an allotment or an assignment shall be considered affected if the overall aggregate C/I, as calculated using Appendix 1 to this Annex, falls below 26 dB or the calculated value for the assignment, based on the Plan, whichever is lower.

APPENDIX 1 TO ANNEX 4

Method for determination of the single-entry and aggregate carrier-to-interference ratio averaged over the necessary bandwidth of the modulated carrier

1 Single-entry

This section describes the method for calculating the single-entry interference potential.

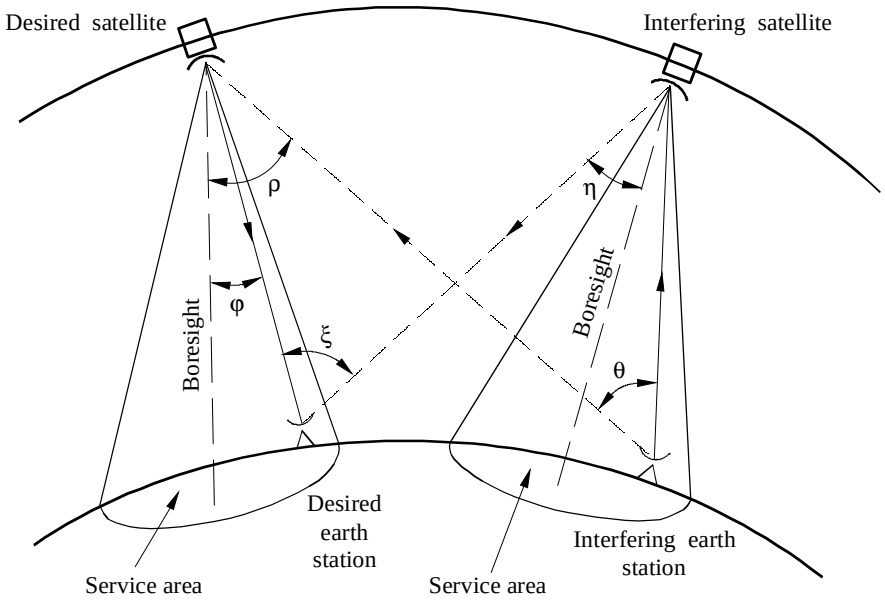
The method is based on the single-entry carrier-to-interference ratio (C/I) which a given allotment or assignment made in accordance with the provisions of Appendix **S30B** might experience due to emission from the proposed modification. The single-entry C/I due to a single interfering satellite network is given by:

$$(C/I)_t = \left(\frac{p_1' \, g_1'(\theta) \, g_2(\rho) \, 1_{su}}{p_1 \, g_1 \, g_2(\varphi) \, 1_{su'}} + \frac{p_3' \, g_3'(\eta) \, g_4(\xi) \, 1_{sd}}{p_3 \, g_3(\varphi) \, g_4 \, 1_{sd'}} \right)^{-1}$$

or

$$(C/I)_t = \left(A'(\theta) \cdot B(\rho) \cdot \Delta g_2(\varphi) \frac{1_{su}}{1_{su'}} + C'(\eta) \cdot D(\xi) \cdot \Delta g_3(\varphi) \frac{1_{sd}}{1_{sd'}} \right)^{-1}$$

FIGURE 1



APS30B/30BA4-01

where:

θ, φ, ρ, η, ξ are angles as defined in Figure 1, above.

In the following, all ratios are numerical power ratios.

p_1: the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the desired earth station transmitting antenna (W/Hz)

g_1: the maximum gain of the desired transmitting earth station antenna

1_{su}: the free-space path loss of the desired up-path signal

$1_{su'}$: the free-space path loss of the interfering up-path signal

$g_2(\varphi)$: the gain of the desired space station receiving antenna in the direction of the desired earth station

$\Delta g_2(\varphi) = \frac{g_2}{g_2(\varphi)}$: discrimination of the desired space station receiving antenna in the direction of the desired earth station

g_2: the maximum gain of the desired space station receiving antenna

p_1': the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the interfering earth station transmitting antenna (W/Hz)

$g_1'(\theta)$: the interfering earth station antenna gain in the direction of the desired satellite

1_{sd}: the free-space path loss of the desired down-path signal

$1_{sd'}$: the free-space path loss of the interfering down-path signal

$g_2(\rho)$: the gain of the desired space station receiving antenna in the direction of the interfering earth station

p_3: the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the desired space station transmitting antenna (W/Hz)

$g_3(\varphi)$: the desired space station transmitting antenna gain in the direction of the desired earth station

$\Delta g_3(\varphi) = \frac{g_3}{g_3(\varphi)}$: discrimination of the desired space station transmitting antenna in the direction of the desired earth station

g_3: the maximum gain of the desired space station transmitting antenna

g_4: the maximum gain of the desired receiving earth station antenna

p_3': the power density, averaged over the necessary bandwidth of the modulated carrier, fed into the interfering space station transmitting antenna (W/Hz)

$g_3'(\eta)$: the interfering space station transmitting antenna gain in the direction of the desired earth station

$g_4(\xi)$: the desired earth station receiving antenna gain in the direction of the interfering satellite

A', C': value of A, C of the interfering network in the direction of the desired network

B, D: value of B, D of the desired network in the direction of the interfering network

A, B, C, D are defined in Annex 1, Section B.

2 Aggregate carrier-to-interference ratio

The aggregate carrier-to-interference ratio, is given by:

$$(C/I)_{agg} = \left(\Sigma_j \frac{1}{(c/i)_{tj}}\right)^{-1}$$

$$j = 1, 2, 3 \ldots n,$$

where n is the total number of networks within the arc of the geostationary orbit visible to the desired network.

ANNEX 5

Application of the PDA (predetermined arc) concept

1 The following method will be used in the application of the PDA concept, which is based on the criteria set out in § 1.1 below.

1.1 For the purposes of this Annex, an administration will be considered as being affected by another administration if, at its nominal orbital position within the predetermined arc, the calculated single-entry carrier-to-interference ratio is less than or equal to 30 dB, or the calculated value, based on the Plan, due to that other administration (whichever is lower), at any test point within the service area of the interfered-with satellite network. The single-entry C/I ratio is calculated by the method in Appendix 1, Annex 4.

Even if the single-entry C/I ratio is above 30 dB, or the calculated value, based on the Plan, due to that other administration (whichever is lower), an administration shall be considered as being affected if the overall aggregate C/I ratio, calculated by the method in Appendix 1, falls below 26 dB[9], or the value for the assignment (whichever is lower).

1.2 The PDA Concept shall be applied in the following steps:

a) the order of all satellites and also the position of satellites in the "design" or "operational" stages shall be fixed so as to minimize the impact on these systems. Next, the nominal positions of "pre-design" systems shall be adjusted so as to compensate for the degraded C/I ratio. The adjustments of nominal positions shall be limited to the range of their respective predetermined arcs;

b) if compatibility is not obtained through 1.2 *a)*, the ordering of allotments of satellites in the "pre-design" stage shall be subject to change within their predetermined arcs, as defined in Article 5;

c) if the C/I objectives are not achieved, the affected administration may at this stage opt to select other measures than repositioning, as described in 1.2 *d)* below;

d) if compatibility is not achieved under 1.2 *b)*, and if the measures of 1.2 *c)* are unsuccessful, the allotment(s)/assignment(s) subject to repositioning shall include the systems in the "design" stage, for their predetermined arc as defined in Article 5.

1.3 Administrations for which the criteria of § 1.1 are not met shall be identified for the purposes of this Annex.

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[9] For allotments with an aggregate C/I ratio less than 26 dB, the calculated C/I ratio based on the Plan will be used. However, if through the use of the PDA Concept, this value is improved in the latter application of this procedure, the improved value will be used until it reaches 26 dB.

ANNEX 6

Technical means which may be used to avoid incompatibilities between systems in the fixed-satellite service at their implementation stage

1 Improved frequency modulated TV carrier dispersal techniques with up to 4-5 MHz peak-to-peak deviation.

2 Frequency separation between signals with high peak spectral density and narrow-band signals (bandwidth segmentation).

3 The use of transmitting and receiving antennas with special beams providing minimum gain in the direction to neighbouring satellites.

4 Shaped beams for transmitting satellite antennas.

5 Transmission (modulation) and reception techniques allowing for the C/I ratios less than 26 dB.

APPENDIX S42

Table of allocation of international call sign series

(See Article **S19**)

Call sign series	Allocated to
AAA-ALZ	United States of America
AMA-AOZ	Spain
APA-ASZ	Pakistan (Islamic Republic of)
ATA-AWZ	India (Republic of)
AXA-AXZ	Australia
AYA-AZZ	Argentine Republic
A2A-A2Z	Botswana (Republic of)
A3A-A3Z	Tonga (Kingdom of)
A4A-A4Z	Oman (Sultanate of)
A5A-A5Z	Bhutan (Kingdom of)
A6A-A6Z	United Arab Emirates
A7A-A7Z	Qatar (State of)
A8A-A8Z	Liberia (Republic of)
A9A-A9Z	Bahrain (State of)
BAA-BZZ	China (People's Republic of)
CAA-CEZ	Chile
CFA-CKZ	Canada
CLA-CMZ	Cuba
CNA-CNZ	Morocco (Kingdom of)
COA-COZ	Cuba
CPA-CPZ	Bolivia (Republic of)
CQA-CUZ	Portugal
CVA-CXZ	Uruguay (Eastern Republic of)
CYA-CZZ	Canada
C2A-C2Z	Nauru (Republic of)
C3A-C3Z	Andorra (Principality of)
C4A-C4Z	Cyprus (Republic of)
C5A-C5Z	Gambia (Republic of the)
C6A-C6Z	Bahamas (Commonwealth of the)
*C7A-C7Z	World Meteorological Organization
C8A-C9Z	Mozambique (Republic of)
DAA-DRZ	Germany (Federal Republic of)
DSA-DTZ	Korea (Republic of)
DUA-DZZ	Philippines (Republic of the)
D2A-D3Z	Angola (Republic of)
D4A-D4Z	Cape Verde (Republic of)
D5A-D5Z	Liberia (Republic of)
D6A-D6Z	Comoros (Islamic Federal Republic of the)
D7A-D9Z	Korea (Republic of)

Call sign series	Allocated to
EAA-EHZ	Spain
EIA-EJZ	Ireland
EKA-EKZ	Armenia (Republic of)
ELA-ELZ	Liberia (Republic of)
EMA-EOZ	Ukraine
EPA-EQZ	Iran (Islamic Republic of)
ERA-ERZ	Moldova (Republic of)
ESA-ESZ	Estonia (Republic of)
ETA-ETZ	Ethiopia (Federal Democratic Republic of)
EUA-EWZ	Belarus (Republic of)
EXA-EXZ	Kyrgyz Republic
EYA-EYZ	Tajikistan (Republic of)
EZA-EZZ	Turkmenistan
E2A-E2Z	Thailand
E3A-E3Z	Eritrea
FAA-FZZ	France
GAA-GZZ	United Kingdom of Great Britain and Northern Ireland
HAA-HAZ	Hungary (Republic of)
HBA-HBZ	Switzerland (Confederation of)
HCA-HDZ	Ecuador
HEA-HEZ	Switzerland (Confederation of)
HFA-HFZ	Poland (Republic of)
HGA-HGZ	Hungary (Republic of)
HHA-HHZ	Haiti (Republic of)
HIA-HIZ	Dominican Republic
HJA-HKZ	Colombia (Republic of)
HLA-HLZ	Korea (Republic of)
HMA-HMZ	Democratic People’s Republic of Korea
HNA-HNZ	Iraq (Republic of)
HOA-HPZ	Panama (Republic of)
HQA-HRZ	Honduras (Republic of)
HSA-HSZ	Thailand
HTA-HTZ	Nicaragua
HUA-HUZ	El Salvador (Republic of)
HVA-HVZ	Vatican City State
HWA-HYZ	France
HZA-HZZ	Saudi Arabia (Kingdom of)
H2A-H2Z	Cyprus (Republic of)
H3A-H3Z	Panama (Republic of)
H4A-H4Z	Solomon Islands
H6A-H7Z	Nicaragua
H8A-H9Z	Panama (Republic of)
IAA-IZZ	Italy

Call sign series	Allocated to
JAA-JSZ	Japan
JTA-JVZ	Mongolia
JWA-JXZ	Norway
JYA-JYZ	Jordan (Hashemite Kingdom of)
JZA-JZZ	Indonesia (Republic of)
J2A-J2Z	Djibouti (Republic of)
J3A-J3Z	Grenada
J4A-J4Z	Greece
J5A-J5Z	Guinea-Bissau (Republic of)
J6A-J6Z	Saint Lucia
J7A-J7Z	Dominica (Commonwealth of)
J8A-J8Z	Saint Vincent and the Grenadines
KAA-KZZ	United States of America
LAA-LNZ	Norway
LOA-LWZ	Argentine Republic
LXA-LXZ	Luxembourg
LYA-LYZ	Lithuania (Republic of)
LZA-LZZ	Bulgaria (Republic of)
L2A-L9Z	Argentine Republic
MAA-MZZ	United Kingdom of Great Britain and Northern Ireland
NAA-NZZ	United States of America
OAA-OCZ	Peru
ODA-ODZ	Lebanon
OEA-OEZ	Austria
OFA-OJZ	Finland
OKA-OLZ	Czech Republic
OMA-OMZ	Slovak Republic
ONA-OTZ	Belgium
OUA-OZZ	Denmark
PAA-PIZ	Netherlands (Kingdom of the)
PJA-PJZ	Netherlands (Kingdom of the) – Netherlands Antilles
PKA-POZ	Indonesia (Republic of)
PPA-PYZ	Brazil (Federative Republic of)
PZA-PZZ	Suriname (Republic of)
P2A-P2Z	Papua New Guinea
P3A-P3Z	Cyprus (Republic of)
P4A-P4Z	Netherlands (Kingdom of the) – Aruba
P5A-P9Z	Democratic People’s Republic of Korea
RAA-RZZ	Russian Federation

Call sign series	Allocated to
SAA-SMZ	Sweden
SNA-SRZ	Poland (Republic of)
SSA-SSM	Egypt (Arab Republic of)
SSN-STZ	Sudan (Republic of the)
SUA-SUZ	Egypt (Arab Republic of)
SVA-SZZ	Greece
S2A-S3Z	Bangladesh (People's Republic of)
S5A-S5Z	Slovenia (Republic of)
S6A-S6Z	Singapore (Republic of)
S7A-S7Z	Seychelles (Republic of)
S8A-S8Z	South Africa (Republic of)
S9A-S9Z	Sao Tome and Principe (Democratic Republic of)
TAA-TCZ	Turkey
TDA-TDZ	Guatemala (Republic of)
TEA-TEZ	Costa Rica
TFA-TFZ	Iceland
TGA-TGZ	Guatemala (Republic of)
THA-THZ	France
TIA-TIZ	Costa Rica
TJA-TJZ	Cameroon (Republic of)
TKA-TKZ	France
TLA-TLZ	Central African Republic
TMA-TMZ	France
TNA-TNZ	Congo (Republic of the)
TOA-TQZ	France
TRA-TRZ	Gabonese Republic
TSA-TSZ	Tunisia
TTA-TTZ	Chad (Republic of)
TUA-TUZ	Côte d'Ivoire (Republic of)
TVA-TXZ	France
TYA-TYZ	Benin (Republic of)
TZA-TZZ	Mali (Republic of)
T2A-T2Z	Tuvalu
T3A-T3Z	Kiribati (Republic of)
T4A-T4Z	Cuba
T5A-T5Z	Somali Democratic Republic
T6A-T6Z	Afghanistan (Islamic State of)
T7A-T7Z	San Marino (Republic of)
T8A-T8Z	Palau (Republic of)
T9A-T9Z	Bosnia and Herzegovina (Republic of)
UAA-UIZ	Russian Federation
UJA-UMZ	Uzbekistan (Republic of)
UNA-UQZ	Kazakstan (Republic of)
URA-UZZ	Ukraine

Call sign series	Allocated to
VAA-VGZ	Canada
VHA-VNZ	Australia
VOA-VOZ	Canada
VPA-VQZ	United Kingdom of Great Britain and Northern Ireland
**VRA-VRZ	China (People's Republic of) – Hongkong
VRA-VSZ	United Kingdom of Great Britain and Northern Ireland
VTA-VWZ	India (Republic of)
VXA-VYZ	Canada
VZA-VZZ	Australia
V2A-V2Z	Antigua and Barbuda
V3A-V3Z	Belize
V4A-V4Z	Saint Kitts and Nevis
V5A-V5Z	Namibia (Republic of)
V6A-V6Z	Micronesia (Federated States of)
V7A-V7Z	Marshall Islands (Republic of the)
V8A-V8Z	Brunei Darussalam
WAA-WZZ	United States of America
XAA-XIZ	Mexico
XJA-XOZ	Canada
XPA-XPZ	Denmark
XQA-XRZ	Chile
XSA-XSZ	China (People’s Republic of)
XTA-XTZ	Burkina Faso
XUA-XUZ	Cambodia (Kingdom of)
XVA-XVZ	Viet Nam (Socialist Republic of)
XWA-XWZ	Lao People’s Democratic Republic
XXA-XXZ	Portugal
XYA-XZZ	Myanmar (Union of)
YAA-YAZ	Afghanistan (Islamic State of)
YBA-YHZ	Indonesia (Republic of)
YIA-YIZ	Iraq (Republic of)
YJA-YJZ	Vanuatu (Republic of)
YKA-YKZ	Syrian Arab Republic
YLA-YLZ	Latvia (Republic of)
YMA-YMZ	Turkey
YNA-YNZ	Nicaragua
YOA-YRZ	Romania
YSA-YSZ	El Salvador (Republic of)
YTA-YUZ	Yugoslavia (Federal Republic of)
YVA-YYZ	Venezuela (Republic of)
YZA-YZZ	Yugoslavia (Federal Republic of)
Y2A-Y9Z	Germany (Federal Republic of)
ZAA-ZAZ	Albania (Republic of)
ZBA-ZJZ	United Kingdom of Great Britain and Northern Ireland
ZKA-ZMZ	New Zealand
ZNA-ZOZ	United Kingdom of Great Britain and Northern Ireland
ZPA-ZPZ	Paraguay (Republic of)

Call sign series	Allocated to
ZQA-ZQZ	United Kingdom of Great Britain and Northern Ireland
ZRA-ZUZ	South Africa (Republic of)
ZVA-ZZZ	Brazil (Federative Republic of)
Z2A-Z2Z	Zimbabwe (Republic of)
Z3A-Z3Z	The Former Yugoslav Republic of Macedonia
2AA-2ZZ	United Kingdom of Great Britain and Northern Ireland
3AA-3AZ	Monaco (Principality of)
3BA-3BZ	Mauritius (Republic of)
3CA-3CZ	Equatorial Guinea (Republic of)
3DA-3DM	Swaziland (Kingdom of)
3DN-3DZ	Fiji (Republic of)
3EA-3FZ	Panama (Republic of)
3GA-3GZ	Chile
3HA-3UZ	China (People’s Republic of)
3VA-3VZ	Tunisia
3WA-3WZ	Viet Nam (Socialist Republic of)
3XA-3XZ	Guinea (Republic of)
3YA-3YZ	Norway
3ZA-3ZZ	Poland (Republic of)
4AA-4CZ	Mexico
4DA-4IZ	Philippines (Republic of the)
4JA-4KZ	Azerbaijani Republic
4LA-4LZ	Georgia
4MA-4MZ	Venezuela (Republic of)
4NA-4OZ	Yugoslavia (Federal Republic of)
4PA-4SZ	Sri Lanka (Democratic Socialist Republic of)
4TA-4TZ	Peru
*4UA-4UZ	United Nations
4VA-4VZ	Haiti (Republic of)
4XA-4XZ	Israel (State of)
*4YA-4YZ	International Civil Aviation Organization
4ZA-4ZZ	Israel (State of)
5AA-5AZ	Libya (Socialist People’s Libyan Arab Jamahiriya)
5BA-5BZ	Cyprus (Republic of)
5CA-5GZ	Morocco (Kingdom of)
5HA-5IZ	Tanzania (United Republic of)
5JA-5KZ	Colombia (Republic of)
5LA-5MZ	Liberia (Republic of)
5NA-5OZ	Nigeria (Federal Republic of)
5PA-5QZ	Denmark
5RA-5SZ	Madagascar (Republic of)
5TA-5TZ	Mauritania (Islamic Republic of)
5UA-5UZ	Niger (Republic of the)
5VA-5VZ	Togolese Republic
5WA-5WZ	Western Samoa (Independent State of)
5XA-5XZ	Uganda (Republic of)
5YA-5ZZ	Kenya (Republic of)

Call sign series	Allocated to
6AA-6BZ	Egypt (Arab Republic of)
6CA-6CZ	Syrian Arab Republic
6DA-6JZ	Mexico
6KA-6NZ	Korea (Republic of)
6OA-6OZ	Somali Democratic Republic
6PA-6SZ	Pakistan (Islamic Republic of)
6TA-6UZ	Sudan (Republic of the)
6VA-6WZ	Senegal (Republic of)
6XA-6XZ	Madagascar (Republic of)
6YA-6YZ	Jamaica
6ZA-6ZZ	Liberia (Republic of)
7AA-7IZ	Indonesia (Republic of)
7JA-7NZ	Japan
7OA-7OZ	Yemen (Republic of)
7PA-7PZ	Lesotho (Kingdom of)
7QA-7QZ	Malawi
7RA-7RZ	Algeria (People’s Democratic Republic of)
7SA-7SZ	Sweden
7TA-7YZ	Algeria (People’s Democratic Republic of)
7ZA-7ZZ	Saudi Arabia (Kingdom of)
8AA-8IZ	Indonesia (Republic of)
8JA-8NZ	Japan
8OA-8OZ	Botswana (Republic of)
8PA-8PZ	Barbados
8QA-8QZ	Maldives (Republic of)
8RA-8RZ	Guyana
8SA-8SZ	Sweden
8TA-8YZ	India (Republic of)
8ZA-8ZZ	Saudi Arabia (Kingdom of)
9AA-9AZ	Croatia (Republic of)
9BA-9DZ	Iran (Islamic Republic of)
9EA-9FZ	Ethiopia (Federal Democratic Republic of)
9GA-9GZ	Ghana
9HA-9HZ	Malta
9IA-9JZ	Zambia (Republic of)
9KA-9KZ	Kuwait (State of)
9LA-9LZ	Sierra Leone
9MA-9MZ	Malaysia
9NA-9NZ	Nepal
9OA-9TZ	Democratic Republic of the Congo
9UA-9UZ	Burundi (Republic of)
9VA-9VZ	Singapore (Republic of)
9WA-9WZ	Malaysia
9XA-9XZ	Rwandese Republic
9YA-9ZZ	Trinidad and Tobago

* Series allocated to an international organization.

** Provisional allocation in accordance with No. **S19.33**.