International Telecommunication Union

FINAL ACTS WRC-2000

World Radiocommunication Conference
(Istanbul, 2000)

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of the World Radiocommunication Conference

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Explanatory Note

The Final Acts are based on the Radio Regulations (Edition of 1998).

Considering the stringent time constraints, this Conference accepted that well-established abbreviations widely used and accepted in ITU may be used in the version of the Final Acts submitted for signing. The Secretary-General ensured, when preparing the published version of the Final Acts, that the abbreviations in question were written out in full or suitably referenced, as appropriate, in line with the prevailing editorial rules applied in the instruments of the Union.

In accordance with No. 123 of the Rules of Procedure of Conferences and Other Meetings of ITU, the Conference entrusted the final numbering of Chapters, Articles, Appendices, Resolutions and Recommendations to the Secretary-General.

Should any editorial problems arise in the preparation of the definitive Final Acts of this Conference, the Conference authorized the Secretary-General to resolve them, with the assistance of the Chairman and Vice-Chairman of the Editorial Committee, and the relevant Committee Chairmen.

The texts in the Final Acts retain the customary symbols in the left-hand margin identifying the action which the Conference has taken on them.

These customary symbols are reproduced below:

– MOD Change to the substance of the text

– SUP Deletion of a provision

– ADD Addition of a new provision. The passages bear the number of the preceding provision in the original text, with the addition of “A”, “B”, etc.

– (MOD) An editorial change in the text. The text was modified by the Editorial Committee to align the language or terminology used with another new or modified text.

Generally, texts not modified and texts deleted by the Conference are not reproduced in the present Final Acts.

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

– Articles, e.g. Article **S52**

– Provision numbers, e.g. No. **S5.342**

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

– Appendices, e.g. Appendix **S30A**

– Resolutions, e.g. Resolution **300 (Rev.WRC-2000)**

– Recommendations, e.g. Recommendation **503 (Rev.WRC-2000)**.

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.

Within the text of the Final Acts, the symbol, ↑, has been used to represent quantities associated with an uplink. Similarly, the symbol, ↓, has been used to represent quantities associated with a downlink.

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

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-2000	World Radiocommunication Conference, (Istanbul, 2000)
WRC-03	World Radiocommunication Conference, 2003[1]
WRC-05/06	World Radiocommunication Conference, 2005/2006[1]

[1] The date of this Conference has not been finalized.

Preamble

The World Radiocommunication Conference (Geneva, 1997) resolved, by Resolution **721 (WRC-97)**, to recommend to the ITU Council that a World Radiocommunication Conference be held in late 1999 (subject to Resolution **50 (WRC-97)**) for a period of four weeks.

At its 1998 session, the Council resolved, by its Resolution 1130, that the Conference be convened in Istanbul from 8 May to 2 June 2000, and established its agenda. The agenda, dates and place were approved by the required majority of the Member States of the Union.

The World Radiocommunication Conference (WRC-2000) met in Istanbul for the stipulated period and worked on the basis of the agenda approved by the Council. It adopted a revision of the Radio Regulations and Appendices thereto, as contained in these Final Acts.

In accordance with its agenda, the Conference also took other decisions that it considered necessary or appropriate, including the review and revision of existing Resolutions and Recommendations and the adoption of various new Resolutions and Recommendations as contained in these Final Acts.

The majority of the provisions revised by the World Radiocommunication Conference (Istanbul, 2000), as contained in the revision of the Radio Regulations referred to in this Preamble, shall enter into force as from 1 January 2002; the remaining provisions shall apply as from the special dates of application indicated in Article **S59** of the revised Radio Regulations.

The delegates signing the revision of the Radio Regulations contained in these Final Acts, which is subject to approval by their competent authorities, declare that, should a Member State of the Union make reservations concerning the application of one or more of the provisions of the revised Radio Regulations, no other Member State shall be obliged to observe that provision or those provisions in its relations with that particular Member State.

IN WITNESS WHEREOF, the delegates of the Member States of the International Telecommunication Union named below have, on behalf of their respective competent authorities, signed one copy of these Final Acts. In case of dispute, the French text shall prevail. This copy shall remain deposited in the archives of the Union. The Secretary-General shall forward one certified true copy to each Member State of the International Telecommunication Union.

Done at Istanbul, 2 June 2000

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JACKY KJUMANTARA WAHYU SOERADI
DATUK MANDA NASUTION

For the Islamic Republic of Iran:

MEHDI TABESHIAN
JAVAD HAMED ROUHBAKHSH

For Ireland:

AIDAN HODSON
PATRICK CAREY

For Iceland:

GUDMUNDUR OLAFSSON
HÖRDUR R. HARDARSON

For the State of Israel:

MOSHE A. GALILI

For Italy:

GIORGIO GUIDARELLI MATTIOLI

For Japan:

SHIGEO TAKENAKA

For the Hashemite Kingdom of Jordan:

AHMAD AL-RAWASHDEH

For the Republic of Kazakstan:

SERIC BURKITBAEV

For the Republic of Kenya:

DONALD KANURU KIBERA
WILSON KIPKOECH CHEPKWONY
BENJAMIN KIGUHI ENYENZE
LEO KIBET BORUETT
JAMES NGUYO KIVUITU
JAMES MUCHINE NG'ANG'A
ROBERT KARIUKI KIBOCHI
ESTHER JEPKORIR CHEMIRMIR
ANDREW KEMOSI OKONGO
JONAS KIPRONO METTO
SHADRACK WESECHERE
HUMPHREY J. MWANGI

For the Lao People's Democratic Republic:

SOMLITH PHOUTHONESY

For the Kingdom of Lesotho:

T.T. SAOANA

For the Republic of Latvia:

KARLIS BOGENS
KARLIS BOGENS, JR
GUNNARS EDMUNDS POSTNIEKS

For The Former Yugoslav Republic of Macedonia:

MILE VELJANOV

For Lebanon:
MAURICE GHAZAL

For the Socialist People’s Libyan Arab Jamahiriya:
MOUSA M. MOUSA
KHALIFA N. MAAYUF

For the Principality of Liechtenstein:
FRÉDÉRIC ROTH

For the Republic of Lithuania:
EUGENIJUS NORKŪNAS

For Luxembourg:
ANNE BLAU

For the Republic of Madagascar:
AIMÉ MARCEL

For Malaysia:
MOHD ARIS BERNAWI

For the Republic of Maldives:
MOHAMED AMIR

For the Republic of Mali:
IDRISSA SAMAKE
CHEICK OUMAR TRAORE
SERIBA BAGAYOKO

For Malta:
MARTIN SPITERI

For the Kingdom of Morocco:
HASSAN LEBBADI

For the Republic of Mauritius:
BHANOODUTT BEEHAREE

For Mexico:
LEONEL LÓPEZ CELAYA
+ ad referendum
REYNALDO CESAR GONZÁLEZ BUSTAMANTE
+ ad referendum

For the Federated States of Micronesia:
WILLIAM H. JAHN

For the Republic of Moldova:

STEPAN MUZICA

For the Principality of Monaco:

RAOUL VIORA

For Mongolia:

LUVSANCHIMEDIIN BANZRAGCH

For the Republic of Mozambique:

ANTÓNIO FERNANDO

For the Republic of Namibia:

B. HARA-GAEB

For the Federal Republic of Nigeria:

LAWAL MOHAMMED MUNIR
ALHAJI M.T. ABU
M.O. AGU
P.F. UGOH
JAMES BEN ICHEME
ADAMU ABDU
O.O. BANJOKO
EKPENYONG EKONG
HYACINTH MADUEKWE
G.O. AJAYI

For Norway:

GEIR JAN SUNDAL

For New Zealand:

CHRIS PERERA
BRUCE EMIRALI
JEFF WASTNEY
ALAN JAMIESON
IAN GOODWIN
KATHARINE MOODY
ALEX ORANGE
MANSOOR SHAFI
SATHY SATHYENDRAN

For the Sultanate of Oman:

SALIM ALI AL-ABDUSSALAM
SALIM JAMEEL SAIF AL-NAMANI
AHMED NASSER ISSA AL-KINDI
ABDULRAZAQ MOHAMED AL-BALUSHI

For the Republic of Uganda:

P.F. MASAMBU
J.M. BANTULAKI
M. KIBULA
E. SSALI
J. KAGORO TUSUBIRA

For the Republic of Uzbekistan:

KONSTANTIN KONOVALOV

For the Islamic Republic of Pakistan:

MAHBOOB ALI

For Papua New Guinea:

ANTHONY JAMEA
JOHN CHOLAI
ARUA TARAVATU

For the Republic of Paraguay:

ANGEL BARBOZA

For the Kingdom of the Netherlands:

JAN BROERE
CHRIS VAN DIEPENBEEK

For Peru:

JULIO GARCÍA TORRES
CARLOS VALDEZ VELÁSQUEZ LÓPEZ
LUIS AMES SORA

For the Republic of the Philippines:

NESTOR C. DACANAY

For the Republic of Poland:

TOMASZ SZYSZKO
WŁADYSLAW WILKANS
KRZYSZTOF SŁOMCZYŃSKI

For Portugal:

LUISA MENDES
FERNANDA GIRÃO
JOSÉ TOSCANO

For the State of Qatar:

ABDUWAHED ABDALLAH FAKHROO
HASSAN MUHAMED AL-MASS

For the Syrian Arab Republic:

MHD MOUAFAK AL AWA
MOHAMAD ADNAN MASRI
MOUSTAFA AJENEH

For the Kyrgyz Republic:

BAIYSH NURMATOV

For the Democratic People's Republic of Korea:

THAE RIM JONG

For the Slovak Republic:

MILAN LUKNÁR

For the Czech Republic:

ZDENEK VOPAŘIL

For Romania:

SERGIU STELIAN ILIESCU

For the United Kingdom of Great Britain and Northern Ireland:

MICHAEL GODDARD
MALCOLM A. JOHNSON

For the Russian Federation:

LEONID REIMAN

For the Republic of San Marino:

IVO GRANDONI
MICHELE GIRI

For the Republic of Senegal:

MAMADOU DIOP
ABDOULAYE CISSE
CHEIKH TIDIANE NDIONGUE
PAUL MENDY
MODA SEYE
PAPE MOMAR NIANG
AMADOU LAMINE BA

For the Republic of Seychelles:

ERROL DIAS

For the Republic of Singapore:

CHOON SAI LIM
YUK MIN LIM
SIOW MENG SOH

For the Republic of Slovenia:

MARKO CUK

For the Republic of the Sudan:

HASSAN M. IBRAHIM

For the Democratic Socialist Republic of Sri Lanka:

R.B. KUMARAPATHIRANA
R.G.H.K. RANATUNGA
K.S.M. VISHAKA

For the Republic of South Africa:

LYNDALL SHOPE-MAFOLE
MOTHIBI RAMUSI
LINDEN PETZER
JAMES ARCHIBALD
CARLOS ALAIS
ALBERT KOFFEMAN
JOHAN SMIT
PETER ZIMRI
DAWIE THERON
MANDLA MCHUNU

For Sweden:

MARIANNE TRESCHOW
JAN-ERIK LEJERKRANS
ANDERS FREDERICH

For the Confederation of Switzerland:

PHILIPPE HORISBERGER

For the Republic of Suriname:

SOENILDAT BOEDDHA
EDMUND NEUS

For the United Republic of Tanzania:

E.T.K. MANGE
PETER GODWIN

For the Republic of Chad:

DJIBRINE EHMANE
GUIRIDONA MOGALBAYE
DJASSIBE TINGABAYE

For Thailand:

WIWAT SUTTIPAK
THONGCHAI SICHAN

For the Kingdom of Tonga:

PAULA P. MA'U
SIONE KITE
MARK POSEN
VIKIANI TEUMOHENGA

For Trinidad and Tobago:

WINSTON RAGBIR

For the Republic of Tunisia:

RIDHA GUELLOUZ

For Turkey:

FATIH MEHMET YURDAL
A. RAŞIT GÜLHAN
VURAL TEKELI
VEDAT KARAASLAN
ABDULLAH KARAKAŞ

For Ukraine:

OLEKSANDR BARANOV

For the Bolivarian Republic of Venezuela:

DALILA HERNANDEZ

For the Socialist Republic of Viet Nam:

LUU VAN LUONG

For the Republic of Yemen:

ABDULGADER IBRAHIM

For the Republic of Zambia:

DAVID KAPITOLO
DOUGLAS RUBBY MUTESHA
EMMANUEL MUYASANI CHILESHE
MUNDIA NYAMBE

For the Republic of Zimbabwe:

O. MUGANYURA

Final Protocol

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Declarations and Reservations*

At the time of signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the undersigned delegates take note of the following Declarations and Reservations made by signatory delegations:

1

Original: Spanish

For the Eastern Republic of Uruguay:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Eastern Republic of Uruguay declares that it reserves for its Government the right:

– to take any action it considers necessary to safeguard its interests, should other Members of the International Telecommunication Union fail in any way to observe the Final Acts, the Annexes thereto and the Radio Regulations, or should reservations by other Members jeopardize the proper functioning of its telecommunication services or its full sovereign rights;

– to express additional reservations, under the Vienna Convention on the Law of Treaties of 1969, to the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) at any time it sees fit between the date of the signature and the date of the possible ratification of the international instruments constituting these Final Acts.

2

Original: English

For the Republic of Mauritius:

The delegation of the Republic of Mauritius reserves for its Administration the right to take any action it may consider necessary to safeguard its interest, should certain Members of the Union fail to observe the provisions of the current Radio Regulations or should reservations entered by other Members jeopardize the operation of its radiocommunication services.

3

Original: English

For the Socialist People's Libyan Arab Jamahiriya:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Great Socialist People's Libyan Arab Jamahiriya reserves for its country the right to take any measures it considers necessary to safeguard its interests. This reservation concerns, in particular, such harmful interference as may be caused to its fixed and mobile services by other networks in the bands allocated to terrestrial services in the frequency range 4-20 GHz, and sub-bands 1.5-2.4 GHz.

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* *Note by the Secretary-General*: The texts of the Final Protocol are shown in the chronological order of their deposit.

4

Original: English

For Iceland, the Principality of Liechtenstein and Norway:

The delegations of the above-mentioned Member States of the European Economic Area declare that the above-mentioned Member States of the European Economic Area will apply the revision of the Radio Regulations adopted at this Conference in accordance with their obligations under the Treaty establishing the European Economic Area.

5

Original: English

For the Kingdom of Lesotho:

1 The Kingdom of Lesotho reserves its rights to take any such action as it may consider necessary to safeguard its interests should any Member of the Union, in any way, fail to comply with the provisions of the Constitution and the Convention of the International Telecommunication Union, the Radio Regulations of the ITU and the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

2 Should any reservation by a Member of the Union directly or indirectly affect the operation of its telecommunication services, Lesotho reserves its right to take any action it may deem necessary.

3 The delegation of the Kingdom of Lesotho reserves the right of its Government to make such additional declarations and reservations as may be necessary up to, and including, the time of ratification of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

6

Original: English

For the Federal Republic of Nigeria:

The delegation of the Federal Republic of Nigeria in signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) held in Istanbul, Turkey from 8 May to 2 June 2000 acknowledges the need for the development of world telecommunications, but reserves the right of its Administration to accept or reject all or some of the provisions of the Radio Regulations of the International Telecommunication Union, and to take all necessary measures to safeguard its interest should reservations by other administrations or any administration’s failure to comply with the Radio Regulations of the International Telecommunication Union jeopardize the satisfactory operation of its telecommunication services, and the commitment made herewith shall be subject to the approval of the Government of the Federal Republic of Nigeria.

7

Original: English

For Ghana:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of Ghana reserves for its Government the right to take any action it considers appropriate to safeguard its legitimate interests, should these interests be deemed to be in jeopardy through the failure of any Member State of the International Telecommunication Union to comply with the provisions of these Final Acts. The Government of Ghana further reserves the right to express reservations on any provisions of the Final Acts deemed to be incompatible with the Constitution, laws and regulations of the country.

8

Original: French/
English/
Spanish

For the Federal Republic of Germany, Austria, Belgium, Denmark, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, the Kingdom of the Netherlands, Portugal, the United Kingdom of Great Britain and Northern Ireland and Sweden:

The delegations of the Member States of the European Union declare that the Member States of the European Union will apply the revision of the Radio Regulations adopted at this Conference in accordance with their obligations under the Treaty establishing the European Economic Community.

9

Original: English

For the Hashemite Kingdom of Jordan:

Having studied the declarations contained in Document 524, the Hashemite Kingdom of Jordan, in signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), reserves the right for its Government to take any measures it might deem necessary to safeguard its interests if another country should in any way fail to respect the conditions specified in the Final Acts or if the reservations made by another country should be prejudicial to the operation of radiocommunication services of the Hashemite Kingdom of Jordan.

In view of the possibility of harmful interference from the operation of non-GSO MSS, including their feeder links, and non-GSO FSS in some frequency bands newly allocated to them by the World Radiocommunication Conference (Istanbul, 2000) to the use of these bands, the delegation of the Hashemite Kingdom of Jordan reserves for its Government the right to continue to use the existing and planned services in these bands free from harmful interference.

Furthermore, the delegation of Jordan declares that the Government of the Hashemite Kingdom of Jordan reserves the right to make any change when depositing its instruments of ratification for the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

10

Original: Spanish

For Ecuador:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of Ecuador:

1 Declares that it reserves for its Government the right:

a) to take any measures it considers necessary, in conformity with its domestic legislation and international law, to safeguard its national interests should any other Members fail to comply with the provisions of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), or should reservations by representatives of other States jeopardize the radiocommunication services of Ecuador or its full sovereign rights;

b) to express reservations, under the Vienna Convention on the Law of Treaties of 1969, with regard to the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), at any time it sees fit between the date of the signature and the date of the possible ratification of the international instruments constituting those Final Acts.

2 Declares that Ecuador is bound by the instrument contained in the Final Acts insofar as it expressly and duly consents to be bound by that international instrument, and subject to the completion of the appropriate constitutional procedures.

3 Declares that its Government cannot give provisional effect to the international instruments which constitute the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

11

Original: English

For the Republic of Mozambique:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Mozambique reserves the right of its Government to take any action it deems necessary to safeguard its interests in the event of Members failing in any way to comply with the provisions of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), or should reservations by other countries jeopardize its telecommunication services.

12

Original: French

For Burkina Faso:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of Burkina Faso declares:

1 that it reserves for its Government the right to take any action it considers appropriate to safeguard the interests of Burkina Faso and to protect the operation of telecommunication services in Burkina Faso should any Member State of the Union fail to comply with the provisions of these Final Acts;

2 that its Government will not accept responsibility for the consequences of reservations expressed by Members of the Union.

13

Original: English

For the Republic of Bulgaria:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Bulgaria reserves for its Government the right to take such action as it may consider necessary to safeguard its interests should any Member of the Union fail to comply with the provisions of the Final Acts adopted by the Conference or should reservations by other countries jeopardize the proper operation of its telecommunication services.

14

Original: English

For Malaysia:

The delegation of Malaysia to the World Radiocommunication Conference (Istanbul, 2000):

1 reserves the right of its Government to take any action and preservation measures it deems necessary to safeguard its national interests should the Final Acts drawn up in the World Radiocommunication Conference (Istanbul, 2000) directly or indirectly affect its sovereignty or be in contravention with the Constitution, Laws and Regulations of Malaysia which exist and may result from any principles of international law or should reservations by any Member of the Union jeopardize Malaysia's telecommunication and radiocommunication services or lead to an increase in its contributory share towards defraying the expenses of the Union;

2 further reserves the rights of its Government to make such reservations as may be necessary up to and including the time of ratification of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

15

Original: French

For the Gabonese Republic:

In signing the Final Acts of the World Radiocommunication Conference of the International Telecommunication Union, held in Istanbul (Turkey) from 8 May to 2 June 2000, the delegation of the Gabonese Republic reserves for its Government the right:

1 to take such action as it may deem necessary to safeguard its interests in the event that the use of frequency bands or orbital positions by certain Member States in a manner that is not in conformity with the relevant provisions might cause harmful interference to its telecommunication services;

2 not to accept any reservation made by other Member States which might be prejudicial to its interests.

16

Original: English

For the Republic of Kenya:

After having considered the declarations contained in the conference document and in signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Kenya herewith declares on behalf of its Government and on behalf of the powers conferred on it:

1 that it reserves the right of its Government to take any action it may consider necessary to safeguard and protect its interest should any Member fail to comply as required with the provisions of the Final Acts and Annexes adopted by this Conference;

2 that in addition, it reserves the right of its Government to take any action it may deem necessary to safeguard and protect its interest should the declarations and/or reservations entered by other delegation(s) in any way affect the normal operation and promotion of telecommunication services in Kenya;

3 that it reserves the right to enter further reservations prior to the ratification of the Final Acts of WRC-2000;

4 that in no way does the signing of the Final Acts of WRC-2000 compromise any provisions in the Constitution in the Laws of the Republic of Kenya.

17

Original: English

For Thailand:

The delegation of Thailand to the World Radiocommunication Conference (Istanbul, 2000) reserves for its Government the right to take any action it deems necessary to safeguard its interests should any Member or Members of the International Telecommunication Union fail, in any way, to comply with the Final Acts of this Conference and the Annexes thereto or should any of the declarations by other Members jeopardize its telecommunication services or infringe its national sovereignty.

18

Original: French/ English

For the People's Democratic Republic of Algeria, the Kingdom of Saudi Arabia, Lebanon, the Kingdom of Morocco, the Sultanate of Oman and the State of Qatar:

Different provisions of the Final Acts contain the following wording: "see Resolution XXX" or "see Recommendation YYY" while Resolution **27** does not refer to this wording as meaning an incorporation by reference.

Consequently, and in application of No. 340F of the Convention, the signatories of this statement do not consider themselves bound by any Resolution or Recommendation indicated in provisions of the Radio Regulations under the wording "see ...".

19

Original: English

For the Republic of Cyprus:

The delegation of the Republic of Cyprus reserves for its Government the right not to be bound by those provisions adopted by the World Radiocommunication Conference (Istanbul, 2000), which are potentially retroactive in character and could prejudice the legal situation established under the auspices of the Radio Regulations in force on the date of signature of the present Final Acts.

20

Original: Spanish

For the Republic of Guatemala:

The Government of the Republic of Guatemala, in signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), reserves the sovereign right to take such action as it may deem fit to regulate radiocommunications within its territory, and to adopt whatever measures it may think necessary, in accordance with its domestic law and with international law, to safeguard its national interests in general, and specifically if other Member States should fail to comply with the provisions of these Final Acts or if reservations by other Member States might affect, or affect, the radiocommunication services of the Republic of Guatemala or its full rights.

21

Original: Spanish

For Spain:

1 The delegation of Spain declares on behalf of its Government that it reserves for the Kingdom of Spain the right, in accordance with the Vienna Convention on the Law of Treaties of 23 May 1969, to express reservations to the Final Acts adopted by this Conference until such time as, in accordance with the provisions of Article 54 of the Constitution of the International Telecommunication Union, it consents to be bound by the revision to the Radio Regulations contained in those Final Acts.

2 The delegation of Spain declares on behalf of its Government that any reference to a country in the Radio Regulations and in the Resolutions and Recommendations adopted by this Conference, as subject to rights and obligations, will be understood only as constituting a Sovereign State.

22

Original: French

For the Republic of Cameroon:

The delegation of the Republic of Cameroon to the World Radiocommunication Conference (Istanbul, 2000), reserves for its Government the right to take any action it considers necessary to protect its interests should a Member of the Union fail to comply with the provisions of these Final Acts or should declarations and reservations made by others jeopardize the efficient operation of its radiocommunication services.

The delegation of the Republic of Cameroon further reserves for its Government the right, as and when necessary, to make additional reservations to these Final Acts.

23

Original: English

For the Republic of Yemen:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the Yemen Republic delegation declares on behalf of its Government that:

It reserves for its Government the right to take any action it may deem necessary consistent with its national law and with international law, to safeguard its national interests, should other Members of the Union fail to comply with the Constitution or the Convention of the International Telecommunication Union (Minneapolis, 1998) and/or the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) or should reservations by representatives of other States jeopardize its telecommunications services or its full sovereign rights.

24

Original: Spanish

For Costa Rica:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Costa Rica makes the following reservations:

1 the terms of the agreements approved are accepted, provided that they are in accordance with and do not contradict existing domestic law in Costa Rica;

2 that there be no failure on the part of other Member States to comply with the provisions adopted by this Conference, that affect the country's interests;

3 the right to make specific reservations to safeguard its telecommunication systems.

25

Original: English

For the Republic of Uganda:

The delegation of the Republic of Uganda to the World Radiocommunication Conference (Istanbul, 2000), reserves for its Government the right to take such measures it considers appropriate to safeguard its legitimate interests on the decisions taken by the Conference.

The Government of Uganda, within the provisions of the International Telecommunication Union and the Radio Regulations as revised and contained in the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), further reserves the right to take any action it deems necessary to safeguard its national interests should the reservations by any administration or administrations affect its national sovereignty.

26

Original: English

For Canada:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of Canada reserves for its Government the right to take any measures it might deem necessary to safeguard its interests if another Member State of the Union should in any way fail to respect the conditions specified in the Final Acts or if the reservations made by any Member State should be prejudicial to the operation of radiocommunication services in Canada.

The delegation of Canada further declares that it reserves for its Government the right to make any statements or reservations when depositing its instruments of ratification for the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

27

Original: English

For the United Republic of Tanzania:

The delegation of the United Republic of Tanzania to the World Radiocommunication Conference (Istanbul, 2000), reserves for its Government the right:

1 to take such action as it may deem necessary to safeguard its interest should any Member fail to observe or comply in any way whatsoever with the decision taken by this Conference, or should reservations entered by other Members jeopardize the proper operation of its telecommunication services;

2 to continue using the existing and planned services free from harmful interference in view of the possibility of such interference from future operation of services in certain frequency bands in accordance with the decisions of the World Radiocommunication Conference (Istanbul, 2000);

3 to accept or reject the consequences of this Conference's decisions which might directly jeopardize its sovereignty as a result of increased use of the mobile service or any other service.

28

Original: English

For Brunei Darussalam:

The delegation of Brunei Darussalam reserves for its Government the right to take any action which it deems necessary to safeguard its interests should any Member of the Union fail in any way to comply with the Radio Regulations as amended by the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), or should any reservations by any Member of the Union jeopardize Brunei Darussalam's radiocommunication or telecommunication services, affect its sovereignty or lead to an increase in its contributory share towards defraying the expenses of the Union.

The delegation of Brunei Darussalam further reserves for its Government the right to make any additional reservations which it deems necessary up to and including the time of its ratification of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

29

Original: English

For the Republic of Botswana:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Botswana declares that its administration will comply with the provisions of the Final Acts without prejudice to the Republic of Botswana's sovereign right to take any measures that the Government of Botswana deems necessary to safeguard its telecommunication services in the event of harmful interference caused to the said services by any Member of the Union failing to comply with the provisions of the Radio Regulations as revised and adopted by this Conference.

The delegation of Botswana further declares that it reserves for its Government the right to make any statements or reservations when depositing its instruments of ratification of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

30

Original: Spanish

For the Bolivarian Republic of Venezuela:

The delegation of the Bolivarian Republic of Venezuela reserves for its Government the right to take such action as it may consider necessary to safeguard its interests should another country fail in any way to comply with the provisions of these Final Acts or should reservations by any country be prejudicial to the radiocommunication services of Venezuela.

31

Original: English

For the Republic of Namibia:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Namibia reserves for its Government the right to take such actions, as may be considered necessary, to safeguard its interests should any Resolutions and Recommendations adopted by the above-mentioned Conference jeopardize in any way the radiocommunication services of the Republic of Namibia.

32

Original: English

For New Zealand:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the New Zealand delegation reserves for its Government the right to take such measures as it might deem necessary to safeguard its interests if any other country should in any way fail to respect the conditions specified in the Final Acts or if the reservations made by any other country should be prejudicial or detrimental to radiocommunication services in New Zealand.

In addition, New Zealand reserves the right to make appropriate specific reservations and statements prior to ratification of the Final Acts.

33

Original: French

For the Republic of Côte d'Ivoire:

The delegation of the Republic of Côte d'Ivoire reserves for its Government the right:

1 to take any action it considers necessary to safeguard its interests should any Member State fail in any way to comply with the provisions of the Constitution and the Convention of the International Telecommunication Union;

2 to reject the consequences of any reservations made to the Final Acts of the present World Radiocommunication Conference (Istanbul, 2000) by other Member States;

3 to make reservations or reject any amendments made by the present Conference which might jeopardize the proper functioning of its radiocommunication services.

34

Original: English

For the Republic of India:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of India reserves for its Government the right to take such actions, as may be considered necessary, to safeguard its interests should any administration make reservations and/or not accept the provisions of the Final Acts or fail to comply with one or more provisions of the Final Acts, including those which form a part of the Radio Regulations.

35

Original: English

For the Democratic People's Republic of Korea:

The delegation of the Democratic People's Republic of Korea to the World Radiocommunication Conference (Istanbul, 2000) would like to express its sincere appreciation and gratitude to the ITU Secretariat, Steering Committee and all those who have exerted great efforts for the successful proceedings of this Conference within a short period. In particular, we wish to deliver our special thanks to the Regions 1 and 3 BSS replanning team who have worked hard irrespective of day and night for the successful output in such a short time-frame.

Frequency allocation should be conducted on the basis of confident compatibility study by ITU-R with different services in conjunction with the use of several identified frequency bands in IMT-2000, and due consideration should be given to protect the interests of developing countries in this regard.

Continued efforts by the Bureau are requested in future conferences to modify/update with detailed study some difficult parts of the Radio Regulations for easier understanding and more convenient applications by the administrations.

36

Original: English

For the Republic of South Africa:

1 The delegation of the Republic of South Africa reserves its Government’s right to take any such action as it may consider necessary to safeguard its interests should any Member of the Union, in any way, fail to comply with the provisions of the Constitution and Convention of the International Telecommunication Union, the Radio Regulations of ITU and the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

2 Should any reservation by a Member of the Union directly or indirectly affect the operation of its telecommunication services, the Republic of South Africa reserves its right to take any action it may deem necessary.

3 The Republic of South Africa reiterates, and incorporates by reference, all declarations made at all prior world radiocommunication conferences.

4 Further, the delegation of the Republic of South Africa reserves the right of its Government to make such additional declarations and reservations as may be necessary up to, and including, the time of ratification of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

37

Original: French

For the Republic of Senegal:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Senegal reserves for its Government the right:

1 to take all steps necessary to safeguard its interests, should any Members fail in any way to comply with decisions taken by the World Radiocommunication Conference (Istanbul, 2000), or should reservations expressed by other Members be such as to jeopardize the operation of its telecommunication services;

2 to accept, or not accept, the consequences of certain decisions that might have a direct adverse effect upon its sovereignty.

38

Original: French

The Republic of Tunisia:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Tunisia reserves for its Government the right to express reservations, should the texts adopted by the present Conference lead to interpretations inconsistent with the basic principles of ITU or with provisions of the Constitution of the Republic of Tunisia.

By this declaration, the delegation of the Republic of Tunisia also reserves for its Government the right to take all action it deems necessary to protect its interests and safeguard its radiocommunication services in the event that any Member or Members of ITU should fail, in any manner whatsoever, to abide by the provisions of these Final Acts, or if the sovereign rights of the Republic of Tunisia are affected.

39

Original: English

For the Federal Democratic Republic of Ethiopia:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Government of the Federal Democratic Republic of Ethiopia reserves for its Government the right to take any step it may deem necessary to safeguard its interest should any administration fail to comply with these instruments or should reservations by other countries jeopardize its interests.

40

Original: English

For Papua New Guinea:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of Papua New Guinea, in light of declarations and reservations deposited by other Member States of ITU, is obliged to reserve for its Government the right to take such actions as it may consider necessary to safeguard its interests should any Member State of ITU fail to observe the provisions adopted by this Conference and in so doing cause harmful interference to, or, should reservations or actions by such Member States jeopardize the operation of radiocommunication and/or telecommunication systems and services which are under the jurisdiction of the Government of Papua New Guinea.

41

Original: English

For the Republic of Korea:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Korea reserves for its Government the right to take any measures as it might deem necessary to safeguard its interests if any other Member State of the Union should in any way fail to respect the conditions specified in the Final Acts or if the reservations made by other countries should be prejudicial to the efficient operation of its telecommunication services.

42

Original: English

For the Republic of Indonesia:

On behalf of the Republic of Indonesia, the delegation of the Republic of Indonesia to the World Radiocommunication Conference (Istanbul, 2000):

1 reserves the right for its Government to take any action and preservation measures it deems necessary to safeguard its national interests should any provision, Recommendation and Resolution of the World Radiocommunication Conference (Istanbul, 2000), directly or indirectly affect its sovereignty or be in contravention of the Constitution, Laws and Regulations of the Republic of Indonesia as a party to other treaties and conventions and from any principles of international law;

2 further reserves the right for its Government to take any action and preservation measures it deems necessary to safeguard its national interests should any Member in any way fail to comply with the provisions of the Radio Regulations, the Constitution and Convention of the International Telecommunication Union, or should the consequences of reservations by any Member jeopardize its telecommunication services or result in an increase of its contributory share towards defraying expenses of the Union.

43

Original: English

For the Republic of Zambia:

The delegation of the Republic of Zambia to the World Radiocommunication Conference (Istanbul, 2000) reserves for its Government the right to take any action it may consider necessary to safeguard its interests, should any Member States or Sector Members or members of the International Telecommunication Union fail to comply with the provisions in the Final Acts of this Conference or should any of the declarations by other members jeopardize the provision of telecommunication services in Zambia.

44

Original: English

For Mongolia:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) the Mongolian delegation declares on behalf of its Government that:

1 in view of the possibility of harmful interference from future operation of mobile-satellite services in certain frequency bands in accordance with the decisions of the Conference may affect the use by Mongolia of existing services in these bands. Therefore, the Mongolian delegation reserves for its Government the rights to continue to use the existing and planned services in these bands free from harmful interference;

2 the Mongolian delegation reserves for its Government the right to take any action it may consider necessary to protect its interests should a Member of the Union fail to comply with the provisions of these Final Acts or should declarations and reservations made by any other Member jeopardize the efficient operation of its telecommunication services or threaten its national sovereignty;

3 the Mongolian delegation further reserves for its Government the right, as and when necessary, to make additional reservations to the Final Acts.

45

Original: English

For the Republic of Singapore:

The delegation of the Republic of Singapore reserves for its Government the right to take any action it considers necessary to safeguard its interests should any Member of the Union fail in any way to comply with the requirements of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), or should reservations by any Member of the Union jeopardize the Republic of Singapore's telecommunication services, affect its sovereignty or lead to an increase in its contributory share towards defraying the expenses of the Union.

46

Original: English

For the Islamic Republic of Pakistan:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), Pakistan's delegation declares that:

1 it reserves the right of its Government to take any action it may consider necessary to safeguard and protect its interests should any Member fail to comply as required with the provisions in the Final Acts and Annexes thereto adopted by this Conference;

2 it reserves the right of its Government to take any action in accordance with national law as it may deem necessary to safeguard and protect its interests should the declaration and/or reservations entered by other delegations in any way affect the normal operation of broadcasting and other telecommunications services in violation of the Radio Regulations in force or decisions taken by the World Radiocommunication Conference (Istanbul, 2000), and promotion of telecommunication services in the Islamic Republic of Pakistan;

3 it reserves its sovereign right to take any action it considers appropriate to regulate its telecommunications;

4 the decisions of the World Radiocommunication Conference (Istanbul, 2000), for dealing with frequency allocations in certain parts of the spectrum regarding areas falling within the territories of the disputed States of Jammu and Kashmir are without prejudice to the position recognized by the relevant resolutions of the United Nations on the question;

5 the delegation of the Republic of Pakistan reserves for its Government the right to make additional reservations when ratifying the Final Acts. It also reserves the right to amend the above listed reservations.

47

Original: English

For the Islamic Republic of Iran:

IN THE NAME OF GOD

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Islamic Republic of Iran formally declares that:

1 In view of the possible endangerment of the interests of its Government due to the application of the decisions of this Conference on the following subjects:

a) matters related to No. **2674 (S23.13)** of the Radio Regulations;

b) in relation to the use of the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz by mobile-satellite services and the transition of existing installations in terrestrial services covered by Article 48 of the Constitution, the Islamic Republic of Iran reserves its right not to take any action in transferring the installation before evolution of the financial and economic impact and cost recovery of such a transition in accordance with Resolution **716**.

2 The delegation of the Islamic Republic of Iran reserves for its Government the right to take any action as it may consider necessary to safeguard its interests should they be affected by decisions taken at this Conference, or by failure on the part of any other country or administration in any way to comply with the provisions of the instruments amending the Constitution and Convention of the International Telecommunication Union as adopted by the Plenipotentiary Conference (Minneapolis, 1998), or the Annexes or Protocols and Regulations attached thereto, or these Final Acts, or should the reservations or declarations by other countries or administrations jeopardize the proper and efficient operation of its telecommunication services, or infringe the full exercise of the sovereign rights of the Islamic Republic of Iran.

3 The delegation of the Islamic Republic of Iran reserves for its Government the right to make additional reservations when ratifying the Final Acts of this Conference.

48

Original: French

For the People's Democratic Republic of Algeria:

In signing the Final Acts of the present World Radiocommunication Conference (Istanbul, 2000), the Algerian delegation to the Conference reserves for its country the right to use whatever means may be necessary to safeguard its interests in any case in which they may be threatened through the failure on the part of a member to comply with the provisions of the Radio Regulations, particularly with respect to § 4.1.20, in Document 494 of WRC-2000, of Article 4 of Appendices **S30** and **S30A** to the said Regulations, where conditions are such as to require its application.

49

Original: English

For the Socialist Republic of Viet Nam:

On behalf of the Government of the Socialist Republic of Viet Nam, the Vietnamese delegation attending the World Radiocommunication Conference (Istanbul, 2000) declares:

1 that it maintains the reservations made at the Plenipotentiary Conference (Nairobi, 1982) and reaffirmed at the Plenipotentiary Conference (Nice, 1989), the Additional Plenipotentiary Conference (Geneva, 1992), the Plenipotentiary Conference (Kyoto, 1994) and the Plenipotentiary Conference (Minneapolis, 1998);

2 that it reserves the right of its Government to take any action which it may deem necessary to safeguard its interests, should any other Member States fail in any way to comply with the provisions of the Constitution, Convention or Administrative Regulations of the International Telecommunication Union as well as the Appendices and Annexes thereto, or should reservations by other Member States jeopardize the telecommunication services or the sovereignty of the Socialist Republic of Viet Nam;

3 that it also reserves the right of its Government to make any additional declarations and reservations prior to the deposit of the instrument of ratification of the amended Constitution and Convention, if necessary.

50

Original: Spanish

For Mexico:

The Government of Mexico, in signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), expressly reserves for itself the right:

1 to take any action it considers necessary to safeguard its interests, and in particular to protect its existing or planned telecommunication networks, systems and services, should a Member of the Union not comply or cease to comply with the provisions of these Acts, or should declarations or reservations made by other Members of the Union affect the proper functioning of its telecommunication networks, systems or services;

2 to accept or reject the consequences arising out of the application, by other Members of the Union or their recognized operating agencies, of the decisions adopted at WRC-2000 which may affect the proper functioning of its existing or planned telecommunication networks, systems and services, or which are or may be detrimental to its property and rights;

3 to reject the establishment and application of any financial due diligence procedure, as well as the establishment and application of any punitive measures other than those laid down in the Constitution and the Convention, to the detriment of the rights of Member States, in respect of any failure or delay in the making of payments or contributions, as the case may be;

4 to make, under the Vienna Convention on the Law of Treaties of 1969, new reservations to these Acts at any time it sees fit, between the date of their signature and the date of their ratification, in accordance with established procedures under its domestic legislation, and not to consider itself bound by any provision of these Acts which may limit its right to make the reservations it deems appropriate.

Accordingly, the Government of Mexico, on the basis of the Table of Frequency Allocations and its footnotes, reserves for itself the right to assign frequencies and regulate their use in the way that is most appropriate in order to satisfy its telecommunication needs.

51

Original: English

For the Republic of Latvia and the Republic of Lithuania:

The delegations of the above-mentioned countries reserve for their Governments the right to take any action they consider necessary to protect their interests should any Member of the Union fail to comply with the provisions of the Final Acts of this Conference, or should reservations made upon signing the Final Acts, or other measures taken by any Member of the Union jeopardize the proper operation of their countries’ telecommunication services.

52

Original: French

For the Republic of Burundi:

In signing the Final Acts of this Conference, the delegation of the Republic of Burundi reserves for its Government the right to take all necessary measures should the application of these Final Acts jeopardize directly or indirectly the interests of its telecommunication services or endanger national security and sovereignty.

53

Original: French

For the Republic of Chad:

In signing the Final Acts of this Conference, the delegation of Chad reserves for its Government the right to take any measures and action necessary to protect its national rights and interests should any Members of the Union fail in any way to comply with the provisions of these Acts and jeopardize directly or indirectly the interests of its telecommunication services or endanger security or national sovereignty.

54

Original: English

For the People's Republic of China:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the People's Republic of China declares:

1 The Chinese delegation reserves the right of its Government to take any measures and actions it may deem necessary to safeguard its interests should other Member States of the International Telecommunication Union in any way fail to comply with or execute the provisions of the Final Acts or the Radio Regulations, or should reservations or declarations made by other Member States jeopardize the proper operation of the telecommunication services of China or affect the full exercise of its sovereign rights.

2 It also reserves the right of its Government to make any additional reservation it considers necessary up to and at the time of its ratification of these Final Acts.

55

Original: English

For Malta:

In signing the present document the delegation of Malta reserves for its Government the right to take such action as it may consider necessary to safeguard its interests should any Members not share in defraying the expenses of the Union, or should any Members fail in any other way to comply with the requirements of the Constitution and Convention of the International Telecommunication Union (Geneva, 1992) and any amendments made thereto by the Plenipotentiary Conference (Kyoto, 1994) and the Plenipotentiary Conference (Minneapolis, 1998), and/or any other instruments associated therewith, or should reservations by other countries jeopardize its telecommunication services.

56

Original: Spanish

For Cuba:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of Cuba reserves for its Government the right to take such action as it may deem necessary to safeguard its interests should other Member States fail to comply with the provisions of these Final Acts or use their radiocommunication services for purposes contrary to those established in the Preamble to the Constitution of the International Telecommunication Union, or should reservations by other Member States jeopardize Cuba's telecommunication services.

The delegation of Cuba also reiterates and incorporates by reference in these Final Acts all its declarations and reservations made at previous world radiocommunication conferences, as well as Declaration No. 81 in the Final Acts of the Plenipotentiary Conference (Minneapolis, 1998).

The delegation of Cuba reserves for its Government the right to make any additional declaration or reservation which it may deem necessary until the time of its ratification of the present Final Acts.

57

Original: English

For the Slovak Republic:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Slovak Republic reserves for its Government the right to take any action as it deems necessary, to safeguard its interests should any Member of the ITU fail in any way to comply with the Final Acts and Annexes or should the reservations made by the representatives of other States jeopardize the proper operation of its telecommunication services.

The Slovak delegation also declares that it signs the Final Acts under the assumption that operation of the assignments of the Slovak Republic in accordance with the Plan for the broadcasting-satellite service contained in Appendices **S30** and **S30A** as adopted by the WRC-2000 shall not be hampered through the application of the provisions 4.1.18, 4.1.19 and 4.1.20 of Articles 4 of either Appendix **S30** or **S30A** by another administration and/or by the ITU.

58

Original: English

For the Czech Republic:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Czech Republic declares that it reserves for its Government the right to take any action which it may deem necessary to safeguard its interests should any Member State fail to comply with the provisions of the Constitution and Convention of the International Telecommunication Union, its annexes and the protocols attached thereto and the Radio Regulations.

The same reservation is made for the Government with regard to the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) and with regard to any reservations or actions by other Member States, which could affect adversely its telecommunication and radiocommunication services.

This reservation applies primarily to the application of provisions 4.1.18, 4.1.19 and 4.1.20 of Article 4 of either Appendix **S30** or Appendix **S30A** of the Radio Regulations. The Czech Republic assignments as contained in the frequency plans in Appendices **S30** and **S30A** adopted by the WRC-2000 shall in no way be hampered by another administration or by ITU through the application of the above-mentioned provisions.

59

Original: English

For the Republic of Zimbabwe:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Zimbabwe states that its Administration would comply with the provisions of the Final Acts of WRC-2000 without prejudice to the Republic of Zimbabwe's sovereign right to take any measures that the Government of Zimbabwe deems necessary to safeguard and protect its interests, particularly telecommunication and other communication services, in the event of harmful or any other form of interference caused by any Member of the Union failing to comply with the provisions of the Radio Regulations as revised and adopted by this Conference.

60

Original: English

For the Kingdom of Saudi Arabia, the State of Bahrain, the United Arab Emirates, the Islamic Republic of Iran, Lebanon, the Socialist People's Libyan Arab Jamahiriya, the Syrian Arab Republic and the Republic of Yemen:

The delegations of the above-mentioned countries to the World Radiocommunication Conference (Istanbul, 2000), declare that the signature and possible ratifications by their respective Governments of the Final Acts of this Conference shall not be valid for the ITU Member under the name of "Israel", and in no way whatsoever imply its recognition by these Governments.

61

Original: English

For the Federative Republic of Brazil:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the Brazilian delegation reserves for its Administration the right to take such measures as it might deem necessary to safeguard its interests if any Member State of the Union should in any way fail to respect the conditions specified in the Final Acts, or if the reservation made by any Member State should be prejudicial to the operation of radiocommunication services in Brazil.

Furthermore, Brazil reserves the right to make additional specific declarations or reservations at the time of deposit of its notification to the International Telecommunication Union of its consent to be bound by the revisions to the Radio Regulations adopted by the World Radiocommunication Conference (Istanbul, 2000).

62

Original: Spanish

For the Dominican Republic:

The Dominican Republic, in signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), declares:

1 that it reserves for its Government the right to take any action it considers necessary, in conformity with its domestic legal and regulatory system and with international law, to safeguard its national

interests should other Members fail to observe the provisions of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), or should reservations expressed by representatives of other States affect the radiocommunication services of the Dominican Republic or its full sovereign rights;

2 that it reserves and claims for its Government the right to express reservations, under the Vienna Convention on the Law of Treaties of 1969, to the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) at any time it sees fit between the date of the signature and the date of the possible ratification of the international instruments constituting the said Final Acts;

3 that the Dominican Republic is bound by the instrument contained in the Final Acts only insofar as it expressly and duly consents to be bound by that international instrument, and subject to the completion of the relevant constitutional and legal procedures; and

4 that in conformity with its Constitution its Government cannot give provisional effect to the international instruments which constitute the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) until they have been duly incorporated in its legal system by the relevant bodies of the Dominican State.

63

Original: Spanish

For the Republic of Colombia:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Colombia:

1 Declares that it reserves for its Government the right:

a) to take any measures it may deem necessary, in conformity with its domestic law and with international law, to safeguard its national interests should any other Members fail to comply with the provisions of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), or should reservations by representatives of other States jeopardize the radiocommunication services of the Republic of Colombia or its full sovereign rights;

b) to express reservations, under the Vienna Convention on the Law of Treaties of 1969, with regard to the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), at any time it sees fit between the date of the signature and the date of the possible ratification of the international instruments constituting those Final Acts.

2 Reaffirms, in their essence, reservations Nos. 40 and 79 made at the World Administrative Radio Conference (Geneva, 1979), especially with regard to the new provisions included in the documents of the Final Acts.

3 Declares that the Republic of Colombia considers itself bound by the instrument contained in the Final Acts only insofar as it expressly and duly consents to be bound by that international instrument, and subject to the completion of the appropriate constitutional procedures.

4 Declares that in conformity with its Constitution, its Government cannot give provisional effect to the international instruments which constitute the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

64

Original: Spanish

For the Republic of Colombia, Costa Rica, the Dominican Republic, the Republic of El Salvador, Ecuador, the Republic of Guatemala, Peru and the Bolivarian Republic of Venezuela:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegations of the above countries declare that their respective Governments express their formal reservations with respect to the provisions contained in Nos. **S9.2B.1, S9.38.1**, Note 3 in § 4.2.8 and 4.1.5 of Appendix **S30**, Note 3 in § 4.2.8 and 4.1.5 of Appendix **S30A** and Note 1 in the title of Article 6 in Appendix **S30B** and of the associated Resolution, and declare in that regard that they do not recognize those provisions, or any measures arising from their possible application, as being binding in nature.

65

Original: English

For the Kingdom of Saudi Arabia, the State of Bahrain, the United Arab Emirates, the Sultanate of Oman and the State of Qatar:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegations of the Administrations of the Cooperation Council for the Arab States of the Gulf (GCC) to this Conference, on behalf of their Governments, reserve the right to take any action they deem necessary to safeguard their interests should they be affected or should any Member fail to comply with the provisions of the Convention or its Annexes, or should reservations by any other country jeopardize their telecommunication services.

66

Original: English

For the Syrian Arab Republic:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Syrian Arab Republic reserves for its Government the right:

1 to confirm and make use of all declarations and reservations made by its delegation during this Conference;

2 to make additional declarations and reservations at the time of its notification to the International Telecommunication Union of its ratification of these Final Acts;

3 to take any measures it might deem necessary to protect its interests, should any Member State of the Union fail to abide by the provisions of these Final Acts or comply with them or should reservations, made by other countries, jeopardize the efficient operation of its telecommunication services.

In addition, the Syrian delegation to this Conference states the following reservations:

1 the Syrian Arab Republic is not in a position to coordinate high altitude platform stations (HAPS), proposed to be used in the 2 GHz frequency band, with any neighbouring administrations until suitable regulatory provisions have been developed;

2 the Syrian Arab Republic is not bound by the newly adopted provisions 4.1.18 and 4.1.19 of Article 4 of Appendices **S30** and **S30A** under which a notifying administration can enter an assignment provisionally in the Master International Frequency Register (MIFR) in spite of continuing disagreement, until the studies called for by Resolution **540 (WRC-2000)** are completed and the provisions of Appendices **S30** and **S30A** as revised by WRC-03 enter into force;

3 in application of Article **S23** (WRC-2000), the deletion of the Syrian territory from the service area of a space station in the broadcasting-satellite service (BSS) cannot be considered as "adversely affecting the rest of the service area" unless when the service area involves administrations having common borders (neighbouring countries).

67

Original: English

For the Republic of Hungary:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Hungary reserves the right for its Government to take such action as it may consider necessary to safeguard its interest should any Member State of the Union fail in any way to observe or comply with the provisions of these Final Acts or should reservations by other countries jeopardize the proper operation of its radiocommunication services.

Hungary reserves its rights not to accept the decision of WRC-2000 on the provisions 4.1.18-4.1.20 of Article 4 of Appendices **S30** and **S30A**.

Hungary signs the Final Acts on the understanding that the taking into operation of the Hungarian assignments as contained in the Frequency Plans of Appendices **S30** and **S30A** adopted by WRC-2000 shall not be hampered by another administration and/or by the ITU through the application of the provisions 4.1.18-4.1.20 of either Appendix **S30** or Appendix **S30A**.

68

Original: English

For the Kingdom of Tonga:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Kingdom of Tonga:

1 Declares that it reserves for its Government the right:

a) to take any measures it may deem necessary, in conformity with its domestic law and with international law, to safeguard its national interests should any other Member fail to comply with the provisions of the Radio Regulations or any other documents contained in the Final Acts of the Conference, or should the Acts or reservations by representatives of other States affect its national sovereignty or its national telecommunications;

b) not to be bound by any provisions in the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), which are, or which are potentially, retroactive in character and which could prejudice the legal situation established under the Radio Regulations in force on the date of signature of the present Final Acts unless it expressly and duly consents to be bound, and subject to the completion of the appropriate procedures established in its domestic law;

c) to make, under the Vienna Convention on the Law of Treaties of 1969, reservations to the above-mentioned Final Acts at any time it considers proper between the date of signature and the date of their ratification or approval and not to be bound by any provision of these Final Acts or of the Constitution and the Convention of the International Telecommunication Union restricting its sovereign right to make reservations.

2 Declares that the eventual ratification by the Kingdom of Tonga of any provisions of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) which are, or which are potentially, retroactive in their application is done so only on the basis that any such ratification of retroactive provisions is made on an exceptional basis. The Kingdom of Tonga does not accept that the inclusion in the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) of any provisions which have, or which potentially have, a retroactive application sets a precedent for a similar approval of retroactive provisions by future conferences.

3 Declares that with regard to the Region 1 broadcasting-satellite service downlink plan included in the revised Appendix **S30** of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the Kingdom of Tonga does not accept any additional and retroactive coordination requirement for any of its Region 3 fixed-satellite service networks in the band 12.2-12.5 GHz for which the complete coordination information was received by the Radiocommunication Bureau prior to 3 June 2000, beyond that which was identified in the original publications for those networks with regard to the Region 1 Appendix **S30** Plan. In the event that any such additional and retroactive coordination requirement is identified by the Radiocommunication Bureau, the delegation of the Kingdom of Tonga reserves for its Government the right not to accept such additional and retroactive coordination requirement and to take any measures it may deem necessary, in conformity with its domestic law and with international law, to safeguard its national interests.

4 Declares that the Kingdom of Tonga considers itself bound by the revision of the Radio Regulations by the World Radiocommunication Conference (Istanbul, 2000), only insofar as it expressly and duly consents to be bound, and subject to the completion of the appropriate procedures established in its domestic law.

69

Original: Russian

For the Republic of Armenia, the Azerbaijani Republic, the Republic of Belarus, the Republic of Kazakstan, the Republic of Uzbekistan, the Kyrgyz Republic, the Russian Federation and Ukraine:

The delegations of the above-mentioned countries reserve for their respective Governments the right to take any action they may consider necessary to protect their interests should any Member of the Union fail to comply with the provisions of the Final Acts of this Conference, or should reservations made upon signing the Final Acts, or other measures taken by any Member of the Union, jeopardize the proper operation of those countries' telecommunication services.

70

Original: French

For France:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the French delegation expresses reservations against the possibility that the number and complexity of the texts adopted within a very limited time and the risks due to the speeding up of the process for the approval of documents might give rise to interpretations which were not in conformity with the final consensus of the conference.

More generally, the delegation of France reserves for its Government the right to take any measures it might deem necessary to protect its interests should any Member State of the Union fail to respect the provisions of these Final Acts or to comply with them or should reservations made by other countries jeopardize the efficient operation of its telecommunication services.

71

Original: English

For the Federal Republic of Germany, Austria, the Principality of Liechtenstein and the Confederation of Switzerland:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegations of the above-mentioned countries declare that their agreement to the respective Article 4 of Appendices **S30** and **S30A** to the Radio Regulations, as modified by this Conference, is on the explicit understanding that the application of § 4.1.18, 4.1.18*bis*, 4.1.19 and 4.1.20 of the aforementioned Articles will not adversely affect the bringing into use of their assignments in conformity with the Plans for Regions 1 and 3, as contained in Appendices **S30** and **S30A**.

72

Original: English

For the Republic of Croatia, the Republic of Hungary, the Slovak Republic and the Czech Republic:

In signing the Final Acts of the WRC-2000, the delegations of the above-mentioned countries formally declare that their acceptance of the WRC-2000 Regions 1 and 3 Appendices **S30** and **S30A** Plans is on the understanding that the final result contained in the WRC-2000 Regions 1 and 3 Appendices **S30** and **S30A** Plans as agreed by this Conference, which on the orbital position 12.8º W assigned eight channels to each of the above-mentioned countries and assigned also three other channels to be used under their common agreement, is a temporary solution and a compromise with respect to that originally proposed by the BR (WRC-2000 Document 34(Add.5)) containing ten channels for each of the above-mentioned countries.

Inclusion of the Sirius-W satellite in the Regions 1 and 3 List on the orbital position 13º W as an existing system with five channels, which has been accepted by this Conference as such, obliged the above-mentioned countries to accept that compromise. It is, however, the understanding of the above-mentioned countries that at the end of the operational lifetime of the current Sirius-W satellite, the five channels then vacated will be assigned on the orbital position of 12.8º W to the above-mentioned countries in a suitable manner for each of them to have ten channels per country as accepted in the methodology and technical assumptions used for establishing the WRC-2000 Regions 1 and 3 Appendices **S30** and **S30A** Plans.

73

Original: English

For the United States of America:

1 The United States of America refers to Article 32, Section 16, of the International Telecommunication Convention (Geneva, 1992) and notes that in considering the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the United States of America may find it necessary to make additional declarations or reservations. Accordingly, the United States of America reserves the right to make additional declarations or reservations at the time of deposit of its instruments of ratification of these revisions to the Radio Regulations.

2 The United States of America shall not be deemed to have consented to be bound by revisions to the Radio Regulations adopted at this Conference without specific notification to the International Telecommunication Union by the United States of America of its consent to be bound.

3 The United States of America reiterates and incorporates by reference all declarations and reservations made at prior world administrative radiocommunication conferences and world radio-communication conferences.

74

Original: English

For the United States of America:

The United States of America notes and agrees with comments by several administrations that the International Telecommunication Union is not the proper forum to consider programme content issues and that implementation of No. **S23.13** is primarily a bilateral issue. Recognizing the rapid changes in communications technology and the role that wireless broadband services are playing in the expansion of access to information necessary for the prosperity and enrichment of all peoples, the United States of America is concerned about efforts to apply No. **S23.13** to various services and thereby potentially inhibiting or restricting the expansion of the flow of information throughout the world. The United States of America strongly believes that applying No. **S23.13** to DTH-FSS is not in the interest of ITU Members and endangers the free flow of information to those countries that need it the most if they are to prosper in the information age of the 21st century.

75

Original: English

For Greece:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) the delegation of Greece declares:

1 that it reserves for its Government the right:

a) to take any action consistent with its national and international law that it may consider or deem necessary or useful to protect and safeguard its sovereign and inalienable rights and legitimate interests, should any Member State of the International Telecommunication Union fail in any way to comply with or apply the provisions of these Final Acts, which include the Radio Regulations and the Resolutions of the Conference, or should the acts of other entities or third parties affect its national sovereignty;

b) to make, under the Vienna Convention on the Law of Treaties of 1969, reservations to the above-mentioned Final Acts at any time it considers proper between the date of signature and the date of their ratification or approval and not to be bound by any provision of these Final Acts or of the Constitution and the Convention of the International Telecommunication Union restricting its sovereign right to make reservations;

2 that it is fully established that the term “country”, used in the provisions of these Final Acts and in any other instrument or act of the International Telecommunication Union with regard to its Members and their rights and obligations, is regarded as being synonymous in all respects with the term “sovereign State” as legally constituted and internationally recognized.

76

Original: English

For Turkey:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of Turkey reserves for its Government the right to take any measures which it deems necessary to protect its interests on the decision taken by the Conference in modifying, amending, deleting and adding provisions, footnotes, tables, Resolutions and Recommendations in the Radio Regulations, should any Member of the Union fail, in any way, to comply with the provisions of the Final Acts, Annexes and the Radio Regulations thereto, in using its existing services and introducing new services for space, terrestrial and other applications or should any reservation made by other Members jeopardize the proper operation of its telecommunication services.

The delegation of Turkey further reserves the rights of its Government to make additional declarations or reservations as may be necessary when depositing its instruments of ratification of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

77

Original: English

For the Lao People’s Democratic Republic:

The Administration of Lao P.D.R. considers that the adoption of the provisions related to No. **S23.13** by WRC-2000 to be illegal because the Rules of Procedure for the Conference were not applied in the adoption of these provisions. Accordingly, it is in no way bound by the adoption of the provision related to No. **S23.13**. The reasons are contained in the minutes of the 1 June 2000 Plenary Meeting.

78

Original: English

For the Republic of Croatia:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of Croatia reserves for its Government the right to take any action it considers necessary to protect its interests should any Member of the Union fail to comply with the provisions of the Final

Acts of this Conference, or should reservations made upon signing the Final Acts, or other measures taken by any Member of the Union jeopardize the proper operation of this country's telecommunication services.

Croatia reserves its rights not to accept the decision of WRC-2000 on the provisions 4.1.18, 4.1.19 and 4.1.20 of Article 4 of RR Appendices **S30** and **S30A**.

Croatia signs the Final Acts also on the understanding that the taking into operation of the Croatian assignment as contained in the Frequency Plans of Appendices **S30** and **S30A** adopted by WRC-2000 shall not be constrained by another administration and/or by the ITU through the application of provisions 4.1.18, 4.1.19 and 4.1.20 of Article 4 of either Appendix **S30** or Appendix **S30A**.

Additional Declarations and Reservations

79

Original: French

For the Republic of Mali:

Taking note of the declarations in Document 524, the delegation of Mali, in signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), reserves for its Government the right to take any measures and action necessary to protect its national rights and interests should any Members of the Union fail in any way to comply with the provisions of the Final Acts adopted by this Conference or should the reservations and declarations made jeopardize directly or indirectly the interests of its telecommunication services or endanger security or national sovereignty.

80

Original: English

For Lao People's Democratic Republic:

After reviewing the declarations by some administrations, the delegation of Lao P.D.R. restates that it is not bound by the decision of this Conference concerning No. **S23.13**, in particular noting that its test points for its additional assignments in the Lists (i.e. LSTAR3B and LSTAR4B) were adopted by this Conference. In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of Lao P.D.R. reserves for its Government the right to take any measures which it deems necessary to protect its interests in any decision taken by the Conference in modifying, amending, deleting and adding provisions, footnotes, tables, Resolutions and Recommendations in the Radio Regulations, should any Member of the Union fail, in any way, to comply with the provisions of the Final Acts, Plans, Lists, Annexes and the Radio Regulations thereto, in using its existing services and introducing new services for space, terrestrial and other applications or should any reservation made by other Members jeopardize the proper operation of its telecommunication services.

81

Original: English

For The Former Yugoslav Republic of Macedonia:

Having taken note of the declarations presented by many Members of the International Telecommunication Union, in signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) the delegation of the Republic of Macedonia reserves for its Government the right to take any measures it might deem necessary to protect its interests in cases where a Member of the Union fails to comply with the provisions of the Radio Regulations or makes reservations that jeopardize the operation of the radiocommunication services in the Republic of Macedonia.

82

Original: English

For the People's Republic of China:

In signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the People's Republic of China, taking note of the declarations in Document 524, hereby declares on behalf of its Government that the Government of the People's Republic of China reserves the right to take any measures and action it may deem necessary to safeguard its interests should the radiation of the BSS system of any other Member State of the International Telecommunication Union cover the territory of China without previously obtaining explicit agreement from China.

83

Original: English

For the Republic of the Philippines:

Having studied the declarations contained in Document 524 and having signed the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), the delegation of the Republic of the Philippines declares that it reserves for its Government the right to take any action it deems necessary and appropriate to safeguard its interests, should any Member or Members of the International Telecommunication Union (ITU) fail in any way to observe the Final Acts, the Annexes thereto and the Radio Regulations, or should reservations by other Members jeopardize the operation of its telecommunications and radiocommunications services or its sovereign rights.

84

Original: English

For the Republic of Estonia:

Taking note of declarations in Document 524 and in signing the Final Acts of this Conference, the delegation of Estonia reserves for its Government the right to take any action it considers necessary to protect its interests should any Member of the Union fail to comply with the provisions of the Final Acts of this Conference, or should reservations made upon signing the Final Acts, or other measures taken by any Member of the Union, jeopardize the proper operation of its country's telecommunication services.

85

Original: English

For the State of Israel:

Declaration 60 made to the Final Acts by certain delegations is incompatible with international law and the principles, objects and purpose of the Constitution and Convention of the International Telecommunication Union, and is therefore devoid of legal validity.

The Government of Israel wishes to put on record that it rejects Declaration 60 and will proceed on the assumption that it can have no validity with respect to the rights and duties of any Member State of ITU.

The Government of Israel reserves its right to take any action deemed necessary to protect its interests and to safeguard the operation of its telecommunication services.

The Government of Israel further reserves the right to make appropriate specific reservations prior to ratification of the Final Acts.

86

Original: English

For the Republic of India:

The delegation of the Republic of India has the honour to refer to § 4 of Declaration 46 (Document 524) made by the delegation of the Islamic Republic of Pakistan. The delegation of the Republic of India notes with regret this reference to the States of Jammu and Kashmir. The delegation of India reiterates that the States of Jammu and Kashmir are an integral part of the sovereign Republic of India. The delegation of the Republic of India, therefore, reserves the right for its Government to take appropriate measures to safeguard its interests as a result of any action on the part of the Islamic Republic of Pakistan, as a result of Declaration 46.

87

Original: English

For the United States of America:

The United States of America, noting Declaration 56 entered by the delegation of Cuba, recalls its rights to broadcast to Cuba on appropriate frequencies free of jamming or other wrongful interference and reserves its rights with respect to existing interference and any future interference by Cuba with United States broadcasting. Furthermore, the United States of America notes that its presence in Guantanamo is by virtue of an international agreement presently in force; the United States of America reserves the right to meet its radiocommunication requirements there as it has in the past.

88

Original: English

For the Federated States of Micronesia:

After having considered the declarations and reservations contained in Conference Document 524, the delegation of the United States of America, acting on behalf of the Government of the Federated States of Micronesia pursuant to Article 31 of the International Telecommunication Convention (Geneva, 1992), declares that it reserves for the Government of the Federated States of Micronesia the right to make any declarations or reservations necessary to safeguard Micronesian interests should declarations or reservations made by other Members jeopardize the proper operation of the telecommunication services of the Federated States of Micronesia.

89

Original: English

For Romania:

With regard to the declarations and reservations contained in Document 524, Romania, in signing the Final Acts of the World Radiocommunication Conference (Istanbul, 2000), reserves the right for its Government to take any measures that might be necessary to safeguard its interests if another country should in any way fail to respect the conditions specified in the Final Acts or if the reservations made by another country should be prejudicial to the operation of the radiocommunication services of Romania.

The delegation of Romania further declares that it reserves for its Government the right to make any statements or reservations when depositing its instruments of ratification for the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

90

Original: English

For Sweden:

The delegation of Sweden, referring to Declaration 72 made by the Republic of Croatia, the Republic of Hungary, the Slovak Republic and the Czech Republic, recalls that the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) contains the regulatory provisions for the broadcasting-satellite service in certain frequency bands, including provisions for the use of the assignments entered in the Regions 1 and 3 Plan and the Regions 1 and 3 List by this Conference.

The delegation of Sweden notes that the action proposed in Declaration 72 is not in conformity with the provisions of Appendices **S30**/**S30A**, as adopted by this Conference.

Provision 4.1.24 states that:

"No assignment in the List shall have a period of operation exceeding 15 years, counted from the date of bringing into use, or 2 June 2000, whichever is later. Upon request by the responsible administration received by the Bureau at the latest three years before the expiry of this period, this period may be extended by up to 15 years, on the condition that all the characteristics of the assignment remain unchanged."

In signing the Final Acts, the delegation of Sweden declares its acceptance of Appendices **S30** and **S30A** on the understanding that provisions 4.1.24 of Appendices **S30** and **S30A**, respectively, apply to all assignments entered in the Regions 1 and 3 List of additional uses, including the assignments for Sweden in the orbital position 13º W.

Sweden does not accept the action proposed by Declaration 72.

Sweden reserves its right to take any measures it might deem necessary to protect its interest should any Member State of the Union fail to respect the provisions of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000).

91

Original: English

For the Federal Republic of Germany, Australia, the Republic of Cyprus, Denmark, the United States of America, France, Greece, the Republic of India, Ireland, Italy, Japan, the Principality of Liechtenstein, the Republic of Lithuania, Luxembourg, Norway, the Kingdom of the Netherlands, Portugal, the Slovak Republic, the Czech Republic, the United Kingdom of Great Britain and Northern Ireland, Sweden and the Confederation of Switzerland:

The delegations of the above-mentioned countries referring to the declaration made by the Republic of Colombia (No. 63), inasmuch as this statement refers to the Bogota Declaration of 3 December 1976 by equatorial countries and to the claims of those countries to exercise sovereign rights over segments of the geostationary-satellite orbit, and similar statements, consider the claims in question cannot be recognized by this Conference. Further, the above-mentioned delegations wish to affirm or reaffirm the declarations made on behalf of a number of the above-mentioned Administrations in this regard when signing the Final Acts of previous conferences of the International Telecommunication Union as if these declarations were here repeated in full.

The above-mentioned delegations also wish to state that reference in Article 44 of the Constitution to the "geographical situation of particular countries" does not imply recognition of claim to any preferential rights to the geostationary-satellite orbit.

92

Original: English

For the Arab Republic of Egypt:

After reviewing the declarations contained in Document 524, the delegation of the Arab Republic of Egypt reserves for its Government the right to make reservations, should the texts adopted by the present Conference lead to interpretations inconsistent with the basic principles of ITU or with the provisions of the Egyptian Constitution.

By this declaration, the delegation of Egypt also reserves for its Government the right to take all action it deems necessary to protect its interests and safeguard its radiocommunication services in the event that any Member or Members of ITU should fail in any manner whatsoever to abide by the provisions of the Final Acts as signed, or should the sovereign rights of Egypt be affected.

93

Original: English

For Malta:

Having taken note of the declarations in Document 524 of the World Radiocommunication Conference (Istanbul, 2000), the delegation of Malta in signing the Final Acts reserves, for its Government, the right to take any action it deems necessary to safeguard its interests should any Member fail in any way to comply with the requirements of the Final Acts of the World Radiocommunication Conference (Istanbul, 2000) or Annexes thereto or should reservations by other countries jeopardize its interests.

ARTICLES

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ARTICLE S1

Terms and definitions

MOD

S1.171 *coordination area:* When determining the need for coordination, the area surrounding an *earth station* sharing the same frequency band with *terrestrial stations*, or surrounding a transmitting *earth station* sharing the same bidirectionally allocated frequency band with receiving *earth stations*, beyond which the level of *permissible interference* will not be exceeded and coordination is therefore not required.

MOD

S1.173 *coordination distance:* When determining the need for coordination, the distance on a given azimuth from an *earth station* sharing the same frequency band with *terrestrial stations*, or from a transmitting *earth station* sharing the same bidirectionally allocated frequency band with receiving *earth stations*, beyond which the level of *permissible interference* will not be exceeded and coordination is therefore not required.

MOD

S1.185 *inclination of an orbit* (of an earth satellite): The angle determined by the plane containing the *orbit* and the plane of the Earth's equator measured in degrees between 0º and 180º and in counter-clockwise direction from the Earth's equatorial plane at the ascending node of the *orbit*.

ARTICLE S5

Frequency allocations

Section II – Categories of services and allocations

MOD

S5.43 1) Where it is indicated in these Regulations that a service or stations in a service may operate in a specific frequency band subject to not causing harmful interference to another service or to another station in the same service, this means also that the service which is subject to not causing harmful interference cannot claim protection from harmful interference caused by the other service or other station in the same service.

ADD

S5.43A 1*bis*) Where it is indicated in these Regulations that a service or stations in a service may operate in a specific frequency band subject to not claiming protection from another service or from another station in the same service, this means also that the service which is subject to not claiming protection shall not cause harmful interference to the other service or other station in the same service.

Section III – Description of the Table of Frequency Allocations

MOD

S5.50 5) The footnote references which appear in the Table below the allocated service or services apply to more than one of the allocated services, or to the whole of the allocation concerned.

Section IV – Table of Frequency Allocations

MOD

S5.55 *Additional allocation:* in Armenia, Azerbaijan, Bulgaria, Georgia, Kyrgyzstan, the Russian Federation, Tajikistan and Turkmenistan, the band 14-17 kHz is also allocated to the radionavigation service on a primary basis.

MOD

S5.58 *Additional allocation:* in Armenia, Azerbaijan, Georgia, Kazakstan, Kyrgyzstan, the Russian Federation, Tajikistan and Turkmenistan, the band 67-70 kHz is also allocated to the radionavigation service on a primary basis.

MOD

S5.59 *Different category of service:* in Bangladesh and Pakistan, the allocation of the bands 70-72 kHz and 84-86 kHz to the fixed and maritime mobile services is on a primary basis (see No. **S5.33**).

MOD

S5.65 *Different category of service:* in Bangladesh, the allocation of the bands 112-117.6 kHz and 126-129 kHz to the fixed and maritime mobile services is on a primary basis (see No. **S5.33**).

MOD

S5.67 *Additional allocation:* in Azerbaijan, Bulgaria, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 130-148.5 kHz is also allocated to the radionavigation service on a secondary basis. Within and between these countries this service shall have an equal right to operate.

MOD

200-495 kHz

<table>
<tr><th colspan="3">Allocation to services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td>415-435
MARITIME MOBILE S5.79
AERONAUTICAL RADIONAVIGATION
S5.72</td><td colspan="2" rowspan="2">415-495
MARITIME MOBILE S5.79 S5.79A
Aeronautical radionavigation S5.80
S5.77 S5.78 S5.82</td></tr>
<tr><td>435-495
MARITIME MOBILE S5.79 S5.79A
Aeronautical radionavigation
S5.72 S5.82</td></tr>
</table>

MOD

S5.75 *Different category of service:* in Armenia, Azerbaijan, Belarus, Georgia, Moldova, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan, Ukraine and the Black Sea areas of Bulgaria and Romania, the allocation of the band 315-325 kHz to the maritime radionavigation service is on a primary basis under the condition that in the Baltic Sea area, the assignment of frequencies in this band to new stations in the maritime or aeronautical radionavigation services shall be subject to prior consultation between the administrations concerned.

MOD

S5.77 *Different category of service:* in Australia, China, the French Overseas Territories of Region 3, India, Indonesia (until 1 January 2005), Iran (Islamic Republic of), Japan, Pakistan, Papua New Guinea and Sri Lanka, the allocation of the band 415-495 kHz to the aeronautical radionavigation service is on a primary basis. Administrations in these countries shall take all practical steps necessary to ensure that aeronautical radionavigation stations in the band 435-495 kHz do not cause interference to reception by coast stations of ship stations transmitting on frequencies designated for ship stations on a worldwide basis (see No. **S52.39**).

SUP

S5.81

MOD

495-1 800 kHz

<table>
<tr><th colspan="3">Allocation to services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td rowspan="2">505-526.5
MARITIME MOBILE S5.79 S5.79A S5.84
AERONAUTICAL RADIONAVIGATION

S5.72</td><td>505-510
MARITIME MOBILE S5.79</td><td rowspan="2">505-526.5
MARITIME MOBILE S5.79 S5.79A S5.84
AERONAUTICAL RADIONAVIGATION
Aeronautical mobile
Land mobile</td></tr>
<tr><td>510-525
MOBILE S5.79A S5.84
AERONAUTICAL RADIONAVIGATION</td></tr>
</table>

MOD

S5.93 *Additional allocation:* in Angola, Armenia, Azerbaijan, Belarus, Georgia, Hungary, Kazakstan, Latvia, Lithuania, Moldova, Mongolia, Nigeria, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., the Russian Federation, Tajikistan, Chad, Turkmenistan and Ukraine, the bands 1 625-1 635 kHz, 1 800-1 810 kHz and 2 160-2 170 kHz and, in Bulgaria, the bands 1 625-1 635 kHz and 1 800-1 810 kHz, are also allocated to the fixed and land mobile services on a primary basis, subject to agreement obtained under No. **S9.21**.

MOD

S5.96 In Germany, Armenia, Austria, Azerbaijan, Belarus, Denmark, Estonia, Finland, Georgia, Hungary, Ireland, Israel, Jordan, Kazakstan, Latvia, Liechtenstein, Lithuania, Malta, Moldova, Norway, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., the United Kingdom, the Russian Federation, Sweden, Switzerland, Tajikistan, Turkmenistan and Ukraine, administrations may allocate up to 200 kHz to their amateur service in the bands 1 715-1 800 kHz and 1 850-2 000 kHz. However, when allocating the bands within this range to their amateur service, administrations shall, after prior consultation with administrations of neighbouring countries, take such steps as may be necessary to prevent harmful interference from their amateur service to the fixed and mobile services of other countries. The mean power of any amateur station shall not exceed 10 W.

MOD

S5.98 *Alternative allocation:* in Angola, Armenia, Azerbaijan, Belarus, Belgium, Bulgaria, Cameroon, the Congo, Denmark, Egypt, Eritrea, Spain, Ethiopia, Georgia, Greece, Italy, Kazakstan, Lebanon, Lithuania, Moldova, the Netherlands, Syria, Kyrgyzstan, the Russian Federation, Somalia, Tajikistan, Tunisia, Turkmenistan, Turkey and Ukraine, the band 1 810-1 830 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

MOD

S5.99 *Additional allocation:* in Saudi Arabia, Austria, Bosnia and Herzegovina, Iraq, Libya, Uzbekistan, Slovakia, the Czech Rep., Romania, Slovenia, Chad, Togo and Yugoslavia, the band 1 810-1 830 kHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

MOD

S5.107 *Additional allocation:* in Saudi Arabia, Botswana, Eritrea, Ethiopia, Iraq, Lesotho, Libya, Somalia and Swaziland, the band 2 160-2 170 kHz is also allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis. The mean power of stations in these services shall not exceed 50 W.

MOD

S5.112 *Alternative allocation:* in Bosnia and Herzegovina, Cyprus, Denmark, Greece, Iceland, Malta, Sri Lanka and Yugoslavia, the band 2 194-2 300 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

MOD

S5.114 *Alternative allocation:* in Bosnia and Herzegovina, Cyprus, Denmark, Greece, Iraq, Malta, and Yugoslavia, the band 2 502-2 625 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

MOD

S5.117 *Alternative allocation:* in Bosnia and Herzegovina, Cyprus, Côte d'Ivoire, Denmark, Egypt, Greece, Iceland, Liberia, Malta, Sri Lanka, Togo and Yugoslavia, the band 3 155-3 200 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

MOD

3 230-5 003 kHz

<table>
<tr><th colspan="3">Allocation to services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td rowspan="2">3 500-3 800
AMATEUR
FIXED
MOBILE except aeronautical mobile
S5.92</td><td>3 500-3 750
AMATEUR
S5.119</td><td rowspan="3">3 500-3 900
AMATEUR
FIXED
MOBILE</td></tr>
<tr><td rowspan="4">3 750-4 000
AMATEUR
FIXED
MOBILE except aeronautical mobile (R)
S5.122 S5.125</td></tr>
<tr><td>3 800-3 900
FIXED
AERONAUTICAL MOBILE (OR)
LAND MOBILE</td></tr>
<tr><td>3 900-3 950
AERONAUTICAL MOBILE (OR)
S5.123</td><td>3 900-3 950
AERONAUTICAL MOBILE
BROADCASTING</td></tr>
<tr><td>3 950-4 000
FIXED
BROADCASTING</td><td>3 950-4 000
FIXED
BROADCASTING
S5.126</td></tr>
</table>

SUP

S5.120

SUP

S5.124

MOD

5 003-7 350 kHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
7 000-7 100	AMATEUR AMATEUR-SATELLITE S5.140 S5.141	
7 100-7 300 BROADCASTING	**7 100-7 300** AMATEUR S5.142	**7 100-7 300** BROADCASTING

MOD

7 350-13 360 kHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
10 100-10 150	FIXED Amateur	

MOD

13 360-18 030 kHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
14 000-14 250	AMATEUR AMATEUR-SATELLITE	
14 250-14 350	AMATEUR S5.152	

MOD

S5.149 In making assignments to stations of other services to which the bands:

13 360-13 410 kHz,	4 990-5 000 MHz,	94.1-100 GHz,
25 550-25 670 kHz,	6 650-6 675.2 MHz,	102-109.5 GHz,
37.5-38.25 MHz,	10.6-10.68 GHz,	111.8-114.25 GHz,
73-74.6 MHz in Regions 1 and 3,	14.47-14.5 GHz,	128.33-128.59 GHz,
150.05-153 MHz in Region 1,	22.01-22.21 GHz,	129.23-129.49 GHz,
322-328.6 MHz,	22.21-22.5 GHz,	130-134 GHz,
406.1-410 MHz,	22.81-22.86 GHz,	136-148.5 GHz,
608-614 MHz in Regions 1 and 3,	23.07-23.12 GHz,	151.5-158.5 GHz,
1 330-1 400 MHz,	31.2-31.3 GHz,	168.59-168.93 GHz,
1 610.6-1 613.8 MHz,	31.5-31.8 GHz in Regions 1 and 3,	171.11-171.45 GHz,
1 660-1 670 MHz,	36.43-36.5 GHz,	172.31-172.65 GHz,
1 718.8-1 722.2 MHz,	42.5-43.5 GHz,	173.52-173.85 GHz,
2 655-2 690 MHz,	42.77-42.87 GHz,	195.75-196.15 GHz,
3 260-3 267 MHz,	43.07-43.17 GHz,	209-226 GHz,
3 332-3 339 MHz,	43.37-43.47 GHz,	241-250 GHz,
3 345.8-3 352.5 MHz,	48.94-49.04 GHz,	252-275 GHz
4 825-4 835 MHz,	76-86 GHz,	
4 950-4 990 MHz,	92-94 GHz,	

are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. **S4.5** and **S4.6** and Article **S29**).

MOD

S5.152 *Additional allocation:* in Armenia, Azerbaijan, China, Côte d'Ivoire, Georgia, Iran (Islamic Republic of), Kazakstan, Moldova, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the band 14 250-14 350 kHz is also allocated to the fixed service on a primary basis. Stations of the fixed service shall not use a radiated power exceeding 24 dBW.

MOD

18 030-23 350 kHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
18 068-18 168	AMATEUR AMATEUR-SATELLITE S5.154	
. . .		
21 000-21 450	AMATEUR AMATEUR-SATELLITE	

MOD

S5.154 *Additional allocation:* in Armenia, Azerbaijan, Georgia, Kazakstan, Moldova, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the band 18 068-18 168 kHz is also allocated to the fixed service on a primary basis for use within their boundaries, with a peak envelope power not exceeding 1 kW.

MOD

S5.155A In Armenia, Azerbaijan, Belarus, Bulgaria, Georgia, Kazakstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, the Czech Rep., the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the use of the band 21 850-21 870 kHz by the fixed service is limited to provision of services related to aircraft flight safety.

MOD

23 350-27 500 kHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
24 890-24 990	AMATEUR AMATEUR-SATELLITE	

MOD

S5.160 *Additional allocation:* in Botswana, Burundi, Lesotho, Malawi, Dem. Rep. of the Congo, Rwanda and Swaziland, the band 41-44 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

MOD

S5.162A *Additional allocation:* in Germany, Austria, Belgium, Bosnia and Herzegovina, China, Vatican, Denmark, Spain, Estonia, Finland, France, Ireland, Iceland, Italy, Latvia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Lithuania, Luxembourg, Moldova, Monaco, Norway, the Netherlands, Poland, Portugal, Slovakia, the Czech Rep., the United Kingdom, the Russian Federation, Sweden and Switzerland the band 46-68 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with Resolution **217 (WRC-97)**.

MOD

47-75.2 MHz

<table>
<tr><th colspan="3">Allocation to services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td rowspan="3">47-68
BROADCASTING

S5.162A S5.163 S5.164 S5.165
S5.169 S5.171</td><td>47-50
FIXED
MOBILE</td><td>47-50
FIXED
MOBILE
BROADCASTING
S5.162A</td></tr>
<tr><td colspan="2">50-54
AMATEUR
S5.162A S5.166 S5.167 S5.168 S5.170</td></tr>
<tr><td>54-68
BROADCASTING
Fixed
Mobile

S5.172</td><td>54-68
FIXED
MOBILE
BROADCASTING

S5.162A</td></tr>
</table>

MOD

S5.175 *Alternative allocation:* in Armenia, Azerbaijan, Belarus, Georgia, Kazakstan, Latvia, Lithuania, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the bands 68-73 MHz and 76-87.5 MHz are allocated to the broadcasting service on a primary basis. The services to which these bands are allocated in other countries and the broadcasting service in the countries listed above are subject to agreements with the neighbouring countries concerned.

MOD

S5.176 *Additional allocation:* in Australia, China, Korea (Rep. of), Estonia (subject to agreement obtained under No. **S9.21**), the Philippines, the Dem. People's Rep. of Korea and Samoa, the band 68-74 MHz is also allocated to the broadcasting service on a primary basis.

MOD

S5.177 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Bulgaria, Georgia, Kazakstan, Latvia, Moldova, Uzbekistan, Poland, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the band 73-74 MHz is also allocated to the broadcasting service on a primary basis, subject to agreement obtained under No. **S9.21**.

MOD

S5.181 *Additional allocation:* in Egypt, Israel, Japan, and Syria, the band 74.8-75.2 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. **S9.21**. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedure invoked under No. **S9.21**.

MOD

75.2-137.175 MHz

<table>
<tr><th colspan="3">Allocation to services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td rowspan="4">75.2-87.5
FIXED
MOBILE except aeronautical mobile

S5.175 S5.179 S5.184 S5.187</td><td colspan="2">75.2-75.4
FIXED
MOBILE
S5.179</td></tr>
<tr><td>75.4-76
FIXED
MOBILE</td><td rowspan="2">75.4-87
FIXED
MOBILE

S5.182 S5.183 S5.188</td></tr>
<tr><td rowspan="3">76-88
BROADCASTING
Fixed
Mobile

S5.185</td></tr>
<tr><td rowspan="3">87-100
FIXED
MOBILE
BROADCASTING</td></tr>
<tr><td rowspan="2">87.5-100
BROADCASTING

S5.190</td></tr>
<tr><td>88-100
BROADCASTING</td></tr>
</table>

MOD

S5.197 *Additional allocation:* in Japan, Pakistan and Syria, the band 108-111.975 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. **S9.21**. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedures invoked under No. **S9.21**.

MOD

S5.202 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Belarus, Bulgaria, the United Arab Emirates, Georgia, Iran (Islamic Republic of), Jordan, Latvia, Moldova, Oman, Uzbekistan, Poland, Syria, Kyrgyzstan, Slovakia, the Czech Rep., Romania, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the band 136-137 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service.

MOD

S5.206 *Different category of service:* in Armenia, Azerbaijan, Belarus, Bulgaria, Egypt, Finland, France, Georgia, Greece, Kazakstan, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Syria, Slovakia, the Czech Rep., Romania, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 137-138 MHz to the aeronautical mobile (OR) service is on a primary basis (see No. **S5.33**).

MOD

137.175-148 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
144-146	AMATEUR AMATEUR-SATELLITE S5.216	

MOD

S5.210 *Additional allocation:* in France, Italy, Liechtenstein, Slovakia, the Czech Rep., the United Kingdom and Switzerland, the bands 138-143.6 MHz and 143.65-144 MHz are also allocated to the space research service (space-to-Earth) on a secondary basis.

MOD

S5.211 *Additional allocation:* in Germany, Saudi Arabia, Austria, Bahrain, Belgium, Bosnia and Herzegovina, Denmark, the United Arab Emirates, Spain, Finland, Greece, Ireland, Israel, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Liechtenstein, Luxembourg, Mali, Malta, Norway, the Netherlands, Qatar, the United Kingdom, Somalia, Sweden, Switzerland, Tanzania, Tunisia, Turkey and Yugoslavia, the band 138-144 MHz is also allocated to the maritime mobile and land mobile services on a primary basis.

MOD

S5.212 *Alternative allocation:* in Angola, Botswana, Burundi, Cameroon, the Central African Rep., the Congo, Gabon, Gambia, Ghana, Guinea, Iraq, Jordan, Lesotho, Liberia, Libya, Malawi, Mozambique, Namibia, Nigeria, Oman, Dem. Rep. of the Congo, Rwanda, Sierra Leone, South Africa, Swaziland, Chad, Togo, Zambia and Zimbabwe, the band 138-144 MHz is allocated to the fixed and mobile services on a primary basis.

MOD

S5.214 *Additional allocation:* in Bosnia and Herzegovina, Croatia, Eritrea, Ethiopia, Kenya, The Former Yugoslav Republic of Macedonia, Malta, Somalia, Sudan, Tanzania and Yugoslavia, the band 138-144 MHz is also allocated to the fixed service on a primary basis.

MOD

S5.221 Stations of the mobile-satellite service in the band 148-149.9 MHz shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations in the following countries: Albania, Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bosnia and Herzegovina, Brunei Darussalam, Bulgaria, Cameroon, China, Cyprus, Congo, Korea (Rep. of), Croatia, Cuba, Denmark, Egypt, the United Arab Emirates, Eritrea, Spain, Estonia, Ethiopia, Finland, France, Gabon, Ghana, Greece, Guinea, Guinea Bissau, Hungary, India, Iran (Islamic Republic of), Ireland, Iceland, Israel, Italy, Jamaica, Japan, Jordan, Kazakstan, Kenya, Kuwait, Latvia, The Former Yugoslav Republic of Macedonia, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Malaysia, Mali, Malta, Mauritania, Moldova, Mongolia, Mozambique, Namibia, Norway, New Zealand, Oman, Uganda, Uzbekistan, Pakistan, Panama, Papua New Guinea, Paraguay, the Netherlands, the Philippines, Poland, Portugal, Qatar, Syria, Kyrgyzstan, Slovakia, Romania, the United Kingdom, the Russian Federation, Senegal, Sierra Leone, Singapore, Slovenia, Sri Lanka, South Africa, Sweden, Switzerland, Swaziland, Tanzania, Chad, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Viet Nam, Yemen, Yugoslavia, Zambia, and Zimbabwe.

MOD

S5.259 *Additional allocation:* in Egypt, Israel, Japan, and Syria, the band 328.6-335.4 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. **S9.21**. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedure invoked under No. **S9.21**.

MOD

S5.262 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bosnia and Herzegovina, Bulgaria, Colombia, Costa Rica, Cuba, Egypt, the United Arab Emirates, Ecuador, Georgia, Hungary, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakstan, Kuwait, Liberia, Malaysia, Moldova, Nigeria, Uzbekistan, Pakistan, the Philippines, Qatar, Syria, Kyrgyzstan, Slovakia, Romania, the Russian Federation, Singapore, Somalia, Tajikistan, Turkmenistan, Ukraine and Yugoslavia, the band 400.05-401 MHz is also allocated to the fixed and mobile services on a primary basis.

MOD

410-470 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
455-456 FIXED MOBILE S5.209 S5.271 S5.286A S5.286B S5.286C S5.286E	**455-456** FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) S5.286A S5.286B S5.286C S5.209	**455-456** FIXED MOBILE S5.209 S5.271 S5.286A S5.286B S5.286C S5.286E
. . .		
459-460 FIXED MOBILE S5.209 S5.271 S5.286A S5.286B S5.286C S5.286E	**459-460** FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) S5.286A S5.286B S5.286C S5.209	**459-460** FIXED MOBILE S5.209 S5.271 S5.286A S5.286B S5.286C S5.286E

MOD

S5.271 *Additional allocation:* in Azerbaijan, Belarus, China, Estonia, India, Latvia, Lithuania, Kyrgyzstan and Turkmenistan, the band 420-460 MHz is also allocated to the aeronautical radionavigation service (radio altimeters) on a secondary basis.

MOD

S5.277 *Additional allocation:* in Angola, Armenia, Azerbaijan, Belarus, Cameroon, Congo, Djibouti, Georgia, Hungary, Israel, Kazakstan, Latvia, Mali, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, the Russian Federation, Rwanda, Tajikistan, Chad, Turkmenistan and Ukraine, the band 430-440 MHz is also allocated to the fixed service on a primary basis.

MOD

S5.290 *Different category of service:* in Afghanistan, Azerbaijan, Belarus, China, Japan, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 460-470 MHz to the meteorological-satellite service (space-to-Earth) is on a primary basis (see No. **S5.33**), subject to agreement obtained under No. **S9.21**.

MOD

470-890 MHz

<table>
<tr><th colspan="3">Allocation to services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr>
<td rowspan="6">470-790
BROADCASTING

S5.149 S5.291A S5.294 S5.296 S5.300 S5.302 S5.304 S5.306 S5.311 S5.312</td>
<td>470-512
BROADCASTING
Fixed
Mobile
S5.292 S5.293</td>
<td rowspan="2">470-585
FIXED
MOBILE
BROADCASTING

S5.291 S5.298</td>
</tr>
<tr>
<td rowspan="2">512-608
BROADCASTING
S5.297</td>
</tr>
<tr>
<td rowspan="2">585-610
FIXED
MOBILE
BROADCASTING
RADIONAVIGATION
S5.149 S5.305 S5.306 S5.307</td>
</tr>
<tr>
<td rowspan="2">608-614
RADIO ASTRONOMY
Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)</td>
</tr>
<tr>
<td rowspan="5">610-890
FIXED
MOBILE S5.317A
BROADCASTING

S5.149 S5.305 S5.306 S5.307 S5.311 S5.320</td>
</tr>
<tr>
<td rowspan="2">614-806
BROADCASTING
Fixed
Mobile

S5.293 S5.309 S5.311</td>
</tr>
<tr>
<td rowspan="2">790-862
FIXED
BROADCASTING
S5.312 S5.314 S5.315 S5.316 S5.319 S5.321</td>
</tr>
<tr>
<td rowspan="2">806-890
FIXED
MOBILE S5.317A
BROADCASTING

S5.317 S5.318</td>
</tr>
<tr>
<td>862-890
FIXED
MOBILE except aeronautical mobile S5.317A
BROADCASTING S5.322

S5.319 S5.323</td>
</tr>
</table>

MOD

S5.293 *Different category of service:* in Canada, Chile, Colombia, Cuba, the United States, Guyana, Honduras, Jamaica, Mexico, Panama and Peru, the allocation of the bands 470-512 MHz and 614-806 MHz to the fixed and mobile services is on a primary basis (see No. **S5.33**), subject to agreement obtained under No. **S9.21**. In Argentina and Ecuador, the allocation of the band 470-512 MHz to the fixed and mobile services is on a primary basis (see No. **S5.33**), subject to agreement obtained under No. **S9.21**.

MOD

S5.296 *Additional allocation:* in Germany, Austria, Belgium, Cyprus, Denmark, Spain, Finland, France, Ireland, Israel, Italy, Libya, Lithuania, Malta, Morocco, Monaco, Norway, the Netherlands, Portugal, Syria, the United Kingdom, Sweden, Switzerland, Swaziland and Tunisia, the band 470-790 MHz is also allocated on a secondary basis to the land mobile service, intended for applications ancillary to broadcasting. Stations of the land mobile service in the countries listed in this footnote shall not cause harmful interference to existing or planned stations operating in accordance with the Table in countries other than those listed in this footnote.

MOD

S5.297 *Additional allocation:* in Costa Rica, Cuba, El Salvador, the United States, Guatemala, Guyana, Honduras, Jamaica and Mexico, the band 512-608 MHz is also allocated to the fixed and mobile services on a primary basis, subject to agreement obtained under No. **S9.21**.

MOD

S5.314 *Additional allocation*: in Austria, Italy, Moldova, Uzbekistan, the United Kingdom and Swaziland, the band 790-862 MHz is also allocated to the land mobile service on a secondary basis.

MOD

S5.315 *Alternative allocation*: in Greece, Italy and Tunisia, the band 790-838 MHz is allocated to the broadcasting service on a primary basis.

MOD

S5.316 *Additional allocation*: in Germany, Saudi Arabia, Bosnia and Herzegovina, Burkina Faso, Cameroon, Côte d'Ivoire, Croatia, Denmark, Egypt, Finland, Israel, Kenya, The Former Yugoslav Republic of Macedonia, Libya, Liechtenstein, Monaco, Norway, the Netherlands, Portugal, Syria, Sweden, Switzerland and Yugoslavia, the band 790-830 MHz, and in these same countries and in Spain, France, Gabon and Malta, the band 830-862 MHz, are also allocated to the mobile, except aeronautical mobile, service on a primary basis. However, stations of the mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause harmful interference to, or claim protection from, stations of services operating in accordance with the Table in countries other than those mentioned in connection with the band.

ADD

S5.317A Administrations wishing to implement International Mobile Telecommunications-2000 (IMT-2000) may use those parts of the band 806-960 MHz which are allocated to the mobile service on a primary basis and are used or planned to be used for mobile systems (see Resolution **224 (WRC-2000)**). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.

MOD

S5.322 In Region 1, in the band 862-960 MHz, stations of the broadcasting service shall be operated only in the African Broadcasting Area (see Nos. **S5.10** to **S5.13**) excluding Algeria, Egypt, Spain, Libya, Morocco, Namibia, Nigeria, South Africa, Tanzania, Zimbabwe and Zambia, subject to agreement obtained under No. **S9.21**.

MOD

890-1 350 MHz

<table>
<tr><th colspan="3">Allocation to services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td rowspan="3">890-942
FIXED
MOBILE except aeronautical mobile S5.317A
BROADCASTING S5.322
Radiolocation
S5.323</td><td>890-902
FIXED
MOBILE except aeronautical mobile S5.317A
Radiolocation
S5.318 S5.325</td><td rowspan="3">890-942
FIXED
MOBILE S5.317A
BROADCASTING
Radiolocation
S5.327</td></tr>
<tr><td>902-928
FIXED
Amateur
Mobile except aeronautical mobile S5.325A
Radiolocation
S5.150 S5.325 S5.326</td></tr>
<tr><td>928-942
FIXED
MOBILE except aeronautical mobile S5.317A
Radiolocation
S5.325</td></tr>
<tr><td>942-960
FIXED
MOBILE except aeronautical mobile S5.317A
BROADCASTING S5.322
S5.323</td><td>942-960
FIXED
MOBILE S5.317A</td><td>942-960
FIXED
MOBILE S5.317A
BROADCASTING
S5.320</td></tr>
<tr><td>960-1 215</td><td colspan="2">AERONAUTICAL RADIONAVIGATION S5.328
S5.328A</td></tr>
<tr><td>1 215-1 240</td><td colspan="2">EARTH EXPLORATION-SATELLITE (active)
RADIOLOCATION
RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) S5.329 S5.329A
SPACE RESEARCH (active)
S5.330 S5.331 S5.332</td></tr>
<tr><td>1 240-1 260</td><td colspan="2">EARTH EXPLORATION-SATELLITE (active)
RADIOLOCATION
RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) S5.329 S5.329A
SPACE RESEARCH (active)
Amateur
S5.330 S5.331 S5.332 S5.334 S5.335</td></tr>
</table>

MOD

890-1 350 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
1 260-1 300	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) S5.329 S5.329A SPACE RESEARCH (active) Amateur S5.282 S5.330 S5.331 S5.334 S5.335 S5.335A	
1 300-1 350	AERONAUTICAL RADIONAVIGATION S5.337 RADIOLOCATION RADIONAVIGATION SATELLITE (Earth-to-space) S5.149 S5.337A	

ADD

S5.325A *Different category of service:* in Cuba, the allocation of the band 902-915 MHz to the land mobile service is on a primary basis.

MOD

S5.328 The use of the band 960-1 215 MHz by the aeronautical radionavigation service is reserved on a worldwide basis for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities.

ADD

S5.328A *Additional allocation:* the band 1 164-1 215 MHz is also allocated to the radionavigation-satellite service (space-to-Earth) (space-to-space) on a primary basis. The aggregate power flux-density produced by all the space stations of all radionavigation-satellite systems at the Earth's surface shall not exceed the provisional value of –115 dB(W/m^2) in any 1 MHz band for all angles of arrival. Stations in the radionavigation-satellite service shall not cause harmful interference to, nor claim protection from, stations of the aeronautical-radionavigation service. The provisions of Resolution **605 (WRC-2000)** apply.

MOD

S5.329 Use of the radionavigation-satellite service in the band 1 215-1 300 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under No. **S5.331**. See also Resolution **606 (WRC-2000)**.

ADD

S5.329A Use of systems in the radionavigation-satellite service (space-to-space) operating in the bands 1 215-1 300 MHz and 1 559-1 610 MHz is not intended to provide safety service applications, and shall not impose any additional constraints on other systems or services operating in accordance with the Table.

MOD

S5.331 *Additional allocation:* in Algeria, Germany, Austria, Bahrain, Belgium, Benin, Bosnia and Herzegovina, Burundi, Cameroon, China, Croatia, Denmark, the United Arab Emirates, France, Greece, India, Iran (Islamic Republic of), Iraq, Kenya, The Former Yugoslav Republic of Macedonia, Liechtenstein, Luxembourg, Mali, Mauritania, Norway, Oman, the Netherlands, Portugal, Qatar, Senegal, Slovenia, Somalia, Sudan, Sri Lanka, Sweden, Switzerland, Turkey and Yugoslavia, the band 1 215-1 300 MHz is also allocated to the radionavigation service on a primary basis.

MOD

S5.332 In the band 1 215-1 260 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause harmful interference to, claim protection from, or otherwise impose constraints on operation or development of the radiolocation service, the radionavigation-satellite service and other services allocated on a primary basis.

ADD

S5.335A In the band 1 260-1 300 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause harmful interference to, claim protection from, or otherwise impose constraints on operation or development of the radiolocation service and other services allocated by footnotes on a primary basis.

ADD

S5.337A The use of the band 1 300-1 350 MHz by earth stations in the radionavigation-satellite service and by stations in the radiolocation service shall not cause harmful interference to, nor constrain the operation and development of, the aeronautical-radionavigation service.

MOD

S5.338 In Azerbaijan, Bulgaria, Mongolia, Kyrgyzstan, Slovakia, the Czech Rep., Romania and Turkmenistan, existing installations of the radionavigation service may continue to operate in the band 1 350-1 400 MHz.

MOD

S5.340 All emissions are prohibited in the following bands:

1 400-1 427 MHz,	
2 690-2 700 MHz,	except those provided for by Nos. **S5.421** and **S5.422**,
10.68-10.7 GHz,	except those provided for by No. **S5.483**,
15.35-15.4 GHz,	except those provided for by No. **S5.511**,
23.6-24 GHz,	
31.3-31.5 GHz,	
31.5-31.8 GHz,	in Region 2,
48.94-49.04 GHz,	from airborne stations,
50.2-50.4 GHz[2],	except those provided for by No. **S5.555A**,
52.6-54.25 GHz,	
86-92 GHz,	
100-102 GHz,	
109.5-111.8 GHz,	
114.25-116 GHz,	
148.5-151.5 GHz,	
164-167 GHz,	
182-185 GHz,	except those provided for by No. **S5.563**,
190-191.8 GHz,	
200-209 GHz,	
226-231.5 GHz,	
250-252 GHz.	

MOD

S5.342 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Bulgaria, Uzbekistan, Kyrgystan, the Russian Federation and Ukraine, the band 1 429-1 535 MHz is also allocated to the aeronautical mobile service on a primary basis exclusively for the purposes of aeronautical telemetry within the national territory. As of 1 April 2007, the use of the band 1 452-1 492 MHz is subject to agreement between the administrations concerned.

MOD

S5.347 *Different category of service:* in Bangladesh, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Cuba, Denmark, Egypt, Greece, Ireland, Italy, Kenya, Mozambique, Portugal, Sri Lanka, Swaziland, Yemen, Yugoslavia and Zimbabwe, the allocation of the band 1 452-1 492 MHz to the broadcasting-satellite service and the broadcasting service is on a secondary basis until 1 April 2007.

MOD

1 525-1 610 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
1 525-1 530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) S5.351A Earth exploration-satellite Mobile except aeronautical mobile S5.349 S5.341 S5.342 S5.350 S5.351 S5.352A S5.354	**1 525-1 530** SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) S5.351A Earth exploration-satellite Fixed Mobile S5.343 S5.341 S5.351 S5.354	**1 525-1 530** SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) S5.351A Earth exploration-satellite Mobile S5.349 S5.341 S5.351 S5.352A S5.354
1 530-1 535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) S5.353A S5.351A Earth exploration-satellite Fixed Mobile except aeronautical mobile S5.341 S5.342 S5.351 S5.354	**1 530-1 535** SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) S5.353A S5.351A Earth exploration-satellite Fixed Mobile S5.343 S5.341 S5.351 S5.354	
1 535-1 559	MOBILE-SATELLITE (space-to-Earth) S5.351A S5.341 S5.351 S5.353A S5.354 S5.355 S5.356 S5.357 S5.357A S5.359 S5.362A	
1 559-1 610	AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) S5.329A S5.341 S5.362B S5.362C S5.363	

MOD

S5.349 *Different category of service:* in Saudi Arabia, Azerbaijan, Bahrain, Bosnia and Herzegovina, Cameroon, Egypt, France, Iran (Islamic Republic of), Iraq, Israel, Kazakstan, Kuwait, The Former Yugoslav Republic of Macedonia, Lebanon, Morocco, Qatar, Syria, Kyrgyzstan, Romania, Turkmenistan, Yemen and Yugoslavia, the allocation of the band 1 525-1 530 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. **S5.33**).

MOD

S5.350 *Additional allocation:* in Azerbaijan, Kyrgyzstan and Turkmenistan, the band 1 525-1 530 MHz is also allocated to the aeronautical mobile service on a primary basis.

ADD

S5.351A For the use of the bands 1 525-1 544 MHz, 1 545-1 559 MHz, 1 610-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 980-2 010 MHz, 2 170-2 200 MHz, 2 483.5-2 500 MHz, 2 500-2 520 MHz and 2 670-2 690 MHz by the mobile-satellite service, see Resolutions **212 (Rev.WRC-97)** and **225 (WRC-2000)**.

MOD

S5.353A In applying the procedures of Section II of Article **S9** to the mobile-satellite service in the bands 1 530-1 544 MHz and 1 626.5-1 645.5 MHz, priority shall be given to accommodating the spectrum requirements for distress, urgency and safety communications of the Global Maritime Distress and Safety System (GMDSS). Maritime mobile-satellite distress, urgency and safety communications shall have priority access and immediate availability over all other mobile satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, distress, urgency and safety communications of the GMDSS. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (The provisions of Resolution **222 (WRC-2000)** shall apply.)

MOD

S5.355 *Additional allocation:* in Bahrain, Bangladesh, Congo, Egypt, Eritrea, Iraq, Israel, Jordan, Kuwait, Lebanon, Malta, Morocco, Qatar, Syria, Somalia, Sudan, Chad, Togo and Yemen, the bands 1 540-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz are also allocated to the fixed service on a secondary basis.

MOD

S5.357A In applying the procedures of Section II of Article **S9** to the mobile-satellite service in the bands 1 545-1 555 MHz and 1 646.5-1 656.5 MHz, priority shall be given to accommodating the spectrum requirements of the aeronautical mobile-satellite (R) service providing transmission of messages with priority 1 to 6 in Article **S44**. Aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article **S44** shall have priority access and immediate availability, by pre-emption if necessary, over all other mobile-satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article **S44**. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (The provisions of Resolution **222 (WRC-2000)** shall apply.)

MOD

S5.359 *Additional allocation:* in Germany, Saudi Arabia, Armenia, Austria, Azerbaijan, Belarus, Benin, Bosnia and Herzegovina, Bulgaria, Cameroon, Spain, France, Gabon, Georgia, Greece, Guinea, Guinea-Bissau, Hungary, Jordan, Kazakstan, Kuwait, Latvia, Lebanon, Libya, Lithuania, Mali, Morocco, Mauritania, Moldova, Mongolia, Nigeria, Uganda, Uzbekistan, Pakistan, Poland, Syria, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, the Russian Federation, Senegal, Swaziland, Tajikistan, Tanzania, Tunisia, Turkmenistan and Ukraine, the bands 1 550-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz are also allocated to the fixed service on a primary basis. Administrations are urged to make all practicable efforts to avoid the implementation of new fixed-service stations in these bands.

ADD

S5.362B *Additional allocation:* The band 1 559-1 610 MHz is also allocated to the fixed service on a primary basis until 1 January 2005 in Germany, Armenia, Azerbaijan, Belarus, Benin, Bosnia and Herzegovina, Bulgaria, Spain, France, Gabon, Georgia, Greece, Guinea, Guinea-Bissau, Hungary, Kazakstan, Latvia, Lithuania, Moldova, Mongolia, Nigeria, Uganda, Uzbekistan, Pakistan, Poland, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, the Russian Federation, Senegal, Swaziland, Tajikistan, Tanzania, Turkmenistan and Ukraine, and until 1 January 2010 in Saudi Arabia, Cameroon, Jordan, Kuwait, Lebanon, Libya, Mali, Morocco, Mauritania, Syria and Tunisia. After these dates, the fixed service may continue to operate on a secondary basis until 1 January 2015, at which time this allocation shall no longer be valid. Administrations are urged to take all practicable steps to protect the radionavigation-satellite service and the aeronautical radionavigation service and not authorize new frequency assignments to fixed-service systems in this band.

ADD

S5.362C *Additional allocation:* in Bahrain, Bangladesh, Congo, Egypt, Eritrea, Iraq, Israel, Jordan, Kuwait, Lebanon, Malta, Morocco, Qatar, Syria, Somalia, Sudan, Chad, Togo and Yemen, the band 1 559-1 610 MHz is also allocated to the fixed service on a secondary basis until 1 January 2015, at which time this allocation shall no longer be valid. Administrations are urged to take all practicable steps to protect the radionavigation-satellite service and not authorize new frequency assignments to fixed-service systems in this band.

MOD

1 610-1 660 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
1 610-1 610.6 MOBILE-SATELLITE (Earth-to-space) S5.351A AERONAUTICAL RADIONAVIGATION S5.341 S5.355 S5.359 S5.363 S5.364 S5.366 S5.367 S5.368 S5.369 S5.371 S5.372	**1 610-1 610.6** MOBILE-SATELLITE (Earth-to-space) S5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION-SATELLITE (Earth-to-space) S5.341 S5.364 S5.366 S5.367 S5.368 S5.370 S5.372	**1 610-1 610.6** MOBILE-SATELLITE (Earth-to-space) S5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) S5.341 S5.355 S5.359 S5.364 S5.366 S5.367 S5.368 S5.369 S5.372
1 610.6-1 613.8 MOBILE-SATELLITE (Earth-to-space) S5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION S5.149 S5.341 S5.355 S5.359 S5.363 S5.364 S5.366 S5.367 S5.368 S5.369 S5.371 S5.372	**1 610.6-1 613.8** MOBILE-SATELLITE (Earth-to-space) S5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATION-SATELLITE (Earth-to-space) S5.149 S5.341 S5.364 S5.366 S5.367 S5.368 S5.370 S5.372	**1 610.6-1 613.8** MOBILE-SATELLITE (Earth-to-space) S5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) S5.149 S5.341 S5.355 S5.359 S5.364 S5.366 S5.367 S5.368 S5.369 S5.372
1 613.8-1 626.5 MOBILE-SATELLITE (Earth-to-space) S5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) S5.341 S5.355 S5.359 S5.363 S5.364 S5.365 S5.366 S5.367 S5.368 S5.369 S5.371 S5.372	**1 613.8-1 626.5** MOBILE-SATELLITE (Earth-to-space) S5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION-SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) S5.341 S5.364 S5.365 S5.366 S5.367 S5.368 S5.370 S5.372	**1 613.8-1 626.5** MOBILE-SATELLITE (Earth-to-space) S5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) Radiodetermination-satellite (Earth-to-space) S5.341 S5.355 S5.359 S5.364 S5.365 S5.366 S5.367 S5.368 S5.369 S5.372
1 626.5-1 660	MOBILE-SATELLITE (Earth-to-space) S5.351A S5.341 S5.351 S5.353A S5.354 S5.355 S5.357A S5.359 S5.362A S5.374 S5.375 S5.376	

MOD

1 660-1 710 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
1 660-1 660.5	MOBILE-SATELLITE (Earth-to-space) S5.351A RADIO ASTRONOMY S5.149 S5.341 S5.351 S5.354 S5.362A S5.376A	

MOD

1 710-2 170 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
1 710-1 930	FIXED MOBILE S5.380 S5.384A S5.388A S5.149 S5.341 S5.385 S5.386 S5.387 S5.388	
1 930-1 970 FIXED MOBILE S5.388A S5.388	**1 930-1 970** FIXED MOBILE S5.388A Mobile-satellite (Earth-to-space) S5.388	**1 930-1 970** FIXED MOBILE S5.388A S5.388
1 970-1 980	FIXED MOBILE S5.388A S5.388	
1 980-2 010	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) S5.351A S5.388 S5.389A S5.389B S5.389F	
2 010-2 025 FIXED MOBILE S5.388A S5.388	**2 010-2 025** FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) S5.388 S5.389C S5.389D S5.389E S5.390	**2 010-2 025** FIXED MOBILE S5.388A S5.388
2 025-2 110	SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE S5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) S5.392	
2 110-2 120	FIXED MOBILE S5.388A SPACE RESEARCH (deep space) (Earth-to-space) S5.388	
2 120-2 160 FIXED MOBILE S5.388A S5.388	**2 120-2 160** FIXED MOBILE S5.388A Mobile-satellite (space-to-Earth) S5.388	**2 120-2 160** FIXED MOBILE S5.388A S5.388
2 160-2 170 FIXED MOBILE S5.388A S5.388 S5.392A	**2 160-2 170** FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) S5.388 S5.389C S5.389D S5.389E S5.390	**2 160-2 170** FIXED MOBILE S5.388A S5.388

ADD

S5.384A The bands, or portions of the bands, 1 710-1 885 MHz and 2 500-2 690 MHz, are identified for use by administrations wishing to implement International Mobile Telecommunications-2000 (IMT-2000) in accordance with Resolution **223 (WRC-2000)**. This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations.

MOD

S5.385 *Additional allocation:* the band 1 718.8-1 722.2 MHz is also allocated to the radio astronomy service on a secondary basis for spectral line observations.

MOD

S5.387 *Additional allocation:* in Azerbaijan, Belarus, Georgia, Kazakstan, Mali, Mongolia, Kyrgyzstan, Slovakia, Romania, Tajikistan and Turkmenistan, the band 1 770-1 790 MHz is also allocated to the meteorological-satellite service on a primary basis, subject to agreement obtained under No. **S9.21**.

MOD

S5.388 The bands 1 885-2 025 MHz and 2 110-2 200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications-2000 (IMT-2000). Such use does not preclude the use of these bands by other services to which they are allocated. The bands should be made available for IMT-2000 in accordance with Resolution **212 (Rev.WRC-97)**. (See also Resolution **223 (WRC-2000)**.)

ADD

S5.388A In Regions 1 and 3, the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz and, in Region 2, the bands 1 885-1 980 and 2 110-2 160 MHz may be used by high altitude platform stations as base stations to provide International Mobile Telecommunications-2000 (IMT-2000), in accordance with Resolution **221 (WRC-2000)**. The use by IMT-2000 applications using high altitude platform stations as base stations does not preclude the use of these bands by any station in the services to which they are allocated and does not establish priority in the Radio Regulations.

MOD

S5.389F In Algeria, Benin, Cape Verde, Egypt, Iran (Islamic Republic of), Mali, Syria and Tunisia, the use of the bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service shall neither cause harmful interference to the fixed and mobile services, nor hamper the development of those services prior to 1 January 2005, nor shall the former service request protection from the latter services.

MOD

S5.390 In Argentina, Brazil, Chile, Colombia, Cuba, Ecuador, Suriname and Uruguay, the use of the bands 2 010-2 025 MHz and 2 160-2 170 MHz by the mobile-satellite services shall not cause harmful interference to stations in the fixed and mobile services before 1 January 2005. After this date, the use of these bands is subject to coordination under No. **S9.11A** and to the provisions of Resolution **716 (WRC-95)**.

MOD

2 170-2 520 MHz

<table>
<tr><th colspan="3">Allocation to services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td>2 170-2 200</td><td colspan="2">FIXED
MOBILE
MOBILE-SATELLITE (space-to-Earth) S5.351A
S5.388 S5.389A S5.389F S5.392A</td></tr>
<tr><td>2 200-2 290</td><td colspan="2">SPACE OPERATION (space-to-Earth) (space-to-space)
EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space)
FIXED
MOBILE S5.391
SPACE RESEARCH (space-to-Earth) (space-to-space)
S5.392</td></tr>
<tr><td>2 290-2 300</td><td colspan="2">FIXED
MOBILE except aeronautical mobile
SPACE RESEARCH (deep space) (space-to-Earth)</td></tr>
<tr><td>2 300-2 450
FIXED
MOBILE
Amateur
Radiolocation
S5.150 S5.282 S5.395</td><td colspan="2">2 300-2 450
FIXED
MOBILE
RADIOLOCATION
Amateur
S5.150 S5.282 S5.393 S5.394 S5.396</td></tr>
<tr><td>2 450-2 483.5
FIXED
MOBILE
Radiolocation
S5.150 S5.397</td><td colspan="2">2 450-2 483.5
FIXED
MOBILE
RADIOLOCATION
S5.150 S5.394</td></tr>
<tr><td>2 483.5-2 500
FIXED
MOBILE
MOBILE-SATELLITE (space-to-Earth) S5.351A
Radiolocation
S5.150 S5.371 S5.397 S5.398 S5.399 S5.400 S5.402</td><td>2 483.5-2 500
FIXED
MOBILE
MOBILE-SATELLITE (space-to-Earth) S5.351A
RADIOLOCATION
RADIODETERMINATION-SATELLITE (space-to-Earth) S5.398
S5.150 S5.402</td><td>2 483.5-2 500
FIXED
MOBILE
MOBILE-SATELLITE (space-to-Earth) S5.351A
RADIOLOCATION
Radiodetermination-satellite (space-to-Earth) S5.398
S5.150 S5.400 S5.402</td></tr>
<tr><td>2 500-2 520
FIXED S5.409 S5.410 S5.411
MOBILE except aeronautical mobile S5.384A
MOBILE-SATELLITE (space-to-Earth) S5.403 S5.351A
S5.405 S5.407 S5.412 S5.414</td><td colspan="2">2 500-2 520
FIXED S5.409 S5.411
FIXED-SATELLITE (space-to-Earth) S5.415
MOBILE except aeronautical mobile S5.384A
MOBILE-SATELLITE (space-to-Earth) S5.403 S5.351A
S5.404 S5.407 S5.414 S5.415A</td></tr>
</table>

MOD

S5.393 *Additional allocation:* in the United States, India and Mexico, the band 2 310-2 360 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial sound broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (WARC-92)**, with the exception of *resolves* 3 in regard to the limitation on broadcasting-satellite systems in the upper 25 MHz.

SUP

S5.408

MOD

S5.412 *Alternative allocation:* in Azerbaijan, Bulgaria, Kyrgyzstan and Turkmenistan, the band 2 500-2 690 MHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

MOD

S5.415A *Additional allocation*: in India and Japan, subject to agreement obtained under No. **S9.21**, the band 2 515-2 535 MHz may also be used for the aeronautical mobile-satellite service (space-to-Earth) for operation limited to within their national boundaries.

MOD

2 520-2 700 MHz

<table>
<tr><th colspan="3">Allocation to services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr>
<td rowspan="2">2 520-2 655
FIXED S5.409 S5.410 S5.411
MOBILE except aeronautical mobile S5.384A
BROADCASTING-SATELLITE S5.413 S5.416
S5.339 S5.403 S5.405 S5.412 S5.418 S5.418B S5.418C</td>
<td rowspan="2">2 520-2 655
FIXED S5.409 S5.411
FIXED-SATELLITE (space-to-Earth) S5.415
MOBILE except aeronautical mobile S5.384A
BROADCASTING-SATELLITE S5.413 S5.416
S5.339 S5.403 S5.418B S5.418C</td>
<td>2 520-2 535
FIXED S5.409 S5.411
FIXED-SATELLITE (space-to-Earth) S5.415
MOBILE except aeronautical mobile S5.384A
BROADCASTING-SATELLITE S5.413 S5.416
S5.403 S5.415A</td>
</tr>
<tr>
<td>2 535-2 655
FIXED S5.409 S5.411
MOBILE except aeronautical mobile S5.384A
BROADCASTING-SATELLITE S5.413 S5.416
S5.339 S5.418 S5.418A S5.418B S5.418C</td>
</tr>
<tr>
<td>2 655-2 670
FIXED S5.409 S5.410 S5.411
MOBILE except aeronautical mobile S5.384A
BROADCASTING-SATELLITE S5.413 S5.416
Earth exploration-satellite (passive)
Radio astronomy
Space research (passive)
S5.149 S5.412 S5.420</td>
<td>2 655-2 670
FIXED S5.409 S5.411
FIXED-SATELLITE (Earth-to-space) (space-to-Earth) S5.415
MOBILE except aeronautical mobile S5.384A
BROADCASTING-SATELLITE S5.413 S5.416
Earth exploration-satellite (passive)
Radio astronomy
Space research (passive)
S5.149 S5.420</td>
<td>2 655-2 670
FIXED S5.409 S5.411
FIXED-SATELLITE (Earth-to-space) S5.415
MOBILE except aeronautical mobile S5.384A
BROADCASTING-SATELLITE S5.413 S5.416
Earth exploration-satellite (passive)
Radio astronomy
Space research (passive)
S5.149 S5.420</td>
</tr>
<tr>
<td>2 670-2 690
FIXED S5.409 S5.410 S5.411
MOBILE except aeronautical mobile S5.384A
MOBILE-SATELLITE (Earth-to-space) S5.351A
Earth exploration-satellite (passive)
Radio astronomy
Space research (passive)
S5.149 S5.419 S5.420</td>
<td>2 670-2 690
FIXED S5.409 S5.411
FIXED-SATELLITE (Earth-to-space) (space-to-Earth) S5.415
MOBILE except aeronautical mobile S5.384A
MOBILE-SATELLITE (Earth-to-space) S5.351A
Earth exploration-satellite (passive)
Radio astronomy
Space research (passive)
S5.149 S5.419 S5.420</td>
<td>2 670-2 690
FIXED S5.409 S5.411
FIXED-SATELLITE (Earth-to-space) S5.415
MOBILE except aeronautical mobile S5.384A
MOBILE-SATELLITE (Earth-to-space) S5.351A
Earth exploration-satellite (passive)
Radio astronomy
Space research (passive)
S5.149 S5.419 S5.420 S5.420A</td>
</tr>
</table>

SUP

S5.417

MOD

S5.418 *Additional allocation:* in Bangladesh, Belarus, Korea (Rep. of), India, Japan, Pakistan, Singapore, Sri Lanka and Thailand, the band 2 535-2 655 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (WARC-92)**. The provisions of No. **S5.416** and Table **S21-4** of Article **S21**, do not apply to this additional allocation. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) is subject to Resolution **539 (WRC-2000)**.

ADD

S5.418A In certain Region 3 countries listed in No. **S5.418**, use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound) for which complete Appendix **S4** coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. **S9.12A**, in respect of geostationary-satellite networks for which complete Appendix **S4** coordination information, or notification information, is considered to have been received after 2 June 2000, and No. **S22.2** does not apply. No. **S22.2** shall continue to apply with respect to geostationary-satellite networks for which complete Appendix **S4** coordination information, or notification information, is considered to have been received before 3 June 2000. Use of the band by non-geostationary-satellite systems in the broadcasting-satellite service (sound) is subject to the provisions of Resolution **539 (WRC-2000)**, and such systems shall be in accordance with Resolution **528 (WARC-92)**.

ADD

S5.418B Use of the band 2 630-2 655 MHz by non-geostationary-satellite systems for which complete Appendix **S4** coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. **S9.12**. Resolution **539 (WRC-2000)** applies.

ADD

S5.418C Use of the band 2 630-2 655 MHz by geostationary-satellite networks for which complete Appendix **S4** coordination information, or notification information, has been received after 2 June 2000 is subject to the application of the provisions of No. **S9.13** with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), and No. **S22.2** does not apply. Resolution **539 (WRC-2000)** applies.

MOD

S5.420A *Additional allocation:* in India and Japan, subject to agreement obtained under No. **S9.21**, the band 2 670-2 690 MHz may also be used for the aeronautical mobile-satellite service (Earth-to-space) for operation limited to within their national boundaries.

MOD

S5.422 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bosnia and Herzegovina, Brunei Darussalam, Congo, Côte d'Ivoire, Cuba, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Georgia, Guinea, Guinea-Bissau, Iran (Islamic Republic of), Iraq, Israel, Jordan, Lebanon, Malaysia, Mali, Mauritania, Moldova, Mongolia, Nigeria, Oman, Uzbekistan, Pakistan, the Philippines, Qatar, Syria, Kyrgyzstan, the Dem. Rep. of the Congo, Romania, the Russian Federation, Somalia, Tajikistan, Tunisia, Turkmenistan, Ukraine, Yemen and Yugoslavia, the band 2 690-2 700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985.

MOD

S5.428 *Additional allocation:* in Azerbaijan, Bulgaria, Cuba, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 3 100-3 300 MHz is also allocated to the radionavigation service on a primary basis.

MOD

S5.430 *Additional allocation:* in Azerbaijan, Bulgaria, Cuba, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 3 300-3 400 MHz is also allocated to the radionavigation service on a primary basis.

MOD

S5.432 *Different category of service:* in Korea (Rep. of), Japan and Pakistan, the allocation of the band 3 400-3 500 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. **S5.33**).

SUP

S5.437

MOD

S5.439 *Additional allocation:* in Iran (Islamic Republic of) and Libya, the band 4 200-4 400 MHz is also allocated to the fixed service on a secondary basis.

MOD

S5.441 The use of the bands 4 500-4 800 MHz (space-to-Earth), 6 725-7 025 MHz (Earth-to-space) by the fixed-satellite service shall be in accordance with the provisions of Appendix **S30B**. The use of the bands 10.7-10.95 GHz (space-to-Earth), 11.2-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space) by geostationary-satellite systems in the fixed-satellite service shall be in accordance with the provisions of Appendix **S30B**. The use of the bands 10.7-10.95 GHz (space-to Earth), 11.2-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to application of the provisions of No. **S9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **S5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated.

MOD

4 800-5 830 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
5 000-5 150	AERONAUTICAL RADIONAVIGATION S5.367 S5.443A S5.443B S5.444 S5.444A	
5 150-5 250	AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE (Earth-to-space) S5.447A S5.446 S5.447 S5.447B S5.447C	

ADD

S5.443A *Additional allocation:* The band 5 000-5 010 MHz is also allocated to the radionavigation-satellite service (Earth-to-space) on a primary basis. See Resolution **603 (WRC-2000)**.

ADD

S5.443B *Additional allocation:* The band 5 010-5 030 MHz is also allocated to the radionavigation-satellite service (space-to-Earth) (space-to-space) on a primary basis. In order not to cause harmful interference to the microwave landing system operating above 5 030 MHz, the aggregate power flux-density produced at the Earth's surface in the band 5 030-5 150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the band 5 010-5 030 MHz shall not exceed –124.5 dB(W/m^2) in a 150 kHz band. In order not to cause harmful interference to the radio astronomy service in the band 4 990-5 000 MHz, the aggregate power flux-density produced in the 4 990-5 000 MHz band by all the space stations within any radionavigation-satellite service (space-to-Earth) system operating in the 5 010-5 030 MHz band shall not exceed the provisional value of –171 dB(W/m^2) in a 10 MHz band at any radio astronomy observatory site for more than 2% of the time. For the use of this band, Resolution **604 (WRC-2000)** applies.

MOD

S5.444 The band 5 030-5 150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. The requirements of this system shall take precedence over other uses of this band. For the use of this band, No. **S5.444A** and Resolution **114 (WRC-95)** apply.

MOD

S5.447 *Additional allocation:* in Germany, Austria, Belgium, Denmark, Spain, Estonia, Finland, France, Greece, Israel, Italy, Japan, Jordan, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Norway, Pakistan, the Netherlands, Portugal, Syria, the United Kingdom, Sweden, Switzerland and Tunisia, the band 5 150-5 250 MHz is also allocated to the mobile service, on a primary basis, subject to agreement obtained under No. **S9.21**.

MOD

S5.448 *Additional allocation:* in Austria, Azerbaijan, Bulgaria, Libya, Mongolia, Kyrgyzstan, Slovakia, the Czech Rep., Romania and Turkmenistan, the band 5 250-5 350 MHz is also allocated to the radionavigation service on a primary basis.

MOD

S5.453 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, Congo, Korea (Rep. of), Egypt, the United Arab Emirates, Gabon, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Libya, Madagascar, Malaysia, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syria, the Dem. People's Rep. of Korea, Singapore, Swaziland, Tanzania, Chad and Yemen, the band 5 650-5 850 MHz is also allocated to the fixed and mobile services on a primary basis.

MOD

S5.454 *Different category of service:* in Azerbaijan, Belarus, Georgia, Mongolia, Uzbekistan, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 5 670-5 725 MHz to the space research service is on a primary basis (see No. **S5.33**).

MOD

S5.469 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Bulgaria, Georgia, Hungary, Lithuania, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the band 8 500-8 750 MHz is also allocated to the land mobile and radionavigation services on a primary basis.

MOD

S5.473 *Additional allocation:* in Armenia, Austria, Azerbaijan, Belarus, Bulgaria, Cuba, Georgia, Hungary, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the bands 8 850-9 000 MHz and 9 200-9 300 MHz are also allocated to the radionavigation service on a primary basis.

MOD

S5.477 *Different category of service:* in Algeria, Saudi Arabia, Austria, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Japan, Jordan, Kuwait, Lebanon, Liberia, Malaysia, Nigeria, Oman, Pakistan, Qatar, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Sweden, Trinidad and Tobago, and Yemen, the allocation of the band 9 800-10 000 MHz to the fixed service is on a primary basis (see No. **S5.33**).

MOD

S5.478 *Additional allocation:* in Azerbaijan, Bulgaria, Mongolia, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Turkmenistan and Ukraine, the band 9 800-10 000 MHz is also allocated to the radionavigation service on a primary basis.

MOD

S5.480 *Additional allocation:* in Argentina, Brazil, Chile, Costa Rica, Cuba, El Salvador, Ecuador, Guatemala, Honduras, Mexico, Paraguay, Peru, Uruguay and Venezuela, the band 10-10.45 GHz is also allocated to the fixed and mobile services on a primary basis.

MOD

S5.481 *Additional allocation:* in Germany, Angola, Brazil, China, Costa Rica, El Salvador, Ecuador, Spain, Guatemala, Japan, Morocco, Nigeria, Oman, Uzbekistan, Paraguay, Peru, the Dem. People’s Rep. of Korea, Sweden, Tanzania, Thailand and Uruguay, the band 10.45-10.5 GHz is also allocated to the fixed and mobile services on a primary basis.

MOD

S5.483 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bosnia and Herzegovina, China, Colombia, Korea (Rep. of), Costa Rica, Egypt, the United Arab Emirates, Georgia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kazakstan, Kuwait, Latvia, Lebanon, Moldova, Mongolia, Uzbekistan, Qatar, Kyrgyzstan, the Dem. People’s Rep. of Korea, Romania, the Russian Federation, Tajikistan, Turkmenistan, Ukraine, Yemen and Yugoslavia, the band 10.68-10.7 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985.

MOD

S5.484A The use of the bands 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) in Region 2, 12.2-12.75 GHz (space-to-Earth) in Region 3, 12.5-12.75 GHz (space-to-Earth) in Region 1, 13.75-14.5 GHz (Earth-to-space), 17.8-18.6 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 27.5-28.6 GHz (Earth-to-space), 29.5-30 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to application of the provisions of No. **S9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **S5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated.

MOD

S5.487 In the band 11.7-12.5 GHz in Regions 1 and 3, the fixed, fixed-satellite, mobile, except aeronautical mobile, and broadcasting services, in accordance with their respective allocations, shall not cause harmful interference to, or claim protection from, broadcasting-satellite stations operating in accordance with the provisions of the Regions 1 and 3 Plan in Appendix **S30**.

MOD

S5.487A *Additional allocation:* in Region 1, the band 11.7-12.5 GHz, in Region 2, the band 12.2-12.7 GHz and, in Region 3, the band 11.7-12.2 GHz, are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis, limited to non-geostationary systems and subject to application of the provisions of No. **S9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the broadcasting-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geosationary-satellite networks, and No. **S5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated.

MOD

S5.488 The use of the band 11.7-12.2 GHz by geostationary-satellite networks in the fixed-satellite service in Region 2 is subject to the provisions of Resolution **77 (WRC-2000)**. For the use of the band 12.2-12.7 GHz by the broadcasting-satellite service in Region 2, see Appendix **S30**.

MOD

S5.491 *Additional allocation:* in Region 3, the band 12.2-12.5 GHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis. The power flux-density limits in Table **S21-4** of Article **S21** shall apply to this frequency band. The introduction of the service in relation to the broadcasting-satellite service in Region 1 shall follow the procedures specified in Article 7 of Appendix **S30**, with the applicable frequency band extended to cover 12.2-12.5 GHz.

MOD

S5.492 Assignments to stations of the broadcasting-satellite service which are in conformity with the appropriate regional Plan or included in the Regions 1 and 3 List in Appendix **S30** may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference, or require more protection from interference, than the broadcasting-satellite service transmissions operating in conformity with the Plan or the List, as appropriate.

MOD

S5.495 *Additional allocation:* in Bosnia and Herzegovina, Croatia, Denmark, France, Greece, Liechtenstein, Monaco, Uganda, Portugal, Romania, Slovenia, Switzerland, Tanzania, Tunisia and Yugoslavia, the band 12.5-12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis.

MOD

S5.496 *Additional allocation:* in Austria, Azerbaijan, Kyrgyzstan and Turkmenistan, the band 12.5-12.75 GHz is also allocated to the fixed service and the mobile, except aeronautical mobile, service on a primary basis. However, stations in these services shall not cause harmful interference to fixed-satellite service earth stations of countries in Region 1 other than those listed in this footnote. Coordination of these earth stations is not required with stations of the fixed and mobile services of the countries listed in this footnote. The power flux-density limit at the Earth's surface given in Table **S21-4** of Article **S21**, for the fixed-satellite service shall apply on the territory of the countries listed in this footnote.

MOD

S5.500 *Additional allocation:* in Algeria, Angola, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Madagascar, Malaysia, Mali, Malta, Morocco, Mauritania, Nigeria, Pakistan, Qatar, Syria, Senegal, Singapore, Sudan, Chad and Tunisia, the band 13.4-14 GHz is also allocated to the fixed and mobile services on a primary basis.

MOD

S5.501 *Additional allocation:* in Austria, Azerbaijan, Hungary, Japan, Mongolia, Kyrgyzstan, Romania, the United Kingdom and Turkmenistan, the band 13.4-14 GHz is also allocated to the radionavigation service on a primary basis.

MOD

S5.502 In the band 13.75-14 GHz, an earth station in the fixed-satellite service shall have a minimum antenna diameter of 4.5 m and the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW. In addition the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW. The protection of assignments to receiving space stations in the fixed-satellite service operating with earth stations that, individually, have an e.i.r.p. of less than 68 dBW shall not impose constraints on the operation of the radiolocation and radionavigation stations operating in accordance with the Radio Regulations. No. **S5.43A** does not apply. See Resolution **733 (WRC-2000)**.

MOD

S5.503 In the band 13.75-14 GHz, geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 shall operate on an equal basis with stations in the fixed-satellite service; after that date, new geostationary space stations in the space research service will operate on a secondary basis. Until those geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 cease to operate in this band:

– the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in geostationary-satellite orbit shall not exceed 71 dBW in the 6 MHz band from 13.772 to 13.778 GHz;

– the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in non-geostationary-satellite orbit shall not exceed 51 dBW in the 6 MHz band from 13.772 to 13.778 GHz.

Automatic power control may be used to increase the e.i.r.p. density in the 6 MHz band in this frequency range to compensate for rain attenuation, to the extent that the power-flux density at the fixed-satellite service space station does not exceed the value resulting from use by an earth station of an e.i.r.p. of 71 dBW or 51 dBW, as appropriate, in the 6 MHz band in clear-sky conditions.

MOD

S5.505 *Additional allocation:* in Algeria, Angola, Saudi Arabia, Bahrain, Bangladesh, Botswana, Brunei Darussalam, Cameroon, China, Congo, Korea (Rep. of), Egypt, the United Arab Emirates, Gabon, Guatemala, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lesotho, Lebanon, Malaysia, Mali, Morocco, Mauritania, Oman, Pakistan, the Philippines, Qatar, Syria, the Dem. People's Rep. of Korea, Senegal, Singapore, Somalia, Sudan, Swaziland, Tanzania, Chad and Yemen, the band 14-14.3 GHz is also allocated to the fixed service on a primary basis.

MOD

14.25-15.63 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
15.43-15.63	FIXED-SATELLITE (Earth-to-space) S5.511A AERONAUTICAL RADIONAVIGATION S5.511C	

MOD

S5.508 *Additional allocation:* in Germany, Bosnia and Herzegovina, France, Greece, Ireland, Iceland, Italy, The Former Yugoslav Republic of Macedonia, Libya, Liechtenstein, Portugal, the United Kingdom, Slovenia, Switzerland and Yugoslavia, the band 14.25-14.3 GHz is also allocated to the fixed service on a primary basis.

MOD

S5.509 *Additional allocation:* in Japan the band 14.25-14.3 GHz is also allocated to the mobile, except aeronautical mobile, service on a primary basis.

MOD

S5.511A The band 15.43-15.63 GHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis. Use of the band 15.43-15.63 GHz by the fixed-satellite service (space-to-Earth and Earth-to-space) is limited to feeder links of non-geostationary systems in the mobile-satellite service, subject to coordination under No. **S9.11A**. The use of the frequency band 15.43-15.63 GHz by the fixed-satellite service (space-to-Earth) is limited to feeder links of non-geostationary systems in the mobile-satellite service for which advance publication information has been received by the Bureau prior to 2 June 2000. In the space-to-Earth direction, the minimum earth station elevation angle above and gain towards the local horizontal plane and the minimum coordination distances to protect an earth station from harmful interference shall be in accordance with Recommendation ITU-R S.1341. In order to protect the radio astronomy service in the band 15.35-15.4 GHz, the aggregate power flux-density radiated in the 15.35-15.4 GHz band by all the space stations within any feeder-link of a non-geostationary system in the mobile-satellite service (space-to-Earth) operating in the 15.43-15.63 GHz band shall not exceed the level of –156 dB(W/m^2) in a 50 MHz bandwidth, into any radio astronomy observatory site for more than 2% of the time.

MOD

S5.514 *Additional allocation:* in Algeria, Germany, Angola, Saudi Arabia, Austria, Bahrain, Bangladesh, Bosnia and Herzegovina, Cameroon, Costa Rica, El Salvador, the United Arab Emirates, Finland, Guatemala, Honduras, India, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Libya, Nepal, Nicaragua, Oman, Pakistan, Qatar, Slovenia, Sudan and Yugoslavia, the band 17.3-17.7 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits given in Nos. **S21.3** and **S21.5** shall apply.

MOD

S5.516 The use of the band 17.3-18.1 GHz by geostationary-satellite systems in the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. The use of the band 17.3-17.8 GHz in Region 2 by systems in the fixed-satellite service (Earth-to-space) is limited to geostationary satellites. For the use of the band 17.3-17.8 GHz in Region 2 by feeder links for the broadcasting-satellite service in the band 12.2-12.7 GHz, see Article **S11**. The use of the bands 17.3-18.1 GHz (Earth-to-space) in Regions 1 and 3 and 17.8-18.1 GHz (Earth-to-space) in Region 2 by non-geostationary-satellite systems in the fixed-satellite service is subject to application of the provisions of No. **S9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **S5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated.

MOD

S5.520 The use of the band 18.1-18.4 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links of geostationary-satellite systems in the broadcasting-satellite service.

MOD

S5.521 *Alternative allocation:* in Germany, Denmark, the United Arab Emirates, Greece and Slovakia, the band 18.1-18.4 GHz is allocated to the fixed, fixed-satellite (space-to-Earth) and mobile services on a primary basis (see No. **S5.33**). The provisions of No. **S5.519** also apply.

MOD

18.6-22.21 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) S5.522B MOBILE except aeronautical mobile Space research (passive) S5.522A S5.522C	**18.6-18.8** EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) S5.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive) S5.522A	**18.6-18.8** EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) S5.522B MOBILE except aeronautical mobile Space research (passive) S5.522A

SUP

S5.522

ADD

S5.522A The emissions of the fixed service and the fixed-satellite service in the band 18.6-18.8 GHz are limited to the values given in Nos. **S21.5A** and **S21.16.2**, respectively.

ADD

S5.522B The use of the band 18.6-18.8 GHz by the fixed-satellite service is limited to geostationary systems and systems with an orbit of apogee greater than 20 000 km.

ADD

S5.522C In the band 18.6-18.8 GHz, in Algeria, Saudi Arabia, Bahrain, Egypt, the United Arab Emirates, Jordan, Lebanon, Libya, Morocco, Oman, Qatar, Syria, Tunisia and Yemen, fixed-service systems in operation at the date of entry into force of the Final Acts of WRC-2000 are not subject to the limits of No. **S21.5A**.

SUP

S5.523

MOD

S5.524 *Additional allocation:* in Afghanistan, Algeria, Angola, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, the Congo, Costa Rica, Egypt, the United Arab Emirates, Gabon, Guatemala, Guinea, India, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Dem. Rep. of the Congo, Syria, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Tanzania, Chad, Togo and Tunisia, the band 19.7-21.2 GHz is also allocated to the fixed and mobile services on a primary basis. This additional use shall not impose any limitation on the power flux-density of space stations in the fixed-satellite service in the band 19.7-21.2 GHz and of space stations in the mobile-satellite service in the band 19.7-20.2 GHz where the allocation to the mobile-satellite service is on a primary basis in the latter band.

MOD

S5.536A Administrations installing Earth exploration-satellite service earth stations cannot claim protection from stations in the fixed and mobile services operated by neighbouring administrations. In addition, earth stations operating in the Earth exploration-satellite service should take into account Recommendation ITU-R SA.1278.

MOD

24.75-29.9 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
27.5-28.5	FIXED S5.537A FIXED-SATELLITE (Earth-to-space) S5.484A S5.539 MOBILE S5.538 S5.540	

ADD

S5.537A In Bhutan, Indonesia, Iran (Islamic Republic of), Japan, Maldives, Mongolia, Myanmar, Pakistan, the Dem. People’s Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 27.5-28.35 GHz may also be used by high altitude platform stations (HAPS). The use of the band 27.5-28.35 GHz by HAPS is limited to operation in the HAPS-to-ground direction and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services.

MOD

29.9-34.2 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
31-31.3	FIXED S5.543A MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research S5.544 S5.545 S5.149	

MOD

S5.541A Feeder links of non-geostationary networks in the mobile-satellite service and geostationary networks in the fixed-satellite service operating in the band 29.1-29.5 GHz (Earth-to-space) shall employ uplink adaptive power control or other methods of fade compensation, such that the earth station transmissions shall be conducted at the power level required to meet the desired link performance while reducing the level of mutual interference between both networks. These methods shall apply to networks for which Appendix **S4** coordination information is considered as having been received by the Bureau after 17 May 1996 and until they are changed by a future competent world radiocommunication conference. Administrations submitting Appendix **S4** information for coordination before this date are encouraged to utilize these techniques to the extent practicable.

MOD

S5.542 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, Congo, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guinea, India, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Pakistan, the Philippines, Qatar, Syria, the Dem. People's Rep. of Korea, Somalia, Sudan, Sri Lanka and Chad, the band 29.5-31 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits specified in Nos. **S21.3** and **S21.5** shall apply.

ADD

S5.543A In Bhutan, Indonesia, Iran (Islamic Republic of), Japan, Maldives, Mongolia, Myanmar, Pakistan, the Dem. People’s Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 31-31.3 GHz may also be used by high altitude platform stations (HAPS) in the ground-to-HAPS direction. The use of the band 31-31.3 GHz by systems using HAPS shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services, taking into account No. **S5.545**. The use of HAPS in the band 31-31.3 GHz shall not cause harmful interference to the passive services having a primary allocation in the band 31.3-31.8 GHz, taking into account the interference criteria given in Recommendations ITU-R SA.1029 and ITU-R RA.769. The administrations of the countries listed above are urged to limit the deployment of HAPS in the band 31-31.3 GHz to the lower half of this band (31-31.15 GHz) until WRC-03.

MOD

S5.545 *Different category of service:* in Armenia, Azerbaijan, Belarus, Georgia, Mongolia, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 31-31.3 GHz to the space research service is on a primary basis (see No. **S5.33**).

MOD

S5.546 *Different category of service:* in Saudi Arabia, Armenia, Azerbaijan, Belarus, Egypt, the United Arab Emirates, Spain, Estonia, Finland, Georgia, Hungary, Iran (Islamic Republic of), Israel, Jordan, Latvia, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, Syria, Kyrgyzstan, Romania, the United Kingdom, the Russian Federation, Tajikistan, Turkmenistan, Turkey and Ukraine, the allocation of the band 31.5-31.8 GHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. **S5.33**).

MOD

S5.547 The bands 31.8-33.4 GHz, 37-40 GHz, 40.5-43.5 GHz, 51.4-52.6 GHz, 55.78-59 GHz and 64-66 GHz are available for high-density applications in the fixed service (see Resolutions **75 (WRC-2000)** and **79 (WRC-2000)**). Administrations should take this into account when considering regulatory provisions in relation to these bands. Because of the potential deployment of high-density applications in the fixed-satellite service in the bands 39.5-40 GHz and 40.5-42 GHz, administrations should further take into account potential constraints to high-density applications in the fixed service, as appropriate (see Resolution **84 (WRC-2000)**).

MOD

S5.547A Administrations should take practical measures to minimize the potential interference between stations in the fixed service and airborne stations in the radionavigation service in the 31.8-33.4 GHz band, taking into account the operational needs of the airborne radar systems.

MOD

34.2-40.5 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
37-37.5	FIXED MOBILE SPACE RESEARCH (space-to-Earth) S5.547	
37.5-38	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) S5.551AA S5.547	
38-39.5	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth) S5.551AA S5.547	
39.5-40	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) S5.551AA S5.547	
40-40.5	EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)	

MOD

S5.550 *Different category of service:* in Armenia, Azerbaijan, Belarus, Georgia, Mongolia, Uzbekistan, Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 34.7-35.2 GHz to the space research service is on a primary basis (see No. **S5.33**).

ADD

S5.551AA In the bands 37.5-40 GHz and 42-42.5 GHz, non-geostationary-satellite systems in the fixed-satellite service should employ power control or other methods of downlink fade compensation of the order of 10 dB, such that the satellite transmissions are at power levels required to meet the desired link performance while reducing the level of interference to the fixed service. The use of downlink fade compensation methods are under study by the ITU-R (see Resolution **84 (WRC-2000)**).

MOD

40.5-55.78 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile S5.547	**40.5-41** FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth) S5.547	**40.5-41** FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile S5.547
41-42.5	FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile S5.547 S5.551AA S5.551F S5.551G	
42.5-43.5	FIXED FIXED-SATELLITE (Earth-to-space) S5.552 MOBILE except aeronautical mobile RADIO ASTRONOMY S5.149 S5.547	

SUP

S5.551B

SUP

S5.551C

SUP

S5.551D

SUP

S5.551E

ADD

S5.551G In order to protect the radio astronomy service in the band 42.5-43.5 GHz, the aggregate power flux-density in the 42.5-43.5 GHz band produced by all the space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth) or in the broadcasting-satellite service (space-to-Earth) system operating in the 41.5-42.5 GHz band shall not exceed –167 dB(W/m^2) in any 1 MHz band at the site of a radio astronomy station for more that 2% of the time. The power flux-density in the band 42.5-43.5 GHz produced by any geostationary station in the fixed-satellite service (space-to-Earth) or in the broadcasting-satellite service (space-to-Earth) operating in the band 42-42.5 GHz shall not exceed –167 dB(W/m^2) in any 1 MHz band at the site of a radio astronomy station. These limits are provisional and will be reviewed in accordance with Resolution **128 (Rev.WRC-2000)**.

MOD

S5.553 In the bands 43.5-47 GHz and 66-71 GHz, stations in the land mobile service may be operated subject to not causing harmful interference to the space radiocommunication services to which these bands are allocated (see No. **S5.43**).

MOD

S5.554 In the bands 43.5-47 GHz, 66-71 GHz, 95-100 GHz, 123-130 GHz, 191.8-200 GHz and 252-265 GHz, satellite links connecting land stations at specified fixed points are also authorized when used in conjunction with the mobile-satellite service or the radionavigation-satellite service.

MOD

S5.555 *Additional allocation:* the band 48.94-49.04 GHz is also allocated to the radio astronomy service on a primary basis.

MOD

S5.556 In the bands 51.4-54.25 GHz, 58.2-59 GHz and 64-65 GHz, radio astronomy observations may be carried out under national arrangements.

MOD

55.78-66 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
55.78-56.9	EARTH EXPLORATION-SATELLITE (passive) FIXED S5.557A INTER-SATELLITE S5.556A MOBILE S5.558 SPACE RESEARCH (passive) S5.547 S5.557	

ADD

S5.557A In the band 55.78-56.26 GHz, in order to protect stations in the Earth exploration-satellite service (passive), the maximum power density delivered by a transmitter to the antenna of a fixed service station is limited to –26 dB(W/MHz).

MOD

S5.558 In the bands 55.78-58.2 GHz, 59-64 GHz, 66-71 GHz, 122.25-123 GHz, 130-134 GHz, 167-174.8 GHz and 191.8-200 GHz, stations in the aeronautical mobile service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **S5.43**).

MOD

S5.559 In the band 59-64 GHz, airborne radars in the radiolocation service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **S5.43**).

MOD

66-86 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
71-74	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	
74-76	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) S5.559A S5.561	
76-77.5	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) S5.149	
77.5-78	AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) S5.149	
78-79	RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) S5.149 S5.560	
79-81	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) S5.149	

MOD

66-86 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
81-84	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) S5.149 S5.560A	
84-86	FIXED FIXED-SATELLITE (Earth-to-space) S5.561A MOBILE RADIO ASTRONOMY S5.149	

ADD

S5.559A The band 75.5-76 GHz is also allocated to the amateur and amateur-satellite services on a primary basis until the year 2006.

ADD

S5.560A The 81-81.5 GHz band is also allocated to the amateur and amateur-satellite services on a secondary basis.

MOD

S5.561 In the band 74-76 GHz, stations in the fixed, mobile and broadcasting services shall not cause harmful interference to stations of the fixed-satellite service or stations of the broadcasting-satellite service operating in accordance with the decisions of the appropriate frequency assignment planning conference for the broadcasting-satellite service.

ADD

S5.561A In Japan, use of the band 84-86 GHz, by the fixed-satellite service (Earth-to-space) is limited to feeder links in the broadcasting-satellite service using the geostationary-satellite orbit.

MOD

86-119.98 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
92-94	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION S5.149	
94-94.1	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy S5.562 S5.562A	
94.1-95	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION S5.149	
95-100	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE S5.149 S5.554	
100-102	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340 S5.341	
102-105	FIXED MOBILE RADIO ASTRONOMY S5.149 S5.341	
105-109.5	FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) S5.562B S5.149 S5.341	
109.5-111.8	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340 S5.341	

MOD

86-119.98 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
111.8-114.25	FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) S5.562B S5.149 S5.341	
114.25-116	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340 S5.341	
116-119.98	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE S5.562C SPACE RESEARCH (passive) S5.341	

ADD

S5.562A In the bands 94-94.1 GHz and 130-134 GHz, transmissions from space stations of the Earth exploration-satellite service (active) that are directed into the main beam of a radio astronomy antenna have the potential to damage some radio astronomy receivers. Space agencies operating the transmitters and the radio astronomy stations concerned should mutually plan their operations so as to avoid such occurrences to the maximum extent possible.

ADD

S5.562B In the bands 105-109.5 GHz, 111.8-114.25 GHz, 155.5-158.5 GHz and 217-226 GHz, the use of this allocation is limited to space-based radio astronomy only.

ADD

S5.562C Use of the band 116-122.25 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, at all altitudes from 0 km to 1 000 km above the Earth’s surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, shall not exceed –148 dB(W/(m^2 · MHz)) for all angles of arrival.

MOD

119.98-158.5 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
119.98-122.25	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE S5.562C SPACE RESEARCH (passive) S5.138 S5.341	
122.25-123	FIXED INTER-SATELLITE MOBILE S5.558 Amateur S5.138	
123-130	FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy S5.562D S5.149 S5.554	
130-134	EARTH EXPLORATION-SATELLITE (active) S5.562E FIXED INTER-SATELLITE MOBILE S5.558 RADIO ASTRONOMY S5.149 S5.562A	
134-136	AMATEUR AMATEUR-SATELLITE Radio astronomy	
136-141	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite S5.149	

MOD

119.98-158.5 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
141-148.5	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION S5.149	
148.5-151.5	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340	
151.5-155.5	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION S5.149	
155.5-158.5	EARTH EXPLORATION-SATELLITE (passive) S5.562F FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) S5.562B S5.149 S5.562G	

ADD

S5.562D *Additional allocation*: In Korea (Rep. of), the bands 128-130 GHz, 171-171.6 GHz, 172.2-172.8 GHz and 173.3-174 GHz are also allocated to the radio astronomy service on a primary basis until 2015.

ADD

S5.562E The allocation to the Earth exploration-satellite service (active) is limited to the band 133.5-134 GHz.

ADD

S5.562F In the band 155.5-158.5 GHz, the allocation to the Earth exploration-satellite (passive) and space research (passive) services shall terminate on 1 January 2018.

ADD

S5.562G The date of entry into force of the allocation to the fixed and mobile services in the band 155.5-158.5 GHz shall be 1 January 2018.

MOD

158.5-202 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
158.5-164	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	
164-167	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340	
167-174.5	FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE S5.558 S5.149 S5.562D	
174.5-174.8	FIXED INTER-SATELLITE MOBILE S5.558	
174.8-182	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE S5.562H SPACE RESEARCH (passive)	
. . .		
185-190	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE S5.562H SPACE RESEARCH (passive)	
190-191.8	EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) S5.340	

MOD

158.5-202 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
191.8-200	FIXED INTER-SATELLITE MOBILE S5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE S5.149 S5.341 S5.554	
200-202	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340 S5.341 S5.563A	

ADD

S5.562H Use of the bands 174.8-182 GHz and 185-190 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, at all altitudes from 0 to 1 000 km above the Earth's surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, shall not exceed -144 dB(W/($m^2 \cdot$ MHz)) for all angles of arrival.

ADD

S5.563A In the bands 200-209 GHz, 235-238 GHz, 250-252 GHz and 265-275 GHz, ground-based passive atmospheric sensing is carried out to monitor atmospheric constituents.

MOD

202-1 000 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
202-209	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340 S5.341 S5.563A	
209-217	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY S5.149 S5.341	
217-226	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) S5.562B S5.149 S5.341	
226-231.5	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340	
231.5-232	FIXED MOBILE Radiolocation	
232-235	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation	
235-238	EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive) S5.563A S5.563B	
238-240	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE	
240-241	FIXED MOBILE RADIOLOCATION	
241-248	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite S5.138 S5.149	

MOD

202-1 000 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
248-250	AMATEUR AMATEUR-SATELLITE Radio astronomy S5.149	
250-252	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340 S5.563A	
252-265	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE S5.149 S5.554	
265-275	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY S5.149 S5.563A	
275-1 000	(Not allocated) S5.565	

ADD

S5.563B The band 237.9-238 GHz is also allocated to the Earth exploration-satellite service (active) and the space research service (active) for spaceborne cloud radars only.

SUP

S5.564

MOD

S5.565 The frequency band 275-1 000 GHz may be used by administrations for experimentation with, and development of, various active and passive services. In this band a need has been identified for the following spectral line measurements for passive services:

– radio astronomy service: 275-323 GHz, 327-371 GHz, 388-424 GHz, 426-442 GHz, 453-510 GHz, 623-711 GHz, 795-909 GHz and 926-945 GHz;

– Earth exploration-satellite service (passive) and space research service (passive): 275-277 GHz, 294-306 GHz, 316-334 GHz, 342-349 GHz, 363-365 GHz, 371-389 GHz, 416-434 GHz, 442-444 GHz, 496-506 GHz, 546-568 GHz, 624-629 GHz, 634-654 GHz, 659-661 GHz, 684-692 GHz, 730-732 GHz, 851-853 GHz and 951-956 GHz.

Future research in this largely unexplored spectral region may yield additional spectral lines and continuum bands of interest to the passive services. Administrations are urged to take all practicable steps to protect these passive services from harmful interference until the date when the allocation Table is established in the above-mentioned frequency band.

ARTICLE S8

Status of frequency assignments recorded in the Master International Frequency Register

MOD

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[1] **S8.1.1** The expression “frequency assignment”, wherever it appears in this Chapter, shall be understood to refer either to a new frequency assignment or to a change in an assignment already recorded in the Master Register. Additionally, wherever the expression relates to a geostationary or non-geostationary space station, it shall be associated with § A.4 of Annex 2A to Appendix **S4**, as relevant, and wherever the expression relates to an earth station associated with a geostationary or non-geostationary space station, it shall be associated with § A.4 *c)* of Annex 2A to Appendix **S4**, as relevant.

ARTICLE S9

Procedure for effecting coordination with or obtaining agreement of other administrations[1, 2, 3, 4, 5, 5bis]

MOD

[3] **A.S9.3** See Appendices **S30** and **S30A**, as appropriate, for the coordination of:

a) proposed modifications to the Appendix **S30** 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), or new or modified assignments proposed for inclusion in the Regions 1 and 3 List of additional uses, with respect to frequency assignments in the same service or in other services to which these bands are allocated;

b) frequency assignments in other services to which the frequency bands referred to in § *a)* above are allocated in the same Region or in another Region, with respect to assignments in 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);

c) proposed modifications to the Appendix **S30A** Plans for feeder links to the broadcasting-satellite service in the frequency bands 17.3-17.8 GHz (in Region 2) and 14.5-14.8 GHz and 17.3-18.1 GHz (in Regions 1 and 3), or new or modified assignments proposed for inclusion in the Regions 1 and 3 List of additional uses, with respect to frequency assignments in the same service or in other services to which these bands are allocated;

d) frequency assignments in other services to which the frequency bands referred to in § *c)* above are allocated in the same Region or in another Region, with respect to assignments in the fixed-satellite service (Earth-to-space) in the frequency bands 17.3-17.8 GHz (in Region 2) and 14.5-14.8 GHz and 17.3-18.1 GHz (in Regions 1 and 3).

For the broadcasting-satellite service and for feeder links for the broadcasting-satellite service in the fixed-satellite service in Region 2, Resolution **42 (Rev.Orb-88)** is also applicable.

MOD

[4] **A.S9.4** Resolution **49 (Rev.WRC-2000)** shall also be applied with respect to those satellite networks and satellite systems that are subject to it.

MOD

[5] **A.S9.5** See also Resolution **51 (Rev.WRC-2000)**.

ADD

[5*bis*] **A.S9.5A** The provisions of Appendices **S30**, **S30A** and **S30B** do not apply to non-geostationary service-satellite systems in the fixed-satellite.

MOD

S9.2 Amendments to the information sent in accordance with the provisions of No. **S9.1** shall also be sent to the Bureau as soon as they become available. The use of an additional frequency band or modification of the orbital location by more than ±12º for a space station using the geostationary-satellite orbit will require the application of the advance publication procedure for this band or orbital location, as appropriate.

MOD

S9.2B On receipt of the complete information sent under Nos. **S9.1** and **S9.2**, the Bureau shall publish[6bis] it in a special section of its International Frequency Information Circular (BR IFIC) within three months. When the Bureau is not in a position to comply with the time limit referred to above, it shall periodically so inform the administrations, giving the reasons therefore.

ADD

[6bis] **S9.2B.1** If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication, after informing the administration concerned. The Bureau shall inform all administrations of such action, and that the network specified in the publication in question no longer has to be taken into consideration by the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration not later than 60 days prior to due date of the payment if payment has not been received by that date. This provision was identified in reply to Resolution 88 (Minneapolis, 1998) of the Plenipotentiary Conference and shall enter into force at a date to be determined by the forthcoming Plenipotentiary Conference.

MOD

S9.5B If, upon receipt of the International Frequency Information Circular (BR IFIC) containing information published under No. **S9.2B**, any administration considers its existing or planned satellite systems or networks or terrestrial stations[7] to be affected, it may send its comments to the publishing administration, so that the latter may take those comments into consideration when initiating the coordination procedure. A copy of these comments may also be sent to the Bureau. Thereafter, both administrations shall endeavour to cooperate in joint efforts to resolve any difficulties, with the assistance of the Bureau, if so requested by either of the parties, and shall exchange any additional relevant information that may be available.

Sub-Section IIA – Requirement and request for coordination

ADD

S9.7A *b)*[11bis, 11ter] for a specific earth station in a geostationary-satellite network in the fixed-satellite service in certain frequency bands, in respect of a non-geostationary-satellite system in the fixed-satellite service;

ADD

S9.7B *c)*[11bis, 11ter] for a non-geostationary-satellite system in the fixed-satellite service in certain frequency bands, in respect of a specific earth station in a geostationary-satellite network in the fixed-satellite service;

ADD

[11bis] **S9.7A.1** and **S9.7B.1** The coordination of a specific earth station under Nos. **S9.7A** or **S9.7B** shall remain within the authority of the administration on whose territory the station is located.

ADD

[11ter] **S9.7A.2** and **S9.7B.2** Coordination information relating to a specific earth station received by the Bureau prior to 30 June 2000 is considered as complete information under Nos. **S9.7A** or **S9.7B** from the date of receipt of complete information for the associated satellite network under No. **S9.7**, provided that the maximum isotropic antenna gain, the lowest total receiving system noise temperature of the earth station and the necessary bandwidth of the emission received by the earth station are equal to those of any typical earth station included in the coordination request for the geostationary-satellite network in the fixed-satellite service.

SUP
S9.8

SUP
S9.9

SUP

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[12] **S9.8.1** and **S9.9.1**

MOD

S9.11A *e)* for a station for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to this provision, the provisions of Nos. **S9.12** to **S9.16** are applicable;

MOD

S9.12 *f)* for a station in a satellite network using a non-geostationary-satellite orbit, for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to this provision or to No. **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;

ADD

S9.12A *g)* for a station in a satellite network using a non-geostationary-satellite orbit, for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to this provision or to No. **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;

MOD

S9.13 *h)* for a station in a satellite network using the geostationary-satellite orbit, for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to this provision or to No. **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;

MOD

S9.14 *i)* for a space station of a satellite network for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to No. **S9.11A** in respect of stations of terrestrial services where the threshold value is exceeded;

MOD

S9.15 *j)* for either a specific earth station or typical earth station of a non-geostationary satellite network for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to No. **S9.11A**, in respect of terrestrial stations in frequency bands allocated with equal rights to space and terrestrial services and where the coordination area of the earth station includes the territory of another country;

MOD

S9.16 *k)* for a transmitting station of a terrestrial service for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to No. **S9.11A** and which is located within the coordination area of an earth station in a non-geostationary-satellite network;

MOD

S9.17 *l)* for any specific earth station or typical mobile earth station in frequency bands above 100 MHz 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**;

SUP

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[13] **S9.17.1**

MOD

S9.17A *m)* for any 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 and 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 another earth station, with the exception of the coordination under No. **S9.19**;

(MOD)

S9.18 *n)* for 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**;

MOD

S9.19 *o)* for any transmitting station of a terrestrial service or any transmitting earth station in the fixed-satellite service (Earth-to-space) in a frequency band shared on an equal primary basis with the broadcasting-satellite service, with respect to typical earth stations included in the service area of a space station in the broadcasting-satellite service;

(MOD)

S9.21 *p)* for any station of a service for which the requirement to seek the agreement of other administrations is included in a footnote to the Table of Frequency Allocations referring to this provision.

MOD

S9.32 If the responsible administration concludes that coordination is not required under Nos. **S9.7** to **S9.7B**, it shall send the relevant information pursuant to Appendix **S4** to the Bureau for action under No. **S9.34**.

MOD

S9.35 *a)* examine that information with respect to its conformity with No. **S11.31**[13*bis*];

ADD

[13*bis*] **S9.35.1** The Bureau shall include the detailed results of its examination under No. **S11.31** of compliance with the limits in Tables **S22-1** to **S22-3** of Article **S22** in the publication under No. **S9.38**.

MOD

S9.36 *b)* identify in accordance with No. **S9.27** any administration with which coordination may need to be effected[14, 14*bis*];

ADD

[14*bis*] **S9.36.2** In the case of coordination under Nos. **S9.7**, **S9.7A** and **S9.7B**, the Bureau shall also identify the specific satellite networks or earth stations with which coordination needs to be effected. In the case of coordination under No. **S9.7** the list of the networks identified by the Bureau under No. **S9.27** is for information purposes only, to help administrations comply with this procedure.

MOD

S9.38 *d)* publish[14*ter*], as appropriate, the complete information in the International Frequency Information Circular (BR IFIC) within four months. Where the Bureau is not in a position to comply with the time-limit referred to above, it shall periodically so inform the administrations, giving the reasons therefor.

ADD

[14ter] **S9.38.1** If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication, after informing the administration concerned. The Bureau shall inform all administrations of such action and that the network specified in the publication in question no longer has to be taken into consideration by the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration not later than 60 days prior to due date of the payment if payment has not been received by that date. This provision was identified in reply to Resolution 88 (Minneapolis, 1998) of the Plenipotentiary Conference and shall enter into force at a date to be determined by the forthcoming Plenipotentiary Conference.

MOD

S9.41 Following receipt of the International Frequency Information Circular (BR IFIC) referring to requests for coordination under Nos. **S9.7** to **S9.7B**, an administration believing that it should have been included in the request or the initiating administration believing that an administration identified under No. **S9.36** in accordance with the provisions of No. **S9.7** (GSO/GSO) (items 1), 2) and 3) of the frequency band column), No. **S9.7A** (GSO earth station/non-GSO system) or No. **S9.7B** (non-GSO system/GSO earth station) of Table S5-1 of Appendix **S5** should not have been included in the request, shall, within four months of the date of publication of the relevant BR IFIC, inform the initiating administration or the identified administration, as appropriate, and the Bureau, giving its technical reasons for doing so, and shall request that its name be included or that the name of the identified administration be excluded, as appropriate.

MOD

S9.42 The Bureau shall study this information on the basis of Appendix **S5** and shall inform both administrations of its conclusions. Should the Bureau agree to include or exclude, as appropriate, the administration in the request, it shall publish an addendum to the publication under No. **S9.38**.

MOD

S9.51 Following its action under No. **S9.50**, the administration with which coordination was sought under Nos. **S9.7** to **S9.7B** shall, within four months of the date of publication of the International Frequency Information Circular (BR IFIC) under No. **S9.38**, either inform the requesting administration and the Bureau of its agreement or act under No. **S9.52**.

ADD

S9.53A Upon expiry of the deadline for comments in respect of a coordination request under Nos. **S9.11** to **S9.14** and **S9.21**, the Bureau shall, according to its records, publish a Special Section, indicating the list of administrations having submitted their disagreement or other comments within the regulatory deadline.

MOD

S9.60 If, within the same four-month period specified in Nos. **S9.51** or **S9.51A**, an administration with which coordination is sought under Nos. **S9.7** to **S9.7B** and **S9.15** to **S9.19** fails to reply or to give a decision under Nos. **S9.51** or **S9.51A** or, following its disagreement under No. **S9.52**, fails to provide information concerning its own assignments on which its disagreement is based, the requesting administration may seek the assistance of the Bureau.

ARTICLE S11

Notification and recording of frequency assignments[1, 2, 3, 3bis]

MOD

[1] **A.S11.1** See also Appendices **S30** and **S30A** as appropriate, for the notification and recording of:

a) frequency assignments to stations in 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);

b) frequency assignments to stations in other services to which the frequency bands referred to in § *a)* above are allocated in the same Region or in another Region, so far as their relationship to the broadcasting-satellite service is concerned, 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);

c) frequency assignments to feeder-link stations in the fixed-satellite service (Earth-to-space) in the frequency bands 14.5-14.8 GHz in Region 1 (see No. **S5.510**) and in Region 3, 17.3-18.1 GHz in Regions 1 and 3 and 17.3-17.8 GHz in Region 2, and to stations in other services in these bands;

d) frequency assignments to stations in the same service or other services to which the frequency bands referred to in § *c)* above are allocated in the same Region or in another Region, so far as their relationship to the fixed-satellite service (Earth-to-space) in these bands is concerned.

For the broadcasting-satellite service in Region 2 and for feeder links in the fixed-satellite service for the broadcasting-satellite service in Region 2, Resolution **42 (Rev.Orb-88)** is also applicable.

See also Appendix **S30B** for the notification and recording of assignments in the following frequency bands:

All Regions, fixed-satellite service only

4 500-4 800 MHz	(space-to-Earth)
6 725-7 025 MHz	(Earth-to-space)
10.7-10.95 GHz	(space-to-Earth)
11.2-11.45 GHz	(space-to-Earth)
12.75-13.25 GHz	(Earth-to-space).

MOD

[2] **A.S11.2** Resolution **49 (Rev.WRC-2000)** shall also be applied with respect to those satellite networks and satellite systems that are subject to it.

MOD

[3] **A.S11.3** See also Resolution **51 (Rev.WRC-2000)**.

ADD

[3bis] **A.S11.3A** The provisions of Appendices **S30**, **S30A** and **S30B** do not apply to non-geostationary-satellite systems in the fixed-satellite service.

MOD

S11.32A *c)* with respect to the probability of harmful interference that may be caused to or by assignments recorded with a favourable finding under Nos. **S11.36** and **S11.37** or **S11.38**, or recorded in application of No. **S11.41**, or published under Nos. **S9.38** or **S9.58** but not yet notified, as appropriate, for those cases for which the notifying administration states that the procedure for coordination under Nos. **S9.7**, **S9.7A**, **S9.7B**, **S9.11**, **S9.12**, **S9.12A**, **S9.13** or **S9.14**, could not be successfully completed (see also No. **S9.65**);[10] or

MOD

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[10] **S11.32A.1** The examination of such notices with respect to any other frequency assignment for which a request for coordination under Nos. **S9.7**, **S9.7A**, **S9.7B**, **S9.12**, **S9.12A** or **S9.13**, as appropriate, has been published under No. **S9.38** but not yet notified shall be effected by the Bureau in the order of their publication under the same number using the most recent information available.

MOD

S11.33 *d)* with respect to the probability of harmful interference that may be caused to or by other assignments recorded with a favourable finding in application of Nos. **S11.36** and **S11.37** or **S11.38** or in application of No. **S11.41**, as appropriate, for those cases for which the notifying administration states that the procedure for coordination or prior agreement under Nos. **S9.15**[11], **S9.16**[11], **S9.17**[11], **S9.17A** or **S9.18**[11] could not be successfully completed (see also No. **S9.65**); [12] or

ADD

S11.35 In cases where the Bureau is not in a position to conduct the examination under No. **S11.32A** or **S11.33**, the Bureau shall immediately inform the notifying administration, which may then resubmit its notice under No. **S11.41**, under the assumption that the finding under No. **S11.32A** or **S11.33** is unfavourable.

MOD

S11.44 The notified date[16] of bringing into use of any assignment to a space station of a satellite network shall be no later than five years following the date of receipt by the Bureau of the relevant information under No. **S9.1**. The notified date of bringing into use may be extended at the request of the notifying administration by not more than two years, only under the conditions specified under Nos. **S11.44B** to **S11.44I**. Any frequency assignment not brought into use within the required period shall be cancelled by the Bureau after having informed the administration at least three months before the expiry of this period.

ADD

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[16] **S11.44.1** In the case of space station frequency assignments that are brought into use prior to the completion of the coordination process, and for which the Resolution **49 (WRC-97)** data have been submitted to the Bureau, the assignment shall continue to be taken into consideration for a maximum period of seven years from the date of receipt of the relevant information under No. **S9.1**. If the first notice for recording of the assignments in question under No. **S11.15** has not been received by the Bureau by the end of this seven-year period, the assignments shall no longer be taken into account by the Bureau and administrations. The Bureau shall inform the notifying administration of its pending actions three months in advance.

In the case of satellite networks for which relevant advance publication information has been received prior to 22 November 1997, the corresponding period will be nine years from the date of publication of this information.

ARTICLE S13

Instructions to the Bureau

Section IV – Board documents

MOD

S13.18 Within one week after a meeting of the Board, a summary of all decisions taken in that meeting shall be made available in electronic form. After each Board meeting the approved minutes of that meeting, shall normally be circulated at least one month before the start of the following meeting to administrations by means of a circular letter and these approved minutes shall also be made available in electronic form.

MOD

S13.19 A copy of all documents considered at the Board's meetings, including the minutes, shall be available for public inspection by administrations in the offices of the Bureau, and shall be made available in electronic form as soon as possible.

ARTICLE S14

Procedure for the review of a finding or other decision of the Bureau

MOD

S14.6 The decision of the Board on the review, to be taken in accordance with the Convention, shall be regarded as final in so far as the Bureau and the Board are concerned. That decision, together with the supporting information, shall be published as under No. **S14.4**. If the review results in a modification to a finding previously formulated by the Bureau, the Bureau shall re-apply the relevant steps of the procedure under which the previous finding had been formulated, including, if appropriate, removal of the corresponding entries from the Master Register or any consequential effect on notices subsequently received by the Bureau. However, if the administration which requested the review disagrees with the Board's decision it may raise the matter at a world radiocommunication conference.

ARTICLE S15

Interferences

Section I – Interference from radio stations

MOD

S15.8 § 4 Special consideration shall be given to avoiding interference on distress and safety frequencies, those related to distress and safety identified in Article **S31** and Appendix **S13**, and those related to safety and regularity of flight identified in Appendix **S27**.

Section VI – Procedure in a case of harmful interference

MOD

S15.28 § 20 Recognizing that transmissions on distress and safety frequencies and frequencies used for the safety and regularity of flight (see Article **S31**, Appendix **S13** and Appendix **S27**) require absolute international protection and that the elimination of harmful interference to such transmissions is imperative, administrations undertake to act immediately when their attention is drawn to any such harmful interference.

MOD

S15.35 § 27 On being informed that a station over which it has jurisdiction is believed to have been the cause of harmful interference, an administration shall, as soon as possible, acknowledge receipt of that information by the quickest means available. Such acknowledgement shall not constitute an acceptance of responsibility.

MOD

S15.37 § 29 An administration receiving a communication to the effect that one of its stations is causing harmful interference to a safety service shall promptly investigate the matter and take any necessary remedial action and respond in a timely manner.

ARTICLE S20

Service documents

SUP

S20.11

ARTICLE S21

Terrestrial and space services sharing frequency bands above 1 GHz

MOD

S21.5 3) The power delivered by a transmitter to the antenna of a station in the fixed or mobile services shall not exceed +13 dBW in frequency bands between 1 GHz and 10 GHz, or +10 dBW in frequency bands above 10 GHz, except as cited in No. **S21.5A**.

ADD

S21.5A As an exception to the power levels given in No. **S21.5**, the sharing environment within which the Earth exploration-satellite (passive) and space research (passive) services shall operate in the band 18.6-18.8 GHz is defined by the following limitations on the operation of the fixed service: the power of each RF carrier frequency delivered to the input of each antenna of a station in the fixed service in the band 18.6-18.8 GHz shall not exceed –3 dBW.

MOD

S21.6 4) The limits given in Nos. **S21.2**, **S21.3**, **S21.4**, **S21.5** and **S21.5A** apply, where applicable, to the services and frequency bands indicated in Table **S21-2** for reception by space stations where the frequency bands are shared with equal rights with the fixed or mobile services:

MOD

TABLE **S21-2** *(end)*

Frequency band	**Service**	**Limit as specified in Nos.**
18.6-18.8 GHz	Earth exploration-satellite Space research	**S21.5A**

MOD

S21.7 5) Transhorizon systems in the 1 700-1 710 MHz, 1 980-2 010 MHz, 2 025-2 110 MHz and 2 200-2 290 MHz bands may exceed the limits given in Nos. **S21.3** and **S21.5**, but the provisions of Nos. **S21.2** and **S21.4** should be observed. Considering the difficult sharing conditions with other services, administrations are urged to keep the number of transhorizon systems in these bands to a minimum.

MOD

TABLE **S21-4** *(continued)*

Frequency band	Service*	Limit in dB(W/m²) for angle of arrival (δ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
10.7-11.7 GHz	Fixed-satellite (space-to-Earth), geostationary-satellite orbit	–150	–150 + 0.5(δ – 5)	–140	4 kHz
10.7-11.7 GHz	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	–126	–126 + 0.5(δ – 5)	–116	1 MHz
11.7-12.5 GHz (Region 1) 12.5-12.75 GHz (Region 1 countries listed in Nos. **S5.494** and **S5.496**) 11.7-12.7 GHz (Region 2) 11.7-12.75 GHz (Region 3)	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	–124	–124 + 0.5(δ – 5)	–114	1 MHz
12.2-12.75 GHz [7] (Region 3) 12.5-12.75 GHz [7] (Region 1 countries listed in Nos. **S5.494** and **S5.496**)	Fixed-satellite (space-to-Earth), geostationary-satellite orbit	–148	–148 + 0.5(δ – 5)	–138	4 kHz
15.43-15.63 GHz	Fixed-satellite (space-to-Earth)	–127	5°-20°: –127 20°-25°: –127 + 0.56(δ – 20)²	25°-29°: –113 29°-31°: –136.9 + 25 log (δ – 20) 31°-90°: –111	1 MHz
17.7-19.3 GHz [7, 8]	Fixed-satellite (space-to-Earth) Meteorological-satellite (space-to-Earth)	–115 [12*bis*] or –115 – *X* [12]	–115 + 0.5(δ – 5) [12*bis*] or –115 – *X* + ((10 + *X*)/20)(δ – 5) [12]	–105 [12*bis*] or –105 [12]	1 MHz
19.3-19.7 GHz 22.55-23.55 GHz 24.45-24.75 GHz 25.25-27.5 GHz	Fixed-satellite (space-to-Earth) Earth exploration-satellite (space-to-Earth) Inter-satellite	–115	–115 + 0.5(δ – 5)	–105	1 MHz

MOD

TABLE **S21-4** *(continued)*

<table>
<tr><th rowspan="2">Frequency band</th><th rowspan="2">Service*</th><th colspan="4">Limit in dB(W/m^2) for angle of arrival (δ) above the horizontal plane</th><th rowspan="2">Reference bandwidth</th></tr>
<tr><th>0°-5°</th><th colspan="2">5°-25°</th><th>25°-90°</th></tr>
<tr><td>31.0-31.3 GHz
34.7-35.2 GHz
(space-to-Earth transmissions referred to in No. S5.550 on the territories of countries listed in No. S5.549)</td><td>Space research</td><td>–115</td><td colspan="2">–115 + 0.5(δ – 5)</td><td>–105</td><td>1 MHz</td></tr>
<tr><td>31.8-32.3 GHz</td><td>Space research</td><td>–120 [14]</td><td colspan="2">–120 + 0.75(δ – 5) [14]</td><td>–105</td><td>1 MHz</td></tr>
<tr><td>32-33 GHz</td><td>Inter-satellite</td><td>–135</td><td colspan="2">–135 + (δ – 5)</td><td>–115</td><td>1 MHz</td></tr>
<tr><td>37-38 GHz</td><td>Space research, non-geostationary-satellite orbit</td><td>–120 [14]</td><td colspan="2">–120 + 0.75(δ – 5) [14]</td><td>–105</td><td>1 MHz</td></tr>
<tr><td>37-38 GHz</td><td>Space research, geostationary-satellite orbit</td><td>–125</td><td colspan="2">–125 + (δ – 5)</td><td>–105</td><td>1 MHz</td></tr>
<tr><td>37.5-40 GHz</td><td>Fixed-satellite, (non-geostationary-satellite orbit)
Mobile-satellite (non-geostationary-satellite orbite)</td><td>–120 [10, 15, 16]</td><td colspan="2">–120 + 0.75(δ – 5) [10, 15, 16]</td><td>–105 [10, 15, 16]</td><td>1 MHz</td></tr>
<tr><td rowspan="2">37.5-40 GHz</td><td rowspan="2">Fixed-satellite (geostationary-satellite orbit)
Mobile-satellite (geostationary-satellite orbit)</td><td rowspan="2">–127 [15, 16]</td><td>5°-20°</td><td>20°-25°</td><td rowspan="2">–105 [15, 16]</td><td rowspan="2">1 MHz</td></tr>
<tr><td>–127 + (4/3)(δ – 5) [15, 16]</td><td>–107 + 0.4(δ – 20) [15, 16]</td></tr>
<tr><td>40-40.5 GHz</td><td>Fixed-satellite</td><td>–115</td><td colspan="2">–115 + 0.5(δ – 5)</td><td>–105</td><td>1 MHz</td></tr>
<tr><td>40.5-42 GHz</td><td>Fixed-satellite (non-geostationary-satellite orbit)
Broadcasting-satellite (non-geostationary-satellite orbit)</td><td>–115 [10, 15, 16, 17]</td><td colspan="2">–115 + 0.5(δ – 5) [10, 15, 16, 17]</td><td>–105 [10, 15, 16, 17]</td><td>1 MHz</td></tr>
</table>

MOD

TABLE **S21-4** *(end)*

<table>
<tr><th rowspan="2">Frequency band</th><th rowspan="2">Service*</th><th colspan="4">Limit in dB(W/m^2) for angle of arrival (δ) above the horizontal plane</th><th rowspan="2">Reference bandwidth</th></tr>
<tr><th>0°-5°</th><th colspan="2">5°-25°</th><th>25°-90°</th></tr>
<tr><td rowspan="2">40.5-42 GHz</td><td rowspan="2">Fixed-satellite (geostationary-satellite orbit)
Broadcasting-satellite (geostationary-satellite orbit)</td><td rowspan="2">–120 [15, 16, 17]</td><td>5°-15°</td><td>15°-25°</td><td rowspan="2">–105 [15, 16, 17]</td><td rowspan="2">1 MHz</td></tr>
<tr><td>–120 + (δ – 5) [15, 16, 17]</td><td>–110 + 0.5(δ – 15) [15, 16, 17]</td></tr>
<tr><td>42-42.5 GHz</td><td>Fixed-satellite (non-geostationary-satellite orbit)
Broadcasting-satellite (non-geostationary-satellite orbit)</td><td>–120 [10, 15, 16, 17]</td><td colspan="2">–120 + 0.75(δ – 5) [10, 15, 16, 17]</td><td>–105 [10, 15, 16, 17]</td><td>1 MHz</td></tr>
<tr><td rowspan="2">42-42.5 GHz</td><td rowspan="2">Fixed-satellite (geostationary-satellite orbit)
Broadcasting-satellite (geostationary-satellite orbit)</td><td rowspan="2">–127 [15, 16, 17]</td><td>5°-20°</td><td>20°-25°</td><td rowspan="2">–105 [15, 16, 17]</td><td rowspan="2">1 MHz</td></tr>
<tr><td>–127 + (4/3)(δ – 5) [15, 16, 17]</td><td>–107 + 0.4(δ – 20) [15, 16, 17]</td></tr>
</table>

MOD

[8] **S21.16.2** In addition to the limits given in Table **S21-4**, in the band 18.6-18.8 GHz the sharing environment within which the Earth exploration-satellite (passive) and space research (passive) services shall operate is defined by the following limitations on the operation of the fixed-satellite service: the power flux-density across the 200 MHz band 18.6-18.8 GHz produced at the surface of the Earth by emissions from a space station under assumed free-space propagation conditions shall not exceed –95 dB(W/m^2), except for less than 5% of time, when the limit may be exceeded by up to 3 dB. The provisions of No. **S21.17** do not apply in this band.

MOD

[10] **S21.16.4** The values given in this table entry shall apply to emissions of space stations of non-geostationary satellites in systems operating with 99 or fewer satellites. Further study concerning the applicability of these values is necessary in order to apply them to systems operating with 100 or more satellites.

MOD

12 **S21.16.6** The function X is defined as a function of the number, N, of satellites in the non-geostationary satellite constellation in the fixed-satellite service, as follows:

$X = 0$	dB	for	$N \leq 50$
$X = \frac{5}{119}(N - 50)$	dB	for	$50 < N \leq 288$
$X = \frac{1}{69}(N + 402)$	dB	for	$N > 288$

In the band 18.8-19.3 GHz, these limits apply to emissions of any space station in a non-geostationary-satellite system in the fixed-satellite service for which complete coordination or notification information, as appropriate, has been received by the Radiocommunication Bureau after 17 November 1995, and which was not operational by that date.

ADD

12*bis* **S21.16.6*bis*** These limits apply to emissions of a space station in the meteorological-satellite service and of a geostationary satellite in the fixed-satellite service. They also apply to emissions of any space station in a non-geostationary-satellite system in the fixed-satellite service in the band 18.8-19.3 GHz for which complete coordination or notification information has been received by the Radiocommunication Bureau by 17 November 1995, or which was in operation by that date.

SUP

S21.16.8

SUP

S21.16.9

ADD

14 **S21.16.10** During the launch and near-Earth operational phase of deep-space facilities, non-geostationary satellite systems in the space research service shall not exceed a power flux-density value of:

–115	dB(W/m^2)	for	$\delta < 5°$
–115 + 0.5 (δ – 5)	dB(W/m^2)	for	$5° \leq \delta \leq 25°$
–105	dB(W/m^2)	for	$\delta > 25°$

in any 1 MHz band, where δ is the angle of arrival above the horizontal plane.

ADD

15 **S21.16.11** Except to the extent provided in No. **S21.16.12**, these values are provisional and shall be applied subject to Resolution **84 (WRC-2000)**.

ADD

16 **S21.16.12** In the bands 37.5-40 and 40.5-42.5 GHz, notwithstanding any further studies, the power flux-density limits in this table shall be applied to stations in the fixed-satellite service for which complete coordination (geostationary satellite orbit) or notification information (non-geostationary satellite orbit), as appropriate, has been received by the Bureau after 2 June 2000 and before the end of WRC-03.

ADD

17 **S21.16.13** The values given for the broadcasting-satellite service are provisional and need review by a future conference.

ARTICLE S22

Space services[1]

Section II – Control of interference to geostationary-satellite systems

SUP

S22.5B

MOD

S22.5C § 6 1) The equivalent power flux-density[2], epfd$\downarrow$ at any point on the Earth's surface visible from the geostationary-satellite orbit, produced by emissions from all the space stations of a non-geostationary-satellite system in the fixed-satellite service in the frequency bands listed in Tables **S22-1A** to **S22-1D**, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limits given in Tables **S22-1A** to **S22-1D** for the given percentages of time. These limits relate to the equivalent power flux-density which would be obtained under free-space propagation conditions, into a reference antenna and in the reference bandwidth specified in Tables **S22-1A** to **S22-1D**, for all pointing directions towards the geostationary-satellite orbit.

MOD

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[2] **S22.5C.1** The equivalent power flux-density is defined as the sum of the power flux-densities produced at a geostationary-satellite system receive station on the Earth's surface or in the geostationary orbit, as appropriate, by all the transmit stations within a non-geostationary-satellite system, taking into account the off-axis discrimination of a reference receiving antenna assumed to be pointing in its nominal direction. The equivalent power flux-density is calculated using the following formula:

$$epfd = 10 \log_{10} \left[\sum_{i=1}^{N_a} 10^{\frac{P_i}{10}} \cdot \frac{G_t(\theta_i)}{4\pi d_i^2} \cdot \frac{G_r(\varphi_i)}{G_{r,max}} \right]$$

where:

- N_a: the number of transmit stations in the non-geostationary-satellite system that are visible from the geostationary-satellite system receive station considered on the Earth's surface or in the geostationary orbit, as appropriate;
- i: the index of the transmit station considered in the non-geostationary-satellite system;
- P_i: the RF power at the input of the antenna of the transmit station, considered in the non-geostationary-satellite system in dBW in the reference bandwidth;
- θ_i: the off-axis angle between the boresight of the transmit station considered in the non-geostationary-satellite system and the direction of the geostationary-satellite system receive station;
- $G_t(\theta_i)$: the transmit antenna gain (as a ratio) of the station considered in the non-geostationary-satellite system in the direction of the geostationary-satellite system receive station;
- d_i: the distance in metres between the transmit station considered in the non-geostationary-satellite system and the geostationary-satellite system receive station;
- φ_i: the off-axis angle between the boresight of the antenna of the geostationary-satellite system receive station and the direction of the *i*-th transmit station considered in the non-geostationary-satellite system;

$G_r(\varphi_i)$: the receive antenna gain (as a ratio) of the geostationary-satellite system receive station in the direction of the *i*-th transmit station considered in the non-geostationary-satellite system;

$G_{r,max}$: the maximum gain (as a ratio) of the antenna of the geostationary-satellite system receive station;

epfd: the computed equivalent power flux-density in dB(W/m^2) in the reference bandwidth.

ADD

S22.5CA 2) The limits given in Tables **S22-1A** to **S22-1D** may be exceeded on the territory of any country whose administration has so agreed.

SUP

TABLE **S22-1**

ADD

TABLE **S22-1A**

Limits to the epfd↓ radiated by non-geostationary-satellite systems in the fixed-satellite service systems in certain frequency bands[3, 4, 5, 6]

Frequency band (GHz)	epfd↓ (dB(W/m²))	Percentage of time during which epfd↓ may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter and reference radiation pattern [7]
10.7-11.7 in all Regions; 11.7-12.2 in Region 2; 12.2-12.5 in Region 3 and 12.5-12.75 in Regions 1 and 3	–175.4 –174 –170.8 –165.3 –160.4 –160 –160	0 90 99 99.73 99.991 99.997 100	40	60 cm Recommendation ITU-R S.1428
	–181.9 –178.4 –173.4 –173 –164 –161.6 –161.4 –160.8 –160.5 –160 –160	0 99.5 99.74 99.857 99.954 99.984 99.991 99.997 99.997 99.9993 100	40	1.2 m Recommendation ITU-R S.1428
	–190.45 –189.45 –187.45 –182.4 –182 –168 –164 –162 –160 –160	0 90 99.5 99.7 99.855 99.971 99.988 99.995 99.999 100	40	3 m Recommendation ITU-R S.1428
	–195.45 –195.45 –190 –190 –172.5 –160 –160	0 99 99.65 99.71 99.99 99.998 100	40	10 m Recommendation ITU-R S.1428

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[3] **S22.5C.2** For certain geostationary fixed-satellite service system receive earth stations, see also Nos. **S9.7A** and **S9.7B**.

[4] **S22.5C.3** In meeting these limits, the administrations intending to develop such systems shall ensure that the assignments appearing in the Plan of Appendix **S30B** will be fully protected.

[5] **S22.5C.4** In addition to the limits shown in Table **S22-1A**, the following single-entry epfd$_\downarrow$ limits apply to all antenna sizes greater than 60 cm in the frequency bands listed in Table **S22-1A**:

100% of the time epfd$_\downarrow$ (dB(W/(m^2 · 40 kHz)))	**Latitude (North or South) (degrees)**
–160	0 < |Latitude| ≤ 57.5
–160 + 3.4 (57.5 – |Latitude|)/4	57.5 < |Latitude| ≤ 63.75
–165.3	63.75 < |Latitude|

[6] **S22.5C.5** For each reference antenna diameter, the limit consists of the complete curve on a plot which is linear in decibels for the epfd$_\downarrow$ levels and logarithmic for the time percentages, with straight lines joining the data points.

[7] **S22.5C.6** For this Table, reference patterns of Recommendation ITU-R S.1428 shall be used only for the calculation of interference from non-geostationary-satellite systems in the fixed-satellite service systems into geostationary-satellite systems in the fixed-satellite service.

ADD

TABLE **S22-1B**

Limits to the epfd↓ radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands[3, 6, 8]

Frequency band (GHz)	epfd↓ (dB(W/m^2))	Percentage of time during which epfd↓ may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter and reference radiation pattern [7]
17.8-18.6	–175.4 –175.4 –172.5 –167 –164 –164	0 90 99 99.714 99.971 100	40	1 m Recommendation ITU-R S.1428
	–161.4 –161.4 –158.5 –153 –150 –150	0 90 99 99.714 99.971 100	1 000	
17.8-18.6	–178.4 –178.4 –171.4 –170.5 –166 –164 –164	0 99.4 99.9 99.913 99.971 99.977 100	40	2 m Recommendation ITU-R S.1428
	–164.4 –164.4 –157.4 –156.5 –152 –150 –150	0 99.4 99.9 99.913 99.971 99.977 100	1 000	
17.8-18.6	–185.4 –185.4 –180 –180 –172 –164 –164	0 99.8 99.8 99.943 99.943 99.998 100	40	5 m Recommendation ITU-R S.1428
	–171.4 –171.4 –166 –166 –158 –150 –150	0 99.8 99.8 99.943 99.943 99.998 100	1 000	

[8] **S22.5C.7** A non-geostationary satellite system shall meet the limits of this Table in both the 40 kHz and the 1 MHz reference bandwidths.

ADD

TABLE **S22-1C**

Limits to the epfd↓ radiated by non geostationary-satelllite systems in the fixed-satellite service in certain frequency bands[3, 6, 8]

Frequency band (GHz)	epfd↓ (dB(W/m^2))	Percentage of time during which epfd↓ may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter and reference radiation pattern [7]
19.7-20.2	–187.4 –182 –172 –154 –154	0 71.429 97.143 99.983 100	40	70 cm Recommendation ITU-R S.1428
	–173.4 –168 –158 –140 –140	0 71.429 97.143 99.983 100	1 000	
19.7-20.2	–190.4 –181.4 –170.4 –168.6 –165 –160 –154 –154	0 91 99.8 99.8 99.943 99.943 99.997 100	40	90 cm Recommendation ITU-R S.1428
	–176.4 –167.4 –156.4 –154.6 –151 –146 –140 –140	0 91 99.8 99.8 99.943 99.943 99.997 100	1 000	
19.7-20.2	–196.4 –162 –154 –154	0 99.98 99.99943 100	40	2.5 m Recommendation ITU-R S.1428
	–182.4 –148 –140 –140	0 99.98 99.99943 100	1 000	

TABLE **S22-1C** *(end)*

Frequency band (GHz)	**epfd↓ (dB(W/m^2))**	**Percentage of time during which epfd↓ may not be exceeded**	**Reference bandwidth (kHz)**	**Reference antenna diameter and reference radiation pattern** [7]
19.7-20.2	–200.4 –189.4 –187.8 –184 –175 –164.2 –154.6 –154 –154	0 90 94 97.143 99.886 99.99 99.999 99.9992 100	40	5 m Recommendation ITU-R S.1428
	–186.4 –175.4 –173.8 –170 –161 –150.2 –140.6 –140 –140	0 90 94 97.143 99.886 99.99 99.999 99.9992 100	1 000	

ADD

TABLE **S22-1D**

Limits to the epfd↓ radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands into 30 cm, 45 cm, 60 cm, 90 cm, 120 cm, 180 cm, 240 cm and 300 cm broadcasting-satellite service antennas[6, 9, 10, 11]

Frequency band (GHz)	**epfd↓ (dB(W/m^2))**	**Percentage of time during which epfd↓ may not be exceeded**	**Reference bandwidth (kHz)**	**Reference antenna diameter and reference radiation pattern** [12]
11.7-12.5 in Region 1; 11.7-12.2 and 12.5-12.75 in Region 3; 12.2-12.7 in Region 2	–165.841 –165.541 –164.041 –158.6 –158.6 –158.33 –158.33	0 25 96 98.857 99.429 99.429 100	40	30 cm Recommendation ITU-R BO.1443, Annex 1
	–175.441 –172.441 –169.441 –164 –160.75 –160 –160	0 66 97.75 99.357 99.809 99.986 100	40	45 cm Recommendation ITU-R BO.1443, Annex 1

TABLE **S22-1D** *(continued)*

Frequency band (GHz)	**epfd↓ (dB(W/m²))**	**Percentage of time during which epfd↓ may not be exceeded**	**Reference bandwidth (kHz)**	**Reference antenna diameter and reference radiation pattern** [12]
11.7-12.5 in Region 1; 11.7-12.2 and 12.5-12.75 in Region 3; 12.2-12.7 in Region 2	–176.441 –173.191 –167.75 –162 –161 –160.2 –160 –160	0 97.8 99.371 99.886 99.943 99.971 99.997 100	40	60 cm Recommendation ITU-R BO.1443, Annex 1
	–178.94 –178.44 –176.44 –171 –165.5 –163 –161 –160 –160	0 33 98 99.429 99.714 99.857 99.943 99.991 100	40	90 cm Recommendation ITU-R BO.1443, Annex 1
	–182.44 –180.69 –179.19 –178.44 –174.94 –173.75 –173 –169.5 –167.8 –164 –161.9 –161 –160.4 –160	0 90 98.9 98.9 99.5 99.68 99.68 99.85 99.915 99.94 99.97 99.99 99.998 100	40	120 cm Recommendation ITU-R BO.1443, Annex 1
	–184.941 –184.101 –181.691 –176.25 –163.25 –161.5 –160.35 –160 –160	0 33 98.5 99.571 99.946 99.974 99.993 99.999 100	40	180 cm Recommendation ITU-R BO.1443, Annex 1

TABLE **S22-1D** *(end)*

Frequency band (GHz)	**epfd↓ (dB(W/m²))**	**Percentage of time during which epfd↓ may not be exceeded**	**Reference bandwidth (kHz)**	**Reference antenna diameter and reference radiation pattern** [12]
11.7-12.5 in Region 1; 11.7-12.2 and 12.5-12.75 in Region 3; 12.2-12.7 in Region 2	–187.441 –186.341 –183.441 –178 –164.4 –161.9 –160.5 –160 –160	0 33 99.25 99.786 99.957 99.983 99.994 99.999 100	40	240 cm Recommendation ITU-R BO.1443, Annex 1
	–191.941 –189.441 –185.941 –180.5 –173 –167 –162 –160 –160	0 33 99.5 99.857 99.914 99.951 99.983 99.991 100	40	300 cm Recommendation ITU-R BO.1443, Annex 1

[9] **S22.5C.8** For broadcasting-satellite service antenna diameters 180 cm, 240 cm and 300 cm, in addition to the single-entry limits shown in Table **S22-1D**, the following single-entry 100% of the time epfd↓ limits also apply in the frequency bands listed in Table **S22-1D**:

100% of the time epfd↓ (dB(W/(m² · 40 kHz)))	**Latitude (North or South) (degrees)**
–160	0 < |Latitude| ≤ 57.5
–160 + 3.4 (57.5 – |Latitude|)/4	57.5 < |Latitude| ≤ 63.75
–165.3	63.75 < |Latitude|

[10] **S22.5C.9** For a broadcasting-satellite service earth station antenna diameter of 240 cm, in addition to the single-entry 100% of the time epfd↓ limit specified in No. **S22.5C.8** to this Table, a single-entry 100% of the time operational epfd↓ limit is specified in Table **S22-4C**.

[11] **S22.5C.10** In meeting these limits, the administrations intending to develop such systems shall ensure that the assignments appearing in the Plans of Appendix **S30** will be fully protected.

[12] **S22.5C.11** For this Table, reference patterns of Annex 1 to Recommendation ITU-R BO.1443 shall be used only for the calculation of interference from non-geostationary satellite systems in the fixed-satellite service into geostationary-satellite systems in the broadcasting-satellite service.

MOD

S22.5D 3) The equivalent power flux-density[13], epfd↑, produced at any point in the geostationary-satellite orbit by emissions from all the earth stations in a non-geostationary satellite system in the fixed-satellite service in the frequency bands listed in Table **S22-2**, for all conditions and for all methods of modulation, shall not exceed the limits given in Table **S22-2** for the specified percentages of time. These limits relate to the equivalent power flux-density which would be obtained under free-space propagation conditions, into a reference antenna and in the reference bandwidth specified in Table **S22-2**, for all pointing directions towards the Earth's surface visible from any given location in the geostationary-satellite orbit.

MOD

[13] **S22.5D.1** See No. **S22.5C.1**.

MOD

TABLE **S22-2**

Limits to the epfd↑ radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands[14]

Frequency band (GHz)	**epfd↑ (dB(W/m^2))**	**Percentage of time epfd↑ level may not be exceeded**	**Reference bandwidth (kHz)**	**Reference antenna beamwidth and reference radiation pattern** [15]
12.50-12.75 12.75-13.25 13.75-14.5	–160	100	40	4° Recommendation ITU-R S.672-4, *Ls* = –20
17.3-18.1 (Regions 1 and 3) 17.8-18.1 (Region 2) [16]	–160	100	40	4° Recommendation ITU-R S.672-4, *Ls* = –20
27.5-28.6	–162	100	40	1.55° Recommendation ITU-R S.672-4, *Ls* = –10
29.5-30	–162	100	40	1.55° Recommendation ITU-R S.672-4, *Ls* = –10

[14] **S22.5D.2** In meeting these limits, the administrations intending to develop such systems shall ensure that the assignments appearing in the Plans of Appendices **S30A** and **S30B** will be fully protected.

[15] **S22.5D.3** For this Table, reference patterns of Recommendation ITU-R S.672-4 shall be used only for the calculation of interference from non-geostationary-satellite systems in the fixed-satellite service into geostationary-satellite systems in the fixed-satellite service. For the case of *Ls* = –10, the values *a* = 1.83 and *b* = 6.32 shall be used in the equations in Annex 1 to Recommendation ITU-R S.672-4 for single-feed circular beams. In all cases of *Ls*, the parabolic main beam equation shall start at zero.

[16] **S22.5D.4** This epfd↑ level also applies to the frequency band 17.3-17.8 GHz to protect broadcasting-satellite service feeder links in Region 2 from non-geostationary fixed-satellite service Earth-to-space transmissions in Regions 1 and 3.

SUP

S22.5E

SUP

S22.5E.1

MOD

S22.5F 4) The equivalent power flux-density[17], $epfd_{is}$, produced at any point in the geostationary-satellite orbit by emissions from all the space stations in a non-geostationary-satellite system in the fixed-satellite service in the frequency bands listed in Table **S22-3**, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limits given in Table **S22-3** for the specified percentages of time. These limits relate to the equivalent power flux-density which would be obtained under free-space propagation conditions into a reference antenna and in the reference bandwidth specified in Table **S22-3**, for all pointing directions towards the Earth's surface visible from any given location in the geostationary-satellite orbit.

MOD

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[17] **S22.5F.1** See No. **S22.5C.1**.

MOD

TABLE **S22-3**

Limits to the $epfd_{is}$ radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands[18]

Frequency band (GHz)	**$epfd_{is}$ (dB(W/m^2))**	**Percentage of time during which $epfd_{is}$ level may not be exceeded**	**Reference bandwidth (kHz)**	**Reference antenna beamwidth and reference radiation pattern** [19]
10.7-11.7 (Region 1) 12.5-12.75 (Region 1) 12.7-12.75 (Region 2)	–160	100	40	4° Recommendation ITU-R S.672-4, *Ls* = –20
17.8-18.4	–160	100	40	4° Recommendation ITU-R S.672-4, *Ls* = –20

[18] **S22.5F.2** In meeting these limits, the administrations intending to develop such systems shall ensure that the assignments appearing in the feeder-link Plans of Appendix **S30A** will be fully protected.

[19] **S22.5F.3** In this Table, the reference pattern of Recommendation ITU-R S.672-4 shall be used only for the calculation of interference from non-geostationary-satellite systems in the fixed-satellite service into geostationary-satellite systems in the fixed-satellite service. In applying the equations of Annex 1 to Recommendation ITU-R S.672-4, the parabolic main beam equation shall start at zero.

SUP

S22.5G

ADD

S22.5H 5) The limits specified in Nos. **S22.5C** to **S22.5D** and **S22.5F** apply to non-geostationary-satellite systems in the fixed-satellite service for which complete coordination or notification information, as appropriate, has been received by the Bureau after 22 November 1997. The limits in Tables **S22-4A**, **S22-4A1**, **S22-4B** and **S22-4C** do not apply to non-geostationary-satellite systems in the fixed-satellite service for which complete coordination or notification information, as appropriate, has been received by the Bureau before 22 November 1997.

ADD

S22.5I 6) An administration operating a non-geostationary-satellite system in the fixed-satellite service which is in compliance with the limits in Nos. **S22.5C**, **S22.5D** and **S22.5F** shall be considered as having fulfilled its obligations under No. **S22.2** with respect to any geostationary-satellite network, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite system and the geostationary-satellite network, provided that the epfd$_{\downarrow}$ radiated by the non-geostationary-satellite system in the fixed-satellite service into any operating geostationary fixed-satellite service earth station does not exceed the operational and additional operational limits given in Tables **S22-4A**, **S22-4A1**, **S22-4B** and **S22-4C**, when the diameter of the earth station antenna is equal to the values given in Table **S22-4A**, **S22-4A1** or **S22-4C**, or the gain of the earth station is equal to or greater than the values given in Table **S22-4B** for the corresponding orbital inclination of the geostationary fixed-satellite service satellite. Except as otherwise agreed between concerned administrations, an administration operating a non-geostationary-satellite system in the fixed-satellite service that is subject to the limits in Nos. **S22.5C**, **S22.5D** and **S22.5F** and which radiates epfd$_{\downarrow}$ into any operating geostationary fixed-satellite service earth station at levels in excess of the operational or additional operational limits given in Tables **S22-4A**, **S22-4A1**, **S22-4B** and **S22-4C**, when the diameter of the earth station antenna is equal to the values given in Table **S22-4A**, **S22-4A1** or **S22-4C**, or the gain of the earth station is equal to or greater than the values given in Table **S22-4B** for the corresponding orbital inclination of the geostationary fixed-satellite service satellite, shall be considered to be in violation of its obligations under No. **S22.2**.

SUP

TABLE **S22-4**

ADD

TABLE **S22-4A**

Operational limits to the epfd↓ radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands[20, 21, 22]

Frequency band (GHz)	**epfd↓ (dB(W/m²))**	**Percentage of time during which epfd↓ may not be exceeded**	**Reference bandwidth (kHz)**	**Geostationary-satellite system receive earth station antenna diameter** [23] **(m)**	**Orbital inclination of the geostationary satellite (degrees)**
10.7-11.7 in all Regions 11.7-12.2 in Region 2 12.2-12.5 in Region 3, and 12.5-12.75 in Regions 1 and 3 (prior to 31 December 2005)	–163 –166 –167.5 –169.5	100	40	3 6 9 ≥ 18	≤ 2.5
	–160 –163 –164.5 –166.5	100	40	3 6 9 ≥ 18	> 2.5 and ≤ 4.5
10.7-11.7 in all Regions 11.7-12.2 in Region 2 12.2-12.5 in Region 3, and 12.5-12.75 in Regions 1 and 3 (from 31 December 2005)	–161.25 –164 –165.5 –167.5	100	40	3 6 9 ≥ 18	≤ 2.5
	–158.25 –161 –162.5 –164.5	100	40	3 6 9 ≥ 18	> 2.5 and ≤ 4.5

[20] **S22.5H.1** For certain geostationary fixed-satellite service receive earth stations, see also Nos. **S9.7A** and **S9.7B**.

[21] **S22.5H.2** In addition to the operational limits shown in Table **S22-4A**, the additional operational limits in Table **S22-4A1** apply to certain geostationary fixed-satellite service earth station antenna sizes in the frequency bands listed in Table **S22-4A**.

[22] **S22.5H.3** The operational limits on the epfd↓ radiated by non-geostationary-satellite systems in the fixed-satellite service shall be the values given in No. **S22.5C.4** or Table **S22-4A**, whichever are the more stringent.

[23] **S22.5H.4** For antenna diameters between the values given in this Table, the limits are given by linear interpolation using a linear scale for epfd↓ (dB) and a logarithmic scale for antenna diameter (m).

ADD

TABLE **S22-4A1**

Additional operational limits to the epfd↓ radiated by non-geostationary-satellite systems in the fixed-satellite service into 3 m and 10 m geostationary fixed-satellite service earth station antennas

epfd↓ (dB(W/(m^2 · 40 kHz)))	Percentage of time during which epfd↓ may not be exceeded	Geostationary-satellite system receive earth station antenna diameter (m)
–182	99.9	3
–179	99.94	
–176	99.97	
–171	99.98	
–168	99.984	
–165	99.993	
–163	99.999	
–161.25	99.99975	
–161.25	100	
–185	99.97	10
–183	99.98	
–179	99.99	
–175	99.996	
–171	99.998	
–168	99.999	
–166	99.9998	
–166	100	

ADD

TABLE **S22-4B**

Operational limits to the epfd↓ radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands[20]

Frequency band (GHz)	epfd↓ (dB(W/m^2))	Percentage of time during which epfd↓ may not be exceeded	Reference bandwidth (kHz)	Geostationary-satellite system receive earth station antenna gain (dBi)	Orbital inclination of geostationary satellite (degrees)
19.7-20.2	–157	100	40	≥ 49	≤ 2.5
	–157	100	40	≥ 43 [24]	≤ 2.5
	–155	100	40	≥ 49	> 2.5 and ≤ 4.5
19.7-20.2	–143	100	1 000	≥ 49	≤ 2.5
	–143	100	1 000	≥ 43 [24]	≤ 2.5
	–141	100	1 000	≥ 49	> 2.5 and ≤ 4.5
17.8-18.6	–164	100	40	≥ 49	≤ 2.5
	–162	100	40	≥ 49	> 2.5 and ≤ 4.5
17.8-18.6	–150	100	1 000	≥ 49	≤ 2.5
	–148	100	1 000	≥ 49	> 2.5 and ≤ 4.5

[24] **S22.5H.5** The operational limit applies to non-geostationary-satellite systems operating at altitudes of 7 000 km or above in order to protect geostationary-satellite systems in the fixed-satellite service employing adaptive coding.

ADD

TABLE **S22-4C**

Operational limits to the epfd↓ radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands[25]

Frequency band (GHz)	epfd↓ (dB(W/m^2))	Percentage of time during which epfd↓ may not be exceeded	Reference bandwidth (kHz)	Geostationary-satellite system receive earth station antenna diameter (m)	Orbital inclination of geostationary satellite (degrees)
12.2-12.7 GHz in Region 2	–167	100	40	≥ 2.4	≤ 0.5

[25] **S22.5C.6** These limits apply into geostationary-satellite system earth stations located in Region 2 west of 140° W, north of 60° N, pointing toward geostationary satellites in the broadcasting-satellite service at 91° W, 101° W, 110° W, 119° W and 148° W with elevation angles greater than 5°. This limit is implemented during a transition period of 15 years.

ADD

S22.5J 7) In case of *force majeure*, telecommand and ranging carriers transmitted to non-geostationary satellites in the fixed-satellite service are not subject to the limits given in Table **S22-2**.

ADD

S22.5K 8) Administrations operating or planning to operate non-geostationary-satellite systems in the fixed-satellite service in the bands listed in Tables **S22-1A** to **S22-1D** of No. **S22.5C** will apply the provisions of Resolution **76 (WRC-2000)** to ensure that the actual aggregate interference into geostationary fixed-satellite service and geostationary broadcasting-satellite service networks caused by such systems operating co-frequency in these frequency bands does not exceed the aggregate power levels shown in Tables **1A** to **1D** of Resolution **76 (WRC-2000)**. In the event that an administration operating a geostationary-satellite network in conformity with the Radio Regulations identifies equivalent power flux-density levels from non-geostationary-satellite systems in the fixed-satellite service which may be in excess of the aggregate limits contained in Tables **1A** to **1D** of Resolution **76 (WRC-2000)**, the administrations responsible for the non-geostationary-satellite systems in the fixed-satellite service will apply the provisions contained in *resolves* 2 of Resolution **76 (WRC-2000)**.

MOD

Section VI – Off-axis power limits on earth stations of a geostationary-satellite network in the fixed-satellite service[26, 27]

MOD

[26] **S22.VI.1** The provisions of this section shall not be used for coordination of, or to evaluate interference between, geostationary fixed-satellite service networks (see No. **S9.50.1**).

ADD

[27] **S22.VI.2** Although the provisions of this section cover off-axis power limitations in all directions, the radiation pattern of geostationary fixed-satellite service earth station antennas in more than two orthogonal planes is not required.

MOD

S22.26 § 9 The level of equivalent isotropically radiated power (e.i.r.p.) emitted by an earth station of a geostationary-satellite network shall not exceed the following values for any off-axis angle φ which is 3° or more off the main-lobe axis of an earth station antenna:

Off-axis angle	*Maximum e.i.r.p.*
$3° \leq \varphi \leq 7°$	$42 - 25 \log \varphi$ dB(W/40 kHz)
$7° < \varphi \leq 9.2°$	21 dB(W/40 kHz)
$9.2° < \varphi \leq 48°$	$45 - 25 \log \varphi$ dB(W/40 kHz)
$48° < \varphi \leq 180°$	3 dB(W/40 kHz)

MOD

S22.27 For frequency-modulated television emissions with energy dispersal, the limits in No. **S22.26** above may be exceeded by up to 3 dB, provided that the off-axis total e.i.r.p. of the transmitted frequency-modulated television carrier does not exceed the following values:

Off-axis angle	*Maximum e.i.r.p.*
$3° \leq \varphi \leq 7°$	$56 - 25 \log \varphi$ dBW
$7° < \varphi \leq 9.2°$	35 dBW
$9.2° < \varphi \leq 48°$	$59 - 25 \log \varphi$ dBW
$48° < \varphi \leq 180°$	17 dBW

MOD

S22.28 Frequency-modulated television carriers which operate without energy dispersal should be modulated at all times with programme material or appropriate test patterns. In this case, the off-axis total e.i.r.p. of the emitted frequency-modulated television carrier shall not exceed the following values:

Off-axis angle	*Maximum e.i.r.p.*
$3° \leq \varphi \leq 7°$	$56 - 25 \log \varphi$ dBW
$7° < \varphi \leq 9.2°$	35 dBW
$9.2° < \varphi \leq 48°$	$59 - 25 \log \varphi$ dBW
$48° < \varphi \leq 180°$	17 dBW

ADD

S22.30 The e.i.r.p. limits given in Nos. **S22.26**, **S22.27**, **S22.28** and **S22.32** do not apply to earth station antennas in service or ready to be in service[28] prior to 2 June 2000, nor to earth stations associated with a satellite network in the fixed-satellite service for which complete coordination or notification information has been received before 2 June 2000.

ADD

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[28] **S22.30.1** "Ready to be in service" relates to the case where antennas have been installed but the start of service has been delayed due to *force majeure*.

ADD

S22.31 Telecommand and ranging[29] carriers transmitted to geostationary satellites in the fixed-satellite service in normal mode of operation (i.e. earth station transmitting telecommand and ranging carriers to a directional receiving antenna on the space station) may exceed the levels given in No. **S22.26** by no more than 16 dB in the frequency bands 12.75-13.25 GHz and 13.75-14.5 GHz. In all other modes of operation, and in case of *force majeure,* telecommand and ranging carriers transmitted to geostationary satellites in the fixed-satellite service are exempted from the levels given in No. **S22.26**.

ADD

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[29] **S22.31.1** Measurement of the distance to the satellite.

ADD

S22.32 § 10 The level of equivalent isotropically radiated power (e.i.r.p.) density emitted by an earth station in a geostationary-satellite network in the 29.5-30 GHz frequency band shall not exceed the following values for any off-axis angle φ which is 3° or more off the main-lobe axis of an earth station antenna:

Off-axis angle	*Maximum e.i.r.p. density*
$3° \leq \varphi \leq 7°$	$28 - 25 \log \varphi$ dB(W/40 kHz)
$7° < \varphi \leq 9.2°$	7 dB(W/40 kHz)
$9.2° < \varphi \leq 48°$	$31 - 25 \log \varphi$ dB(W/40 kHz)
$48° < \varphi \leq 180°$	−1 dB(W/40 kHz)

ADD

S22.33 Not used.

ADD

S22.34 Telecommand and ranging carriers transmitted to geostationary satellites in the fixed-satellite service in normal mode of operation (i.e. earth station transmitting telecommand and ranging carriers to a directional receiving antenna on the space station) may exceed the levels given in No. **S22.32** by no more than 10 dB in the frequency band 29.5-30 GHz. In all other modes of operation, and in case of *force majeure,* telecommand and ranging carriers transmitted to geostationary satellites in the fixed-satellite service are exempted from the levels given in No. **S22.32**.

ADD

S22.35 For geostationary-satellite systems in which the earth stations are expected to transmit simultaneously in the same 40 kHz band, e.g. for geostationary-satellite systems employing code-division multiple access, the maximum e.i.r.p. values given in No. **S22.32** should be decreased by 10 log(N) dB, where N is the number of earth stations which are in the receive satellite beam of the satellite with which these earth stations are communicating and which are expected to transmit simultaneously on the same frequency.

ADD

S22.36 Earth stations operating in the frequency band 29.5-30 GHz should be designed in such a manner that 90% of their peak off-axis e.i.r.p. density levels do not exceed the values given in No. **S22.32**. Further study is needed to determine the off-axis angular range over which these exceedences would be permitted, taking into account the interference level into adjacent satellites. The statistical processing of the off-axis e.i.r.p. density peaks should be carried out using the method given in Recommendation ITU-R S.732.

ADD

S22.37 The limits given in Nos. **S22.26** to **S22.28** and **S22.32** apply under clear-sky conditions. During rain-fade conditions, the limits may be exceeded by earth stations when using uplink power control.

ADD

S22.38 Earth stations in the fixed-satellite service operating in the 29.5-30 GHz band, which have lower elevation angles to the geostationary-satellite orbit, will require higher e.i.r.p. levels relative to the same terminals at higher elevation angles to achieve the same power flux-densities at the geostationary-satellite orbit, due to the combined effect of increased distance and atmospheric absorption. Earth stations with low elevation angles may exceed the levels given in No. **S22.32** by the following amounts:

Elevation angle to geostationary-satellite orbit (ε)	*Increase in e.i.r.p. density* (dB)
$\varepsilon \leq 5°$	2.5
$5° < \varepsilon \leq 30°$	$0.1(25 - \varepsilon) + 0.5$

ADD

S22.39 The values in No. **S22.32** applicable to the off-axis angle range from 48° to 180° are intended to account for spillover effects.

ARTICLE S23

Broadcasting services

ADD

S23.13A If the Bureau receives an indication of a written agreement under No. **S23.13**, it shall include reference to that agreement when the assignments to the system are recorded with reference to No. **S23.13** in the Remarks column of the Master International Frequency Register or included in the Regions 1 and 3 List.

ADD

S23.13B If, within the four-month period following the publication of the Special Section for a broadcasting-satellite service (except sound broadcasting) network submitted for coordination under Article **S9** or Appendix **S30**, an administration informs the Bureau that all technical means have not been used to reduce the radiation over its territory, the Bureau shall draw the attention of the responsible administration to the comments received. The Bureau shall request the two administrations to make every effort possible in order to resolve the issue. Either administration may request the Bureau to study the matter and submit its report to the administrations concerned. If no agreement can be reached, then the Bureau shall delete the territory of the objecting administration from the service area without adversely affecting the rest of the service area and inform the responsible administration.

ADD

S23.13C If, after the four-month period mentioned above, an administration objects to remaining in the service area, the Bureau shall delete the territory of the objecting administration from the service area of the broadcasting-satellite service (except sound broadcasting) network concerned without adversely affecting the rest of the service area and inform the responsible administration.

ARTICLE S52

Special rules relating to the use of frequencies

Section VI – Use of frequencies for radiotelephony

C2 – Call and reply

ADD

S52.220A Administrations should encourage the coast stations and ship stations under their jurisdiction to use digital selective calling techniques for call and reply.

ADD

S52.220B § 96A When calling by radiotelephony is necessary, it should be done (in order of preference):

ADD

S52.220C 1) on the working frequencies assigned to the coast stations; or

ADD

S52.220D 2) when this is not possible, on the calling frequencies listed under No. **S52.221** or **S52.221A** below.

MOD

S52.221 § 97 1) Ship stations may use the following carrier frequencies for calling in radiotelephony:

4 125 kHz[3, 4, 5]
6 215 kHz[4, 5]
8 255 kHz
12 290 kHz[5] (see also No. **S52.221A**)
16 420 kHz[5] (see also No. **S52.221A**)
18 795 kHz
22 060 kHz
25 097 kHz

ADD

S52.221A Calling on the carrier frequencies 12 290 kHz and 16 420 kHz shall cease as soon as possible and no later than 31 December 2003. The alternative carrier frequencies 12 359 kHz and 16 537 kHz may be used by ship stations and coast stations for calling on a simplex basis, provided that the peak envelope power does not exceed 1 kW.

MOD

S52.222 2) Coast stations may use the following carrier frequencies for calling in radiotelephony[6]:

4 417 kHz[7]
6 516 kHz[7]
8 779 kHz
13 137 kHz (see No. **S52.222A**)
17 302 kHz (see No. **S52.222A**)
19 770 kHz
22 756 kHz
26 172 kHz

ADD

S52.222A The carrier frequencies 13 137 kHz and 17 302 kHz shall not be used as calling frequencies after 31 December 2003. The alternative carrier frequencies 12 359 kHz and 16 537 kHz may be used by ship stations and coast stations for calling on a simplex basis, provided that the peak envelope power does not exceed 1 kW.

MOD

S52.224 § 99 1) Before transmitting on the carrier frequencies 4 125 kHz, 6 215 kHz, 8 291 kHz, 12 290 kHz or 16 420 kHz a station shall listen on the frequency for a reasonable period to make sure that no distress traffic is being sent (see No. **S52.221A** and Recommendation ITU-R M.1171).

ARTICLE S59

MOD

Entry into force and provisional application of the Radio Regulations

MOD

S59.1 These Regulations, which complement the provisions of the Constitution and Convention of the International Telecommunication Union, and as revised and contained in the Final Acts of WRC-95, WRC-97 and WRC-2000, shall be applied, pursuant to Article 54 of the Constitution, on the following basis.

MOD

S59.3 The other provisions of these Regulations, as revised by WRC-95 and WRC-97, apply provisionally as of 1 January 1999, with the following exceptions:

ADD

S59.5 The other provisions of these Regulations, as revised by WRC-2000, shall enter into force on 1 January 2002, with the following exceptions:

ADD

S59.6 – the revised provisions for which other effective dates of application are stipulated in Resolutions **49 (Rev.WRC-2000)**, **51 (Rev.WRC-2000)**, **53 (Rev.WRC-2000)**, **55 (WRC-2000)**, **56 (WRC-2000)**, **58 (WRC-2000), 59 (WRC-2000)**, **77 (WRC-2000)**, **84 (WRC-2000)**, **122 (Rev.WRC-2000)**, **128 (Rev.WRC-2000)**, **533 (Rev.WRC-2000)**, **539 (WRC-2000)**, **540 (WRC-2000)**, **541 (WRC-2000), 542 (WRC-2000), 604 (WRC-2000)** and **605 (WRC-2000).**

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APPENDICES

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APPENDIX S3

Table of maximum permitted spurious emission power levels

(See Article **S3**)

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

MOD

6 Radar systems are exempt from spurious emission limits under this Section. The lowest practicable power of spurious emission should be achieved.

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

MOD

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 accurately measure the power supplied to the antenna transmission line (for example, radars), or for specific applications where the antenna is designed to provide significant attenuation at the spurious frequencies. Additionally, the e.i.r.p. method may need some modification for special cases, e.g. beam forming radars.

ADD

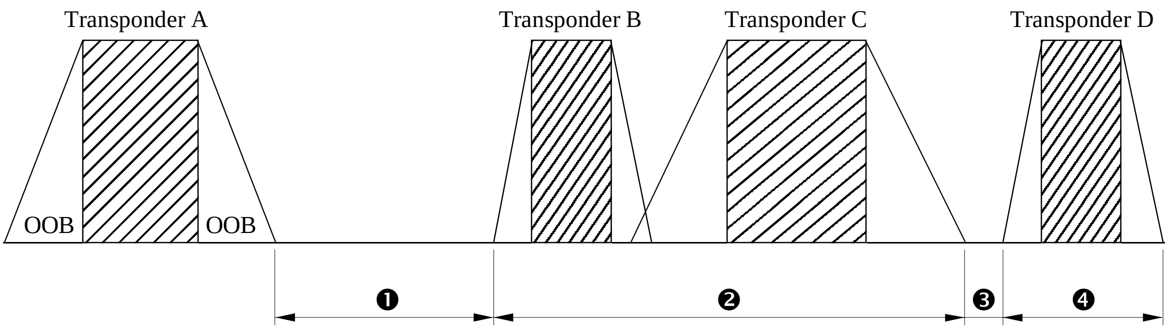
11*bis* As the bandwidth of an emitted signal becomes more and more narrow (to the limiting case of an unmodulated carrier with a theoretical necessary bandwidth of zero), the application of the term "necessary bandwidth" as used in determining the region where spurious emission limits apply to space services becomes more and more difficult. In the limiting case, ±250% of necessary bandwidth (recognized in many cases as establishing the region beyond which spurious emissions are defined) approaches zero. Radio beacon signals and other unmodulated signals, such as those used in uplink and downlink circuits in control and tracking of satellites, are examples of a case where it is difficult in practice to apply the concept of "necessary bandwidth" in determining where out-of-band emissions end, and spurious emissions begin. Pending further studies and definitive action by a future world radiocommunication conference for determining the portion of spectrum where spurious emission limits apply for transmitters using amplifiers to pass an essentially unmodulated signal (or a signal with very small bandwidth), the amplifier bandwidth is taken to be the necessary bandwidth.

ADD

11*ter* For the case of a single satellite operating with more than one transponder in the same service area, and when considering the limits for spurious emissions as indicated in § 11 of this Appendix, spurious emissions from one transponder may fall on a frequency at which a second, companion transponder is transmitting. In these situations, the level of spurious emissions from the first transponder is well exceeded by the fundamental or out-of-band emissions of the second transponder. Therefore, the limits of this Appendix should not apply to those spurious emissions of a satellite that fall within either the necessary bandwidth or the out-of-band region of another transponder on the same satellite, in the same service area (see Fig. 1).

FIGURE 1

Example of the applicability of spurious emission limits to a satellite transponder



CMR-2000/256-01

Transponders A, B, C and D are operating on the same satellite in the same service area. Transponder A is not required to meet spurious emission limits in frequency ranges ❷ and ❹, but is required to meet them in frequency ranges ❶ and ❸.

MOD

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, 16]	43 + 10 log (*P*), or 60 dBc, whichever is less stringent
Space services (space stations) [10, 17]	43 + 10 log (*P*), or 60 dBc, whichever is less stringent
Radiodetermination [14]	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 those using SSB) [16]	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
Low-power device radio equipment [13]	56 + 10 log (*P*), or 40 dBc, whichever is less stringent
Emergency transmitters [18]	No limit

MOD

14 For radiodetermination systems (radar as defined by No. **S1.100**), spurious emission attenuation (dB) shall be determined for radiated emission levels, and not at the antenna transmission line. The measurement methods for determining the radiated spurious emission levels from radar systems should be guided by Recommendation ITU-R M.1177.

ADD

16 Earth stations in the amateur-satellite service operating below 30 MHz are in the service category "Amateur services operating below 30 MHz (including those using SSB)".

ADD

17 Space stations in the space research service intended for operation in deep space as defined by No. **S1.177** are exempt from spurious emission limits.

ADD

18 Emergency position-indicating radio beacon, emergency locator transmitters, personal location beacons, search and rescue transponders, ship emergency, lifeboat and survival craft transmitters and emergency land, aeronautical or maritime transmitters.

APPENDIX S4

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

ANNEX 1A

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

MOD

ITEM B – Notifying administration

Symbol of the notifying administration.

MOD

ITEM SYNC – Synchronized network

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

ADD

ITEM 1AA – Usable frequency range

For MF/HF adaptive systems, the difference between the maximum and minimum assignable frequencies of a distinct frequency band.

SUP

ITEM 1D

MOD

ITEM 1E – Frequency offset, in terms of the line frequency

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

ADD

ITEM 1E1 – Frequency offset (kHz)

The carrier frequency offset (kHz) expressed by a number (positive or negative).

SUP

ITEM 1H

MOD

ITEM 3A – Call sign or station identification

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

MOD

ITEM 4A – Name of the location of the transmitting station

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

MOD

ITEM 4B – Country or geographical area

Symbol of the geographical area in which the station is located.

SUP

ITEM 4F

MOD

ITEM 5A – Name of the location of the receiving station

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

MOD

ITEM 5B – Country or geographical area

Symbol of the geographical area in which the receiving station is located.

ADD

ITEM 7A1 – Frequency stability

Frequency stability for analogue television (RELAXED, NORMAL or PRECISION).

MOD

ITEM 7AA – Type of modulation

For HF broadcasting stations in their exclusive bands, a symbol which specifies the use of DSB, SSB or any new modulation techniques recommended by ITU-R.

ADD

ITEM 7B1 – Adjacent channel protection ratio

For assignments to stations of the broadcasting service covered by the LF/MF Broadcasting Agreement (Regions 1 and 3) (Geneva, 1975), the protection ratio (dB) to be used for adjacent channel interference calculations.

MOD

ITEM 7D – Transmission system

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

MOD

ITEM 8A – Power delivered to the antenna

The power delivered to the antenna transmission line expressed in dBW, with the exception of LF/MF sound broadcasting, for which the power delivered to the antenna shall be expressed in kW.

MOD

ITEM 8B – Radiated power (dBW)

The radiated power expressed in dBW in one of the forms described in Nos. **S1.161** to **S1.163**.

ADD

ITEM 8BA – Range of power control

In the case of systems where automatic power control is applied, the range of power control (dB) above the nominal power indicated in item 8B.

MOD

ITEM 8BH – Maximum effective radiated power (dBW) – horizontal

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

MOD

ITEM 8BV – Maximum effective radiated power (dBW) – vertical

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

MOD

ITEM 8D – Vision/sound power ratio

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

MOD

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.

MOD

ITEM 9AA – Central azimuth of augmentation

The central azimuth of the augmentation (centre of the span) in degrees for an assignment to an MF broadcasting station in Region 2.

MOD

ITEM 9CA – Total span of augmentation

The total span of the augmentation in degrees for an assignment to an MF broadcasting station in Region 2.

SUP

ITEM 9H

MOD

ITEM 9I – Maximum radiation or r.m.s. value of radiation

The maximum radiation (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.

For assignments to stations of the broadcasting service covered by the MF Broadcasting Agreement (Region 2) (Rio de Janeiro, 1981), the product of the r.m.s. characteristic field strength, calculated in the horizontal plane, and the square root of the power.

ADD

ITEM 9L – Maximum effective radiated power (dB(kW))

The maximum effective radiated power, expressed in dB relative to an e.r.p. of 1 kW on a short vertical antenna.

SUP

ITEM 9N

MOD

ITEM 9NH – Attenuation (dB) of the horizontally polarized component at different azimuths

The value of attenuation of the horizontally polarized component in the horizontal plane at different azimuths, with respect to the maximum e.r.p. of this component, expressed in dB.

MOD

ITEM 9NV – Attenuation (dB) of the vertically polarized component at different azimuths

The value of attenuation of the vertically polarized component in the horizontal plane at different azimuths, with respect to the maximum e.r.p. of this component, expressed in dB.

MOD

ITEM 9Q – Type of antenna

Symbol designating a simple vertical antenna or any other antenna.

MOD

ITEM 9R – Slew angle

For HF broadcasting stations in their exclusive bands, the slew angle represents the difference between the azimuth of maximum radiation and the direction of unslewed radiation.

MOD

ITEM 9T3 – Phase difference of the field

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

SUP

ITEM 9T6

MOD

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

Description of top-loaded or sectionalized towers, in accordance with the Regional Administrative MF Broadcasting Conference (Region 2) (Rio de Janeiro, 1981) Agreement.

SUP

ITEM 10A

MOD

ITEM 10CA – Start date

For HF broadcasting stations in their exclusive bands, this parameter is used in the case that the requirement starts after the start of the schedule.

MOD

ITEM 10CB – Stop date

For HF broadcasting stations in their exclusive bands, this parameter is used in the case that the requirement stops before the end of the schedule.

MOD

ITEM 10CC – Days of operation

For HF broadcasting stations in their exclusive bands, this parameter is used when the station does not transmit every day of the week.

MOD

ITEM 11 – Coordination with other administrations

Symbol of the administration with which coordination has been effected and the provision (No. of the Radio Regulations, regional agreement, or other arrangement) requiring such coordination.

SUP

ANNEX 1B

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

ADD

ANNEX 1B

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

Notice type	**T01**	**T02**	**T03**	**T04**	**T11**	**T12**			**T13**		**T14**	**T15**	**T16**	**T17**		**AR S12**	**Notice type**
Item No.	**BC**	**BT**	**BC**	**BC**	**FX**	**AL, BC[1], FA, FB, FC, FL, FP, LR, OE, RN, SS**	**FD, FG, SM**	**NL**	**AM, MA, ML, MO, MR, MS, NR, OD, SA**	**RM**	**AL[2], FA[3], FB[3], FC[2], FD[2], FG[2], FL, FP, FX[3], LR, NL[2], OE, RN, SM, SS**	**FC[4]**	**AL[5], FC[5]**	**FX**	**FA, FB, FC[2], FD[2], FG[2], FL, FP**	**BC**	**Item No.**
B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	B
SYNC			+	+													SYNC
1A	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	1A
1AA														X	X		1AA
1B					+	+	+	+	+	+	+		+	+	+		1B
1C						+						*[6]				O	1C
1E		*[7,13]															1E
1E1		*[7, 13]															1E1
1G																O	1G
1X												*[6]	O				1X
1Y												O					1Y
1Z												+					1Z
2C	+	+	+	+	X	X	X	X	X	X	X	X		X	X		2C
3A	O	O	O	O	+	+	X	O						+	X	O	3A

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	T01	T02	T03	T04	T11	T12			T13		T14	T15	T16	T17		AR S12	Notice type
Item No.	**BC**	**BT**	**BC**	**BC**	**FX**	**AL, BC[1], FA, FB, FC, FL, FP, LR, OE, RN, SS**	**FD, FG, SM**	**NL**	**AM, MA, ML, MO, MR, MS, NR, OD, SA**	**RM**	**AL[2], FA[3], FB[3], FC[2], FD[2], FG[2], FL, FP, FX[3], LR, NL[2], OE, RN, SM, SS**	**FC[4]**	**AL[5], FC[5]**	**FX**	**FA, FB, FC[2], FD[2], FG[2], FL, FP**	**BC**	**Item No.**
4A	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		4B
4C	X	X	X	X	X	X	X	X	*[8]	X	*[8]	+	X	X	X	X	4C
4D									*[8]	X	*[8]						4D
4E									*[8]		*[8]	X					4E
4G			X														4G
5A					X[9]				X	X				X[9]			5A
5B					X[9]				X	X				X[9]			5B
5C					X[9]	*[10]	*[10]	*	X	X				X[9]	*[10]		5C
5D						*[10]	*[10]					X			*[10]	X	5D
5E						*[10]	*[10]	*					X		*[10]		5E
5F						*[10]	*[10]	*					X		*[10]		5F
5G					O	O	O	O				O		O	O		5G
6A					X	X	X	X	X	X	X	X	X	X	X		6A
6B					X	X	X	X	X	X	X	X	X	X	X		6B
7A	X[11]		X[11]	O	X	X	X	X	X	X	X	X	X	X	X		7A
7A1		+[7]															7A1
7AA																X	7AA
7B				X	+									+			7B
7B1			X														7B1
7C1		X															7C1
7C2		+[7]															7C2
7D	+																7D
7E					+[12]												7E

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	T01	T02	T03	T04	T11	T12			T13		T14	T15	T16	T17		AR S12	Notice type
Item No.	**BC**	**BT**	**BC**	**BC**	**FX**	**AL, BC[1], FA, FB, FC, FL, FP, LR, OE, RN, SS**	**FD, FG, SM**	**NL**	**AM, MA, ML, MO, MR, MS, NR, OD, SA**	**RM**	**AL[2], FA[3], FB[3], FC[2], FD[2], FG[2], FL, FP, FX[3], LR, NL[2], OE, RN, SM, SS**	**FC[4]**	**AL[5], FC[5]**	**FX**	**FA, FB, FC[2], FD[2], FG[2], FL, FP**	**BC**	**Item No.**
7F					+[12]												7F
8					X	X	X	X	X	X	X	X		X	X		8
8A			X	X	*	*	X	*	*	*	*	X		X	X	X	8A
8AB					+[12]												8AB
8B					*	*	*	*	*	*	*			+	+		8B
8BA														O	O		8BA
8BH	X	X															8BH
8BV	X	X															8BV
8D		+[7]															8D
9	X	X			X	X	X	X				X		X	X		9
9A					+	+	+	+				+		+	+	X	9A
9AA				+													9AA
9AB					+	+	+	+				+		+	+		9AB
9B					+	+	+	+									9B
9C					+	+	+	+				+		+	+		9C
9CA				+													9CA
9D	X	X			+												9D
9E	X	+	X		+	+	+	+									9E
9EA	X	+			+	+	+	+									9EA
9EB	X	X															9EB
9EC	+	+															9EC
9F				+													9F
9G					+	+	+	+			+	+		+	+		9G
9GH			+														9GH
9GV			+														9GV

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	T01	T02	T03	T04	T11	T12			T13		T14	T15	T16	T17		AR S12	Notice type
Item No.	**BC**	**BT**	**BC**	**BC**	**FX**	**AL, BC[1], FA, FB, FC, FL, FP, LR, OE, RN, SS**	**FD, FG, SM**	**NL**	**AM, MA, ML, MO, MR, MS, NR, OD, SA**	**RM**	**AL[2], FA[3], FB[3], FC[2], FD[2], FG[2], FL, FP, FX[3], LR, NL[2], OE, RN, SM, SS**	**FC[4]**	**AL[5], FC[5]**	**FX**	**FA, FB, FC[2], FD[2], FG[2], FL, FP**	**BC**	**Item No.**
9I				X													9I
9IA				+													9IA
9J					O	O	O	O						O	O	X	9J
9K					+[12]												9K
9L			X														9L
9NA				+													9NA
9NH	+	+															9NH
9NV	+	+															9NV
9O				+													9O
9P				O													9P
9Q			X	X													9Q
9R																X	9R
9T1				+													9T1
9T2				+													9T2
9T3				+													9T3
9T4				+													9T4
9T5				+													9T5
9T7				+													9T7
9T8				+													9T8
9T9A				+													9T9A
9T9B				+													9T9B
9T9C				+													9T9C
9T9D				+													9T9D
10B	+	+	X	X	X	X	X	X	X	X	X	X	X	X	X		10B
10CA																+	10CA

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	T01	T02	T03	T04	T11	T12			T13		T14	T15	T16	T17		AR S12	Notice type
Item No.	**BC**	**BT**	**BC**	**BC**	**FX**	**AL, BC[1], FA, FB, FC, FL, FP, LR, OE, RN, SS**	**FD, FG, SM**	**NL**	**AM, MA, ML, MO, MR, MS, NR, OD, SA**	**RM**	**AL[2], FA[3], FB[3], FC[2], FD[2], FG[2], FL, FP, FX[3], LR, NL[2], OE, RN, SM, SS**	**FC[4]**	**AL[5], FC[5]**	**FX**	**FA, FB, FC[2], FD[2], FG[2], FL, FP**	**BC**	**Item No.**
10CB																+	10CB
10CC																+	10CC
10D												X					10D
10E												X					10E
11	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O		11
12A	O	O	O	O	O	O	O	O	O	O	O			O	O	+	12A
12B	+	+	+	+	X	X	X	X	X	X	X			X	X		12B

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

[1] Outside the planned LF/MF bands and the VHF/UHF bands (up to 960 MHz), the HF bands that are governed by Article **S12**.

[2] In the non-planned bands.

[3] Outside the bands governed by the GE85M and GE89 Regional Agreements.

[4] In the bands governed by Appendix **S25**.

[5] In the bands governed by the GE85 Regional Agreement.

[6] 1C or 1X.

[7] For analogue television only if the frequency stability is normal or precision.

[8] (4C and 4D) or (4E).

[9] (5A, 5B and 5C) or (minimum three sets of 5C).

[10] (Minimum three sets of 5C) or (5D) or (5E and 5F).

[11] The necessary bandwidth only.

[12] This information may be furnished for stations in the fixed service when the parameters are used as a basis for effecting coordination with another administration.

[13] 1E or 1E1.

ANNEX 2A

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

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

A.2 Date of bringing into use

MOD

a) The date (actual or foreseen, as appropriate) of bringing the frequency assignment (new or modified) into use. The date of bringing into use denotes the date at which the frequency assignment is brought into regular operation[2a] to provide the published radiocommunication service with the technical parameters within the technical characteristics notified to the Bureau. 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).

ADD

[2a] Pending further studies by ITU-R on the applicability of the term "regular operation" to non-geostationary satellite networks, the condition of regular operation shall be limited to geostationary satellite networks.

A.4 Orbital information

b)

ADD

In addition, if the stations operate in a frequency band subject to Nos **S22.5C**, **S22.5D** or **S22.5F**:

6) new data elements required to characterize properly the orbital operation of the non-geostationary satellite systems:

   a) for each range of latitudes provide:

   – the maximum number of non-geostationary satellites transmitting with overlapping frequencies to a given location; and

   – the associated latitude range;

   b) the minimum altitude of the space station above the surface of the Earth at which any satellite transmits;

   c) an indicator identifying if the space station uses station-keeping to maintain a repeating ground track;

d) where the space station uses station-keeping to maintain a repeating ground track, the time in seconds that it takes for the constellation to return to its starting position, i.e. such that all satellites are in the same location with respect to the Earth and each other;

e) an indicator identifying if the space station should be modelled with a specific precession rate of the ascending node of the orbit instead of the J_2 term;

f) for a space station that is to be modelled with a specific precession rate of the ascending node of the orbit instead of the J_2 term, the precession rate in degrees/day, measured counter-clockwise in the equatorial plane;

g) the longitude of the ascending node for the *j*-th orbital plane, measured counter-clockwise in the equatorial plane from the Greenwich meridian to the point where the satellite orbit makes its south-to-north crossing of the equatorial plane ($0° \le \Omega_j < 360°$) (see Note);

h) the time at which the satellite is at the location defined by Ω_j (see Note);

i) the longitudinal tolerance of the longitude of the ascending node.

NOTE – For the evaluation of epfd a reference to a point on the Earth is used and hence the "longitude of the ascending node" is required. All satellites in the constellation should use the same reference time.

7) new data elements required to characterize properly the performance of the non-geostationary satellite systems:

a) the maximum number of non-geostationary satellites receiving simultaneously with overlapping frequencies from the associated earth stations within a given cell;

b) the average number of associated earth stations with overlapping frequencies per square kilometre within a cell;

c) the average distance between co-frequency cells;

d) for the exclusion zone about the geostationary-satellite orbit provide:

– the type of zone;

– the width of the zone in degrees.

MOD

A.7 Earth station site characteristics

For a specific earth station:

a) 1) the horizon elevation angle in degrees for each azimuth around the earth station;

2) the distance in kilometres from the earth station to the horizon for each azimuth around the earth station;

b) that is operating to an associated GSO space station, 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) that is operating to an associated GSO space station, 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 (m) of the antenna above mean sea level;

e) that is operating to associated non-GSO space stations, the minimum angle of elevation of the antenna in the direction of maximum radiation in degrees from the horizontal plane for each azimuth around the earth station.

SUP

A.9

ADD

A.14 Spectrum masks

For stations operating in a frequency band subject to Nos **S22.5C**, **S22.5D** or **S22.5F**:

a) for each e.i.r.p. mask used by the non-geostationary space station provide:

– the type of mask;

– the mask identification code;

– the mask pattern defined in terms of the power in the reference bandwidth for a series of off-axis angles with respect to a specified reference point;

– the lowest frequency for which the mask is valid;

– the highest frequency for which the mask is valid;

b) for each associated earth station e.i.r.p. mask provide:

– the type of mask;

– the mask identification code;

– the mask pattern defined in terms of the power in the reference bandwidth for a series of off-axis angles with respect to a specified reference point;

– the lowest frequency for which the mask is valid;

– the highest frequency for which the mask is valid;

– the minimum elevation angle at which any associated earth station can transmit to a non-geostationary satellite;

– the minimum separation angle between the geostationary-satellite orbit arc and the associated earth station main beam-axis at which the associated earth station can transmit towards a non-geostationary satellite;

c) for each pfd mask used by the non-geostationary space station provide:

– the type of mask;

– the mask identification code;

– the mask pattern of the power flux-density defined in three dimensions;

– the lowest frequency for which the mask is valid;

– the highest frequency for which the mask is valid.

(The space-station pfd mask is defined by the maximum power flux-density generated by any space station in the interfering non-geostationary-satellite system as seen from any point on the surface of the Earth.)

ADD

A.15 Commitment regarding compliance with additional operational epfd↓ limits

For non-geostationary-satellite systems operating in the fixed-satellite service in the bands 10.7-11.7 GHz (in all Regions), 11.7-12.2 GHz (Region 2), 12.2-12.5 GHz (Region 3), and 12.5-12.75 GHz (Regions 1 and 3), a commitment that the filed for system will meet the additional operational epfd↓ limits that are specified in Table **S22-4A1** under No. **S22.5I**.

ADD

A.16 Commitment regarding compliance with off-axis power limitations

A commitment that the earth stations operating with a geostationary-satellite network in the fixed-satellite service meet the off-axis power limitations given in Nos. **S22.26** to **S22.28** or **S22.32** (as appropriate) under the conditions specified in Nos. **S22.30**, **S22.31** and **S22.34** to **S22.39**, where the earth stations are subject to those power limitations.

ADD

A.17 Compliance with aggregate power flux-density limits

a) For non-geostationary-satellite systems operating in the radionavigation-satellite service in the band 5 010-5 030 MHz, the aggregate power flux-density produced at the Earth's surface in the band 5 030-5 150 MHz in a 150 kHz bandwidth and in the band 4 990-5 000 MHz in a 10 MHz bandwidth, as defined in No. **S5.444C**.

b) For non-geostationary-satellite systems operating in the fixed-satellite service and broadcasting-satellite service in the band 41.5-42.5 GHz the calculated aggregate power flux-density in any 1 MHz bandwidth produced at the site of a radio astronomy station for more than 2% of the time in the band 42.5-43.5 GHz, as defined in No. **S5.551G**.

c) For satellite systems operating in the radionavigation-satellite service in the band 1 164-1 215 MHz, the calculated aggregate power flux-density produced at the Earth's surface by all the space stations within all radionavigation-satellite systems, as defined in No. **S5.328A**.

d) For non-geostationary-satellite systems operating in the fixed-satellite service (feeder links) in the band 15.43-15.63 GHz (space-to-Earth), the aggregate power flux-density produced at the Earth's surface in the band 15.35-15.4 GHz, as defined in No. **S5.511A**.

B.3 Geostationary space station antenna characteristics

g)

MOD

1) co-polar gain of the antenna in the direction of maximum radiation referred to an isotropic radiator (dBi) and cross-polar gain of the antenna in the case of a beam of other than elliptical shape;

MOD

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;

– 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;

SUP

6)

SUP

7)

C.8 Power characteristics of the transmission

MOD

h) In the case of a space station submitted in accordance with Appendix **S30**, the power supplied to the antenna (dBW) and the maximum power density per Hz supplied to the antenna (dB(W/Hz)), averaged over the worst 5 MHz and 27 MHz, and averaged over the worst 40 kHz in the case of Region 2.

C.9 Information on modulation characteristics

b)

ADD

9) in the case of a digital modulation, the effective and transmitted bit rate (Mbits/s) and symbol rate (Msymbols/s);

ADD

10) roll-off factor of the filter of the receiver.

ADD

d) For stations operating in a frequency band subject to Nos. **S22.5C**, **S22.5D** or **S22.5F**, provide:

– the type of mask;

– the mask identification code.

C.11 Service area

MOD

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

– a set of a maximum of 20 feeder-link test points, and

– a service area contour on the surface of the Earth or a service area defined by a minimum elevation angle (degrees).

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 20 test points and by a service area contour on the surface of the Earth or a service area defined by a minimum elevation angle (degrees).

SUP

C.14

ADD

C.15 Description of the group(s) required in the case of non-simultaneous emissions

MOD

D Overall link characteristics

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

In the case of fixed-satellite service networks using the frequency bands specified in No. **S9.7** (GSO/GSO) of Table S5-1 of Appendix **S5**, (§ 1), 2) and 3) of the frequency band column), the data specified in this section of the Appendix is not mandatory and should not be submitted to the Bureau.

ANNEX 2B

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

MOD

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[11]	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.b.6					X[13]					A.4.b.6	
A.4.b.7					X[13]					A.4.b.7	
A.4.c						X				A.4.c	
A.5				X	X	X[11]	X	X	X	A.5	
A.6				X	X	X[11]	X	X	X	A.6	

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.7.a.1						X[11]		X		A.7.a.1	
A.7.a.2						O				A.7.a.2	
A.7.b						X[11]		X		A.7.b	
A.7.c						X[11]				A.7.c	
A.7.d						X[11]		X		A.7.d	
A.7.e						X[11]				A.7.e	
A.8							X			A.8	
A.10						X[11]				A.10	
A.11							X	X		A.11	
A.12								X		A.12	
A.13				X	X	X				A.13	
A.14.a					X					A.14.a	
A.14.b					X					A.14.b	
A.14c					X					A.14.c	
A.15					X					A.15	
A.16				X						A.16	
A.17.a					X					A.17.a	
A.17.b					X					A.17.b	
A.17.c					X					A.17.c	
A.17.d					X					A.17.d	

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

[11] Not required for coordination under No. **S9.7A** or **S9.7B**.

[13] Required for networks operating in the bands defined in No. **S22.5C**, **S22.5D** or **S22.5F**.

MOD

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[11]			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.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[11]				B.5.b	
B.5.c						X[12]				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.

11 Not required for coordination under No. **S9.7A** or **S9.7B**.

12 In the case of coordination under **S9.7A**, the reference radiation pattern is to be provided.

MOD

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[11]	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[11]				C.8.b	
C.8.c			O	X[6]	X[6]	X[6, 11]				C.8.c	
C.8.d				X[2]	X[2]					C.8.d	
C.8.e			O	X[6]	X[6]	X[6, 11]				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	
C.9.a.1			O	C	C					C.9.a.1	
C.9.a.2			O	C	C					C.9.a.2	
C.9.a.3			O	C	C					C.9.a.3	
C.9.a.4			O	C	C					C.9.a.4	
C.9.a.5			O	C	C					C.9.a.5	
C.9.a.6			O	C	C					C.9.a.6	
C.9.b.1							X	X		C.9.b.1	
C.9.b.2							X	X		C.9.b.2	
C.9.b.3							X	X		C.9.b.3	
C.9.b.4							X	X		C.9.b.4	

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.b.5							X	X		C.9.b.5	
C.9.b.6							X	X		C.9.b.6	
C.9.b.7							X	X		C.9.b.7	
C.9.b.8							X	X		C.9.b.8	
C.9.b.9							X	X		C.9.b.9	
C.9.b.10							X	X		C.9.b.10	
C.9.c			X		X					C.9.c	
C.9.d			X		X		X	X		C.9.d	
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.15							X	X		C.15	

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**.

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

[11] Not required for coordination under No. **S9.7A** or **S9.7B**.

APPENDIX S5

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

MOD

1

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.

MOD

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[4] The associated space network characteristics must have been communicated to the Bureau under No. **S9.30** or under § 4.1.3/4.2.6 of Article 4 of Appendix **S30** or § 4.1.3/4.2.6 of Article 4 of Appendix **S30A**.

SUP

TABLE S5-1

ADD

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 radiocommunication 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	1) 3 400-4 200 MHz 5 725-5 850 MHz (Region 1) and 5 850-6 725 MHz 2) 10.95-11.2 GHz 11.45-11.7 GHz 11.7-12.2 GHz (Region 2) 12.2-12.5 GHz (Region 3) 12.5-12.75 GHz (Regions 1 and 3) 12.7-12.75 GHz (Region 2) and 13.75-14.5 GHz	i) Bandwidth overlap, and ii) any network in the fixed-satellite service (FSS) with a space station within an orbital arc of ±10° of the nominal orbital position of a proposed network in the FSS i) Bandwidth overlap, and ii) any network in the FSS with a space station within an orbital arc of ±9° of the nominal orbital position of a proposed network in the FSS		With respect to the FSS in the bands in 1), 2) and 3), an administration may request, pursuant to No. **S9.41**, to be included in requests for coordination, indicating the networks for which the value of $\Delta T/T$ calculated by the method in § 2.2.1.2 and 3.2 of Appendix **S8** exceeds 6%. When the Bureau, on request by an affected administration, studies this information pursuant to No. **S9.42**, the calculation method given in § 2.2.1.2 and 3.2 of Appendix **S8** shall be used. With respect to the FSS in the bands in 1), 2) and 3), an administration may request, pursuant to No. **S9.41**, that an administration be excluded from requests for coordination,

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. **S9.7** GSO/GSO (*cont.*)		3) 17.7-20.2 GHz, and 27.5-30 GHz	i) Bandwidth overlap, and ii) any network in the FSS with a space station within an orbital arc of ±8° of the nominal orbital position of a proposed network in the FSS		giving as reason that the network of this administration will not be affected because value of $\Delta T/T$ calculated by the method in § 2.2.1.2 and 3.2 of Appendix **S8** do not exceed 6%. When the Bureau, at the request of an administration, studies this information pursuant to No. **S9.42**, the calculation method given in § 2.2.1.2 and 3.2 of Appendix **S8** shall be used
		4) All frequency bands, other than those in § 1), 2) and 3), allocated to a space service, and the bands in § 1), 2) and 3) where the radio service of the proposed network or affected networks is other than the FSS, or in the case of coordination of space stations operating in the opposite direction of transmission	Value of $\Delta T/T$ exceeds 6%	Appendix **S8**	

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. **S9.7A** GSO earth station/ non-GSO system	A specific earth station in a GSO satellite network in the FSS in respect of a non-GSO satellite system in the FSS	10.7-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) in Region 2, 12.2-12.75 GHz (space-to-Earth) in Region 3, 12.5-12.75 GHz (space-to-Earth) in Region 1, 17.8-18.6 GHz (space-to-Earth), and 19.7-20.2 GHz (space-to-Earth)	i) Bandwidths overlap; and ii) the GSO satellite network has specific receive earth stations which meet all of the following conditions: a) earth station antenna maximum isotropic gain greater than or equal to 64 dBi for the frequency bands 10.7-12.75 GHz or 68 dBi for the frequency bands 17.8-18.6 GHz and 19.7-20.2 GHz; b) *G*/*T* of 44 dB/K or higher; c) emission bandwidth of 250 MHz or higher for the frequency bands below 12.75 GHz or 800 MHz or higher for the frequency bands above 17.8 GHz; and	i) Check by using the assigned frequencies and bandwidths; ii) use the maximum antenna gain (*G*), the lowest total receiving system noise temperature (*T*), and the emission bandwidth of the specific receive earth station as given in the Appendix **S4** data; and	The threshold/condition for coordination does not apply to typical receive earth stations operating in GSO satellite networks

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. **S9.7A** GSO earth station/ non-GSO system (*cont.*)			iii) the equivalent power flux-density, epfd$_{\downarrow}$, from the non-GSO satellite system exceeds: a) in the frequency band 10.7-12.75 GHz: –174.5 dB(W/(m^2 · 40 kHz)) for any percentage of time for non-GSO satellite systems with all satellites only operating at or below 2 500 km altitude, or –202 dB(W/(m^2 · 40 kHz)) for any percentage of the time for non-GSO satellite systems with any satellites operating above 2 500 km altitude; b) in the frequency bands 17.8-18.6 GHz or 19.7-20.2 GHz: –157 dB(W/(m^2 · MHz)) for any percentage of time for non-GSO satellite systems with all satellites only operating at or below 2 500 km altitude, or –185 dB(W/(m^2 · MHz)) for any percentage of the time for non-GSO satellite systems with any satellites operating above 2 500 km altitude	iii) use the epfd$_{\downarrow}$ radiated by the non-GSO FSS satellite system into the earth station employing the very large antenna when this antenna is pointed towards the wanted GSO satellite	

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. **S9.7B** Non-GSO system/GSO earth station	A non-GSO satellite system in the FSS in respect of a specific earth station in a GSO satellite network in the FSS	10.7-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) in Region 2, 12.2-12.75 GHz (space-to-Earth) in Region 3, 12.5-12.75 GHz (space-to-Earth) in Region 1, 17.8-18.6 GHz (space-to-Earth), and 19.7-20.2 GHz (space-to-Earth)	i) Bandwidths overlap; and ii) the GSO satellite network has specific receive earth stations which meets all of the following conditions: a) earth station antenna maximum isotropic gain greater than or equal to 64 dBi for the frequency bands 10.7-12.75 GHz or 68 dBi for the frequency bands 17.8-18.6 GHz and 19.7-20.2 GHz; b) *G*/*T* of 44 dB/K or higher; c) emission bandwidth of 250 MHz or higher for the frequency bands below 12.75 GHz or 800 MHz or higher for the frequency bands above 17.8 GHz; and	i) Check by using the assigned frequencies and bandwidths; ii) use the maximum antenna gain (*G*), the lowest total receiving system noise temperature (*T*), and the emission bandwidth of the specific receive earth station as given in the Appendix **S4** data;	The threshold/condition for coordination do not apply to typical receive earth stations operating in GSO satellite networks

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. **S9.7B** Non-GSO system/GSO earth station (*cont.*)			iii) the epfd$_{\downarrow}$ from the non-GSO satellite system exceeds: a) in the frequency bands 10.7-12.75 GHz: –174.5 dB(W/(m^2 · 40 kHz)) for any percentage of time for non-GSO satellite systems with all satellites only operating at or below 2 500 km altitude, or –202 dB(W/(m^2 · 40 kHz)) for any percentage of the time for non-GSO satellite systems with any satellites operating above 2 500 km altitude; b) in the frequency bands 17.8-18.6 GHz or 19.7-20.2 GHz: –157 dB(W/(m^2 · MHz)) for any percentage of time for non-GSO satellite systems with all satellites only operating at or below 2 500 km altitude, or –185 dB(W/(m^2 · MHz)) for any percentage of the time for non-GSO satellite systems with any satellites operating above 2 500 km altitude	iii) use the epfd$_{\downarrow}$ radiated by the non-GSO FSS satellite system into the earth station employing the very large antenna when this antenna is pointed towards the wanted GSO satellite	

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, non-GSO/ terrestrial	A space station in the broadcasting-satellite service (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) 17.3-17.8 GHz (Region 2) 21.4-22 GHz (Region 1 and 3) 74-76 GHz	Bandwidths overlap; Resolution **539 (WRC-2000)** also applies	Check by using the assigned frequencies and bandwidths	
No. **S9.12** Non-GSO/ non-GSO	A station in a non-GSO satellite network in the frequency bands for which a footnote refers to No. **S9.11A** or No. **S9.12**, in respect of any other non-GSO satellite network, with the exception of coordination between earth stations operating in the opposite direction of transmission	Frequency bands for which a footnote refers to No. **S9.11A** or No. **S9.12**	Bandwidths overlap	Check by using the assigned frequencies and bandwidths	
No. **S9.12A** Non-GSO/ GSO	A station in a GSO satellite network in the frequency bands for which a footnote refers to No. **S9.11A** or to No. **S9.12A**, in respect of any other GSO satellite network, with the exception of coordination between earth stations operating in the opposite direction of transmission	Frequency bands for which a footnote refers to No. **S9.11A** or No. **S9.12A**	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 GSO satellite network in the frequency bands for which a footnote refers to No. **S9.11A** or to No. **S9.13**, in respect of any other non-GSO satellite network, with the exception of coordination between earth stations operating in the opposite direction of transmission	Frequency bands for which a footnote refers to No. **S9.11A** or **S9.13**	Bandwidths overlap	Check by using the assigned frequencies and bandwidths	
No. **S9.14** Non-GSO/ terrestrial, GSO/terrestrial	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	Frequency bands for which a footnote refers to No. **S9.11A**	See § 1 of Annex 1 to this Appendix	See § 1 of Annex 1 to 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	Frequency bands for which a footnote refers to No. **S9.11A**	The coordination area of the earth station covers the territory of another administration	Appendix **S7**	

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 satellite network in frequency bands for which a footnote refers to No. **S9.11A**	Frequency bands for which a footnote refers to No. **S9.11A**	Transmitting terrestrial station is situated within the coordination area of a receiving earth station		The coordination area of the affected earth station has already been determined using the calculation method of Appendix **S7**
No. **S9.17** GSO, non-GSO/ terrestrial	A specific earth station or a typical mobile earth station in frequency bands above 100 MHz 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	The coordination area of the earth station covers the territory of another administration	Appendix **S7**	

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 coordination under No. **S9.19**	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	Appendix **S7**	
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 (*end*)

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, non-GSO/ GSO, non-GSO	Any transmitting station of a terrestrial service or a transmitting earth station in the FSS (Earth-to-space) in a frequency band shared on an equal primary basis with the BSS, with respect to typical earth stations included in the service area of a space station in the BSS	Bands listed in No. **S9.11** and the band 11.7-12.7 GHz	i) Necessary bandwidths overlap; and ii) the power flux-density (pfd) of the interfering station at the edge of the BSS service area exceeds the permissible level	Check by using the assigned frequencies and bandwidths	See also Article 6 of Appendix **S30**
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	Incompatibility established by the use of Appendices **S7**, **S8**, technical annexes of Appendices **S30** or **S30A**, pfd 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**, other technical provisions of the Radio Regulations or ITU-R Recommendations	

SUP

TABLE S5-1A

ANNEX 1

SUP

2

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3

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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

ADD

APPENDIX S7

Methods for the determination of the coordination area around an earth station in frequency bands between 100 MHz and 105 GHz

1 Introduction

This Appendix addresses the determination of the coordination area (see No. **S1.171**) around a transmitting or receiving earth station that is sharing spectrum in frequency bands between 100 MHz and 105 GHz with terrestrial radiocommunication services or with earth stations operating in the opposite direction of transmission.

The coordination area represents the area surrounding an earth station sharing the same frequency band with terrestrial stations, or the area surrounding a transmitting earth station that is sharing the same bidirectionally allocated frequency band with receiving earth stations, within which the permissible level of interference may be exceeded and hence coordination is required. The coordination area is determined on the basis of known characteristics for the coordinating earth station and on conservative assumptions for the propagation path and for the system parameters for the unknown terrestrial stations (see Tables 7 and 8), or the unknown receiving earth stations (Table 9), that are sharing the same frequency band.

1.1 Overview

This Appendix contains procedures and system parameters for calculating an earth station's coordination area, including predetermined distances.

The procedures allow the determination of a distance in all azimuthal directions around a transmitting or receiving earth station beyond which the predicted path loss would be expected to exceed a specified value for all but a specified percentage of the time. This distance is called the coordination distance (see No. **S1.173**). When the coordination distance is determined for each azimuth around the coordinating earth station it defines a distance contour, called the coordination contour (see No. **S1.172**), that encloses the coordination area.

It is important to note that, although the determination of the coordination area is based on technical criteria, it represents a regulatory concept. Its purpose is to identify the area within which detailed evaluations of the interference potential need to be performed in order to determine whether the coordinating earth station or any of the terrestrial stations, or in the case of a bidirectional allocation any of the receiving earth stations that are sharing the same frequency band, will experience unacceptable levels of interference. Hence, the coordination area is not an exclusion zone within which the sharing of frequencies between the earth station and terrestrial stations or other earth stations is prohibited, but a means for determining the area within which more detailed calculations need to be performed. In most cases a more detailed analysis will show that sharing within the coordination area is possible since the procedure for the determination of the coordination area is based on unfavourable assumptions with regard to the interference potential.

For the determination of the coordination area, two separate cases are to be considered:

– case when the earth station is transmitting and hence capable of interfering with receiving terrestrial stations or earth stations;

– case when the earth station is receiving and hence may be the subject of interference from transmitting terrestrial stations.

Calculations are performed separately for great circle propagation mechanisms (propagation mode (1)) and, if required by the sharing scenario (see § 1.4), for scattering from hydrometeors (propagation mode (2)). The coordination contour is then determined using the greater of the two distances predicted by the propagation mode (1) and propagation mode (2) calculations for each azimuth around the coordinating earth station. Separate coordination contours are produced for each sharing scenario. Guidance and examples of the construction of coordination contours, and their component propagation mode (1) and propagation mode (2) contours, are provided in § 1.6.

To facilitate bilateral discussion it can be useful to calculate additional contours, defining smaller areas, that are based on less conservative assumptions than those used for the calculation of the coordination contour.

1.2 Structure of this Appendix

In this Appendix the general principles are separated from the detailed text on methods. The general principles are contained in the main body of the Appendix, while the methods are contained in a series of annexes, enabling the user to select only those sections that are relevant for a specific sharing scenario.

Table 1 is provided to help the user to navigate through the Appendix and the Annexes; it also indicates the relevant sections that need to be explored for a specific coordination case.

TABLE 1

Cross-reference between sharing scenarios and calculation methods

Applicable sections and Annexes	Sharing scenarios of § 1.4: § 1.4.1 Earth stations operating with geostationary space stations	§ 1.4.2 Earth stations operating with non-geostationary space stations [1]	§ 1.4.3 Earth stations operating with both geostationary and non-geostationary space stations	§ 1.4.4 Earth stations operating in bidirectionally allocated frequency bands	§ 1.4.5 Broadcasting-satellite service earth stations	§ 1.4.6 Mobile (except aeronautical mobile) earth stations	§ 1.4.7 Aeronautical mobile earth stations
§ 1.3 Basic concepts	X	X	X	X	X	X	X
§ 1.5 Propagation model concepts	X	X	X	X	See § 1.4.1, § 1.4.2, § 1.4.3 or § 1.4.4 as applicable and § 1.6	See § 1.4.1, § 1.4.2, § 1.4.3 or § 1.4.4 as applicable and § 1.6	See § 1.4.1, § 1.4.2, § 1.4.3 or § 1.4.4 as applicable and § 1.6
§ 1.6 The coordination contour: concepts and construction	X	X	X	X			
§ 2.1 Earth stations operating with geostationary space stations	X		X				
§ 2.2 Earth stations operating with non-geostationary space stations		X	X				
§ 3 Determination of the coordination area between earth stations operating in bidirectionally allocated frequency bands				X			
§ 4 General considerations for the determination of the propagation mode (1) required distance	X	X	X	X			
§ 5 General considerations for the determination of the propagation mode (2) required distance	X		X				
Annex 1 Determination of the required distance for propagation mode (1)	X	X	X	X			
Annex 2 Determination of the required distance for propagation mode (2)	X		X				
Annex 3 Antenna gain towards the horizon for an earth station operating with a geostationary space station	X		X				
Annex 4 Antenna gain towards the horizon for earth stations operating with non-geostationary space stations		X	X	X			
Annex 5 Determination of the coordination area for a transmitting earth station with respect to receiving earth stations operating with geostationary space stations in bidirectionally allocated frequency bands				X			
Annex 6 Supplementary and auxiliary contours	X	X	X	X			
Annex 7 System parameters and predetermined coordination distances for determination of the coordination area around an earth station	X	X	X	X			

[1] For an earth station using a non-tracking antenna the procedure of § 2.1 is used. For an earth station using a non-directional antenna the procedures of § 2.1.1 are used.

1.3 Basic concepts

Determination of the coordination area is based on the concept of the permissible interference power at the antenna terminals of a receiving terrestrial station or earth station. Hence, the attenuation required to limit the level of interference between a transmitting terrestrial station or earth station and a receiving terrestrial station or earth station to the permissible interference power for *p*% of the time is represented by the "minimum required loss", which is the loss that needs to be equalled or exceeded by the predicted path loss for all but *p*% of the time[1].

For propagation mode (1) the following equation applies:

$$L_b(p) = P_t + G_t + G_r - P_r(p) \qquad \text{dB} \qquad (1)$$

where:

- p: maximum percentage of time for which the permissible interference power may be exceeded
- $L_b(p)$: propagation mode (1) minimum required loss (dB) for *p*% of the time; this value must be exceeded by the propagation mode (1) predicted path loss for all but *p*% of the time
- P_t: maximum available transmitting power level (dBW) in the reference bandwidth at the terminals of the antenna of a transmitting terrestrial station or earth station
- $P_r(p)$: permissible interference power of an interfering emission (dBW) in the reference bandwidth to be exceeded for no more than *p*% of the time at the terminals of the antenna of a receiving terrestrial station or earth station that may be subject to interference, where the interfering emission originates from a single source
- G_t: gain (dB relative to isotropic) of the antenna of the transmitting terrestrial station or earth station. For a transmitting earth station, this is the antenna gain towards the physical horizon on a given azimuth; for a transmitting terrestrial station, the maximum main beam axis antenna gain is to be used
- G_r: gain (dB relative to isotropic) of the antenna of the receiving terrestrial or earth station that may be subject to interference. For a receiving earth station, this is the gain towards the physical horizon on a given azimuth; for a receiving terrestrial station, the maximum main beam axis antenna gain is to be used.

In the case of a receiving earth station, the permissible interference power $P_r(p)$ is specified with respect to the actual percentage of time the receiver is in operation, rather than the total elapsed time.

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[1] When p is a small percentage of the time, in the range 0.001% to 1.0%, the interference is referred to as "short-term"; if $p \geq 20\%$, it is referred to as "long-term" (see § 1.5.3).

For propagation mode (2), a volume scattering process is involved and a modification of the above approach is necessary. Where the coordinating earth station antenna beam intersects a rain cell, a common volume may be formed with a terrestrial station beam or an earth station beam (operating in the opposite direction of transmission in bidirectionally allocated frequency bands). In the case of a terrestrial station, the assumptions are made that the terrestrial station beamwidth is relatively large in comparison with that of the coordinating earth station (terrestrial station gain values are given in Tables 7 and 8) and that the terrestrial station is some distance from the common volume. The terrestrial station beam is therefore assumed to illuminate the whole rain cell, which is represented by a vertical cylinder filled with hydrometeors that give rise to isotropically scattered signals. This scattering process may give rise to unwanted coupling between the coordinating earth station and terrestrial stations or other earth stations operating in bidirectionally allocated frequency bands, via the common volume.

The earth station antenna gain and its beamwidth are interdependent. The size of the common volume, and the number of scattered signals arising within that volume, increases as the gain of the earth station antenna transmitting or receiving those signals decreases, the one effect compensating for the other. A term which approximates the full integral required to evaluate the volume scattering process within the earth station antenna beam is included in equation (72). Therefore in the procedure for evaluation of interference that may arise from propagation mode (2) mechanisms a simplifying assumption can be made that the path loss is independent of the earth station antenna gain[2].

Hence for propagation mode (2), equation (1) reduces to:

$$L_x(p) = P_t + G_x - P_r(p) \qquad \text{dB} \qquad (2)$$

where:

$L_x(p)$: minimum loss required for propagation mode (2)

G_x: maximum antenna gain (dBi) assumed for the terrestrial station. Tables 7 and 8 give values of G_x for the various frequency bands.

To facilitate the calculation of propagation mode (2) auxiliary contours (see Annex 6) the calculation is further modified by placing the terrestrial network antenna gain G_x within the iterative loop for the propagation mode (2) required loss calculations[3].

Hence equation (2) further reduces to:

$$L(p) = P_t - P_r(p) \qquad \text{dB} \qquad (3)$$

[2] If the earth station antenna has a wide beamwidth, the method can still be used to determine the propagation mode (2) contour. However, the fact that the antenna beam may be wider than the rain cell and hence not actually fully filled with hydrometeors will mean that the interference potential may be slightly overestimated.

[3] See equation (82).

where:

$L(p)$: propagation mode (2) minimum required loss (dB) for p% of the time; this value must be exceeded by the propagation mode (2) predicted path loss for all but p% of the time.

For both modes of propagation, P_t and $P_r(p)$ are defined for the same radio-frequency bandwidth (the reference bandwidth). Further, $L_b(p)$, $L(p)$ and $P_r(p)$ are defined for the same small percentage of the time, and these values are set by the performance criteria of the receiving terrestrial station or receiving earth station that may be subject to interference.

For an earth station operating with a geostationary space station, Annex 3 provides the numerical method for determining the minimum angle between the earth station antenna main beam axis and the physical horizon as a function of azimuth, and the corresponding antenna gain. In the case of a space station in a slightly inclined geostationary orbit, the minimum elevation angle and corresponding horizon gain will depend on the maximum inclination angle to be coordinated.

For an earth station operating with non-geostationary space stations, the antenna gain of the earth station in the direction of the horizon varies as a function of time and Annex 4 provides the numerical methods for its determination.

For an earth station operating in a frequency band with a bidirectional allocation, the antenna gain to be used in determining the propagation mode (1) minimum required loss is calculated using the methods in Annex 3 or Annex 4, as appropriate.

Determination of the coordination area requires the calculation of the predicted path loss and its comparison with the minimum required loss, for every azimuth around the coordinating earth station, where:

– the predicted path loss is dependent on several factors including the length and general geometry of the interfering path (e.g. antenna pointing, horizon elevation angle), antenna directivity, radio climatic conditions, and the percentage of the time during which the predicted path loss is less than the minimum required loss; and

– the minimum required loss is based on system and interference model considerations.

The required coordination distance is the distance at which these two losses are considered to be equal for the stated percentage of time.

In determining the coordination area, the pertinent parameters of the coordinating earth station are known, but knowledge of the terrestrial stations or other earth stations sharing that frequency range is limited. Hence it is necessary to rely on assumed system parameters for the unknown terrestrial stations or the unknown receiving earth stations. Furthermore, many aspects of the interference path between the coordinating earth station and the terrestrial stations or other earth stations (e.g. antenna geometry and directivity) are unknown.

The determination of the coordination area is based on unfavourable assumptions regarding system parameter values and interference path geometry. However, in certain circumstances, to assume that all the worst-case values will occur simultaneously is unrealistic, and leads to unnecessarily large values of minimum required loss. This could lead to unnecessarily large coordination areas. For propagation mode (1), detailed analyses, supported by extensive operational experience, have shown that the requirement for the propagation mode (1) minimum required loss can be reduced because of the very small probability that the worst-case assumptions for system parameter values and interference path geometry will exist simultaneously. Therefore, a correction is applied within the calculation for the propagation mode (1) predicted path loss in the appropriate sharing scenario to allow benefit to be derived from these mitigating effects. The application of this correction factor is described in more detail in § 4.4.

This correction applies to cases of coordination with the fixed service. It is frequency, distance and path dependent. It does not apply in the case of the coordination of an earth station with mobile stations, nor with other earth stations operating in the opposite direction of transmission, nor in the case of propagation via hydrometeor scatter (propagation mode (2)).

A number of propagation models are used to cover the propagation mechanisms that exist in the full frequency range. These models predict the path loss as a monotonically increasing function of distance. Therefore, coordination distances are determined by calculating the path loss iteratively for an increasing distance until either the minimum required loss is achieved, or a maximum calculation distance limit is reached (see § 1.5.3).

The iteration method always starts at a defined value of minimum distance, d_{min} (km), and iteration is performed using a uniform step size, s (km), for increasing the distance. A step size of 1 km is recommended.

1.4 Sharing scenarios

The following subsections describe the basic assumptions made for the various earth station sharing scenarios. These subsections need to be read in conjunction with the information contained in Table 1 and § 1.6 which contains guidance on the development of a coordination contour. Except as discussed in § 1.4.5 to 1.4.7, the earth stations around which coordination areas are determined are assumed to be fixed earth stations authorized to operate at a single permanent location. In cases of earth stations that can be operated from a number of fixed locations, the coordination areas are determined for each individual location.[4]

[4] While some fixed satellite systems transmit to fixed earth stations operating at unspecified locations within a service area defined by an administration, methods for determining the coordination areas are specified only for individual sites. To minimize the number of individual earth stations requiring detailed coordination in these cases, administrations may wish to develop bilateral agreements based on distances, calculated in accordance with Recommendation ITU-R SM.1448, extended from the periphery of a service area.

1.4.1 Earth stations operating with geostationary space stations

For an earth station operating with a space station in the geostationary orbit, the space station appears to be stationary with respect to the Earth. However variations in gravitational forces acting on the space station and limitations in positional control mean that a geostationary space station's orbital parameters are not constant. Movement from the space station's nominal orbital position in an east/west direction (longitudinal tolerance) is limited under the Radio Regulations (see Nos. **S22.6** to **S22.18**), but movement in the north/south direction (inclination excursion) is not specified.

Relaxation in the north/south station-keeping of a geostationary space station allows its orbit to become inclined, with an inclination that increases gradually with time. Therefore the determination of the coordination area requires consideration of the range of movement of the earth station antenna. Although the direction of pointing of the earth station antenna may in practice vary with time, the earth station antenna may also be pointing in one direction for considerable periods of time. Hence the gain of the earth station antenna in the direction of the horizon is assumed to be constant. For an earth station operating with a space station in an orbit as described above, an assumption of constant horizon gain as the inclination angle increases may lead to a conservative estimation of the coordination area, the degree of conservatism increasing with increasing inclination angle.

For an earth station operating with a geostationary space station the coordination area is determined using the procedures described in § 2.1.

1.4.2 Earth stations operating with non-geostationary space stations

Earth stations operating with non-geostationary space stations may use a directional or a non-directional antenna. Furthermore, earth stations using a directional antenna may track the orbital path of a non-geostationary space station.

While an earth station operating with a geostationary space station is assumed to have a constant antenna gain towards the horizon, for an earth station antenna that is tracking the orbital path of a non-geostationary space station, the antenna gain towards the horizon will vary with time. Therefore, it is necessary to estimate the variation of the antenna gain with time towards the horizon for each azimuth in order to determine the coordination area. The procedure is described in § 2.2.

For an earth station operating with a non-geostationary space station, the motion of a relatively high gain tracking antenna reduces the probability of interference due to propagation mode (2) mechanisms and hence the propagation mode (2) required distances will be relatively short. The minimum coordination distance d_{min} (see § 1.5.3) will provide adequate protection in these cases. The propagation mode (2) contour is therefore taken to be identical to a circle whose radius is the minimum coordination distance. Propagation mode (2) calculations are not required in these circumstances and the coordination area is determined using the propagation mode (1) procedure in § 2.2 only.

For an earth station operating with a non-geostationary space station using a non-directional antenna, a similar situation applies, and the low gain means that propagation mode (2) required distances will be less than the minimum coordination distance. Hence, for the case of a non-directional antenna the propagation mode (2) contour is also coincident with the circle of radius d_{min}, and the coordination area is determined using the propagation mode (1) procedures described in § 2.1.1 only.

For an earth station operating with a non-geostationary space station using a non-tracking directional antenna, the potential for interference arising from propagation mode (2) is the same as for an earth station operating with a geostationary space station. Hence, for the case of non-tracking directional antenna the coordination area is determined using both the propagation mode (1) and propagation mode (2) procedures described in § 2.1.

1.4.3 Earth stations operating with both geostationary and non-geostationary space stations

For earth stations that are sometimes intended to operate with geostationary space stations and at other times with non-geostationary space stations, separate coordination areas are determined for each type of operation. In such cases, the coordination area for the geostationary space station is determined using the procedures described in § 2.1 and the coordination area for the non-geostationary space station is determined using the procedure described in § 2.2. For each case, the percentage of time, p, is specified for all the operational time that the receiving earth station is expected to spend in reception from geostationary space stations or non-geostationary space stations, as appropriate.

1.4.4 Earth stations operating in bidirectionally allocated frequency bands

For earth stations operating in some frequency bands there may be co-primary allocations to space services operating in both the Earth-to-space and space-to-Earth directions. In this case, where two earth stations are operating in opposite directions of transmission it is only necessary to establish the coordination area for the transmitting earth station, as receiving earth stations will automatically be taken into consideration. Hence, a receiving earth station operating in a bidirectionally allocated frequency band will only be involved in coordination with a transmitting earth station if it is located within the transmitting earth station's coordination area.

For a transmitting earth station operating with either geostationary or non-geostationary satellites in a bidirectionally allocated frequency band, the coordination area is determined using the procedures described in § 3.

1.4.5 Broadcasting-satellite service earth stations

For earth stations in the broadcasting-satellite service operating in the unplanned bands, the coordination area is determined by extending the periphery of the specified service area within which the earth stations are operating by the coordination distance based on a typical BSS earth station. In calculating the coordination distance, no additional protection can be assumed to be available from the earth station horizon elevation angle, i.e. A_h = 0 dB in Annex 1, for all azimuth angles around the earth station.

1.4.6 Mobile (except aeronautical mobile) earth stations

For a mobile (except aeronautical mobile) earth station, the coordination area is determined by extending the periphery of the specified service area, within which the mobile (except aeronautical mobile) earth stations are operating, by the coordination distance. The coordination distance may be represented by a predetermined coordination distance (see Table 10), or it may be calculated. In calculating the coordination distance, no additional protection can be assumed to be available from the earth station horizon elevation angle, i.e. A_h = 0 dB in Annex 1, for all azimuths around the earth station.

1.4.7 Aeronautical mobile earth stations

For aeronautical mobile earth stations, the coordination area is determined by extending the periphery of the specified service area within which the aeronautical mobile earth station operates, by an appropriate predetermined coordination (see Table 10) distance for the respective services.

1.5 Propagation model concepts

For each mode of propagation, according to the requirements of the specific sharing scenario (see § 1.4) it is necessary to determine the predicted path loss. The determination of this predicted path loss is based on a number of propagation mechanisms.

Interference may arise through a range of propagation mechanisms whose individual dominance depends on climate, radio frequency, time percentage in question, distance and path topography. At any given point in time, one or more mechanisms may be present. The propagation mechanisms that are considered within this Appendix in the determination of the interference potential are as follows:

– *Diffraction*: Insofar as it relates to diffraction losses occurring over the earth station's local physical horizon. This effect is referred to below as "site shielding". The remainder of the path along each radial is considered to be flat and therefore free of additional diffraction losses.

– *Tropospheric scatter*: This mechanism defines the "background" interference level for paths longer than about 100 km, beyond which the diffraction field becomes very weak.

– *Surface ducting*: This is the most important short-term interference mechanism over water and in flat coastal land areas, and can give rise to high signal levels over greater distances, sometimes exceeding 500 km. Such signals can exceed the equivalent "free-space" level under certain conditions.

– *Elevated layer reflection and refraction*: The treatment of reflection and/or refraction from layers at heights of up to a few hundred metres is an important mechanism that enables signals to by-pass any diffraction losses due to the underlying terrain under favourable path geometry situations. Here again, the impact can be significant over long distances.

– *Hydrometeor scatter*: Hydrometeor scatter can be a potential source of interference between terrestrial station transmitters and earth stations because it may act isotropically, and can therefore have an impact irrespective of whether the common volume is on or off the great-circle interference path between the coordinating earth station and terrestrial stations, or other receiving earth stations operating in bidirectionally allocated frequency bands.

In this Appendix, propagation phenomena are classified into two modes as follows:

– *Propagation mode (1)*: propagation phenomena in clear air (tropospheric scatter, ducting, layer reflection/refraction, gaseous absorption and site shielding). These phenomena are confined to propagation along the great-circle path.

– *Propagation mode (2)*: hydrometeor scatter.

1.5.1 Propagation mode (1)

For the determination of the propagation mode (1) required distances, the applicable frequency range has been divided into three parts:

– For VHF/UHF frequencies between 100 MHz and 790 MHz and for time percentages from 1% to 50% of an average year.

– From 790 MHz to 60 GHz and for time percentages from 0.001% to 50% of an average year.

– From 60 GHz to 105 GHz and for time percentages from 0.001% to 50% of an average year.

The variation in predicted path loss due to the horizon elevation angle around an earth station is calculated by the method described in § 1 of Annex 1, using the horizon elevation angles and distances along different radials from the earth station. For all frequencies between 100 MHz and 105 GHz, the attenuation arising from the horizon characteristics is included in the value of propagation mode (1) predicted path loss, unless its use is specifically prohibited for a particular sharing scenario (see § 1.4.5 and § 1.4.6).

In the determination of the propagation mode (1) required distance, the world is divided into four basic radio-climatic zones. These zones are defined as follows:

– Zone A1: coastal land, i.e. land adjacent to a Zone B or a Zone C area (see below), up to an altitude of 100 m relative to mean sea or water level, but limited to a maximum distance of 50 km from the nearest Zone B or Zone C area; in the absence of precise information on the 100 m contour, an approximation (e.g. 300 feet) may be used. Large inland areas of at least 7 800 km^2 which contain many small lakes, or a river network, comprising more than 50% water, and where more than 90% of the land is less than 100 m above the mean water level may be included in Zone A1[5].

– Zone A2: all land, other than coastal land as defined in Zone A1 above.

– Zone B: "cold" seas, oceans and large bodies of inland water situated at latitudes above 30°, with the exception of the Mediterranean Sea and the Black Sea. A "large" body of inland water is defined, for the administrative purpose of coordination, as one having an area of at least 7 800 km^2, but excluding the area of rivers. Islands within such bodies of water are to be included as water within the calculation of this area if they have elevations lower than 100 m above the mean water level for more than 90% of their area. Islands that do not meet these criteria should be classified as land for the purposes of calculating the area of the water.

– Zone C: "warm" seas, oceans and large bodies of inland water situated at latitudes below 30°, as well as the Mediterranean Sea and the Black Sea.

1.5.2 Propagation mode (2)

For the determination of the propagation mode (2) required distance, interference arising from hydrometeor scatter can be ignored at frequencies below 1 000 MHz and above 40.5 GHz outside the minimum coordination distance (see § 1.5.3.1). Below 1 000 MHz, the level of the scattered signal is very low and above 40.5 GHz, although significant scattering occurs, the scattered signal is then highly attenuated along the path from the scatter volume to the receiving terrestrial station or earth station. Site shielding is not relevant to propagation mode (2) mechanisms as the interference path is via the main beam of the coordinating earth station antenna.

1.5.3 Distance limits

The effect of interference on terrestrial and space systems often needs to be assessed by considering long- and short-term interference criteria. These criteria are generally represented by a permissible interference power not to be exceeded for more than a specified percentage of time.

The long-term interference criterion (typically associated with percentages of time ≥ 20%) allows the error performance objective (for digital systems) or noise performance objective (for analogue systems) to be met. This criterion will generally represent a low level of interference and hence require a high degree of isolation between the coordinating earth station and terrestrial stations, or other receiving earth stations operating in bidirectionally allocated bands.

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5 These additional areas may be declared as coastal Zone A1 areas by administrations for inclusion in the ITU Digital World Map (IDWM).

The short-term criterion is a higher level of interference, typically associated with time percentages in the range 0.001% to 1% of time, which will either make the interfered-with system unavailable, or cause its specified short-term interference objectives (error rate or noise) to be exceeded.

This Appendix addresses only the protection provided by the short-term criterion. There is therefore an implicit assumption that if the short-term criterion is satisfied, then any associated long-term criteria will also be satisfied. This assumption may not remain valid at short distances because additional propagation effects (diffraction, building/terrain scattering etc.) requiring a more detailed analysis become significant. A minimum coordination distance is therefore needed to avoid this difficulty. This minimum coordination distance is always the lowest value of coordination distance used. At distances equal to or greater than the minimum coordination distance, it can be assumed that interference due to continuous (long-term) propagation effects will not exceed levels permitted by the long-term criteria.

In addition to the minimum coordination distance, it is also necessary to set an upper limit to the calculation distance. Hence the coordination distance, on any azimuth, must lie within the range between the minimum coordination distance and the maximum calculation distance.

1.5.3.1 Minimum coordination distance

For the reasons stated in § 1.5.3, it is necessary to set a lower limit, d_{min}, for the coordination distance. The iterative calculation of the coordination distance starts at this minimum distance, and this distance varies according to radiometeorological factors and the frequency band (see § 4.2). This same minimum coordination distance applies both to propagation mode (1) and propagation mode (2) calculations.

1.5.3.2 Maximum calculation distance

Maximum calculation distances are required for propagation modes (1) and (2). In the case of mode (1), this distance corresponds to the maximum coordination distance, d_{max1}, given in § 4.3 for each of the four radioclimatic Zones. The propagation mode (1) maximum calculation distance is therefore dependent on the mixture of radioclimatic Zones in the propagation path, as described in § 4.3.

The maximum calculation distance for propagation mode (2) is given in § 2 of Annex 2.

1.6 The coordination contour: concepts and construction

The coordination distance, determined for each azimuth around the coordinating earth station, defines the coordination contour that encloses the coordination area. The coordination distance lies within the range defined by the minimum coordination distance and the maximum calculation distance.

In this Appendix, the procedures determine the distance at which the minimum required loss is equal to the predicted path loss. In addition, some procedures[6] require that, for any azimuth, the greater of the distances determined for propagation mode (1) and propagation mode (2) is the distance to be used in determining the coordination contour. In both these cases, the distance at which the minimum required loss is equal to the predicted path loss may or may not be within the range of valid values that define the limits for the coordination distance. Hence, the distance determined from the application of all the procedures is referred to as the required distance.

The coordination area is determined by one of the following methods:

– calculating, in all directions of azimuth from the earth station, the coordination distances and then drawing to scale on an appropriate map the coordination contour; or

– extending the service area in all directions by the calculated coordination distance(s); or

– for some services and frequency bands, extending the service area in all directions by a predetermined coordination distance.

Where a coordination contour includes the potential interference effects arising from both propagation mode (1) and propagation mode (2), the required distance used for any azimuth is the greater of the propagation mode (1) and propagation mode (2) required distances.

The sharing scenarios and the various procedures contained in this Appendix are based on different assumptions. Hence, the coordination area developed for one sharing scenario is likely to be based on different sharing considerations, interference paths and operational constraints than the coordination area developed under a different sharing scenario. Separate coordination areas are therefore required for each sharing scenario described in § 1.4, and each coordination area is specific to the radiocommunication services covered by the sharing scenario under which it was developed. Further, the coordination area developed for one sharing scenario cannot be used to determine the extent of any impact on the radiocommunication services covered by a different sharing scenario. Thus, a coordinating earth station operating in a bidirectionally allocated frequency band that is also allocated to terrestrial services will have two separate coordination areas:

– one coordination area for determining those administrations with terrestrial services that may be affected by the operation of the coordinating earth station; and

– one coordination area for determining those administrations with receiving earth stations that may be affected by the operation of the coordinating (transmitting) earth station.

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6 The same procedures are also used to develop supplementary and auxiliary contours (see Annex 6).

This means that the establishment of the coordination area for an earth station will generally require the determination of several individual coordination areas, each drawn on a separate map. For example, an earth station which transmits to a geostationary space station in the band 10.7-11.7 GHz will need to develop the following coordination areas with respect to:

– analogue terrestrial services which receive in the same band; this will comprise the potential effects arising from both propagation mode (1) and propagation mode (2) interference paths;

– an earth station operating with a geostationary space station which receives in the same band; this will comprise the potential effects arising from both propagation mode (1) and propagation mode (2) interference paths;

– an earth station operating with a non-geostationary space station which receives in the same band; this will comprise the potential effects arising from propagation mode (1) interference paths.

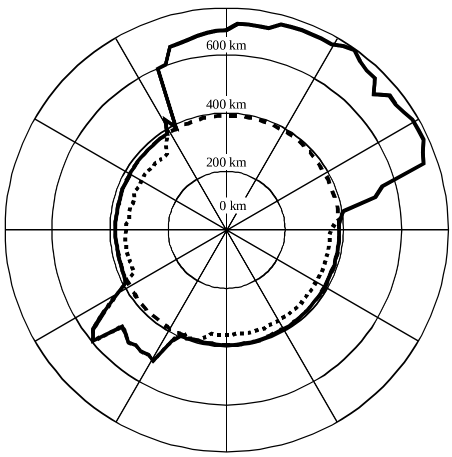
In addition, separate coordination contours are produced if the earth station both transmits and receives in bands shared with terrestrial services. However, for earth stations in bidirectionally allocated frequency bands, the coordination contours with respect to other earth stations are only produced for a transmitting earth station (see § 1.4.4).

Examples of coordination contours for each of the sharing scenarios in § 1.4 is provided in Fig. 1. It will be noticed that for some of the sharing scenarios there is a commonality to the construction of the coordination contour (shown by a solid line) that encompasses each coordination area. For those sharing scenarios where both propagation mode (1) and propagation mode (2) interference paths need to be taken into consideration, the parts of the propagation mode (1) contour and that part of the propagation mode (2) contour located within the overall coordination contour may be drawn using dashed lines.

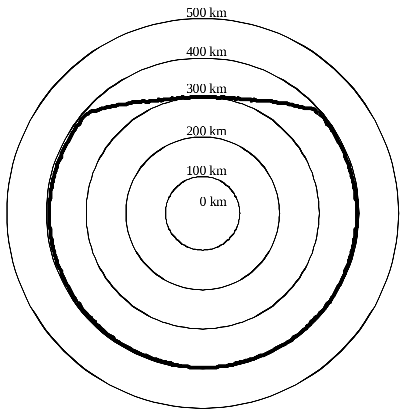
In addition to the coordination contour, supplementary contours and auxiliary contours (see Annex 6) may be drawn to facilitate more detailed sharing discussions. Supplementary contours are based on the coordinating earth station sharing frequency bands with other radiocommunication services, or other types of radio systems in the same service, that have less onerous sharing criteria than the radio system used for developing the coordination area. These supplementary contours may be developed by the same method used to determine the coordination contour, or by other methods as agreed on a bilateral basis between administrations. For example, the Time Variant Gain method described in § 4 of Annex 6 can be used to generate supplementary contours for earth stations operating with non-geostationary space stations. Auxiliary contours are based on less conservative assumptions, with regard to the interference path and operational constraints, for the unknown terrestrial stations, or earth stations. Auxiliary contours are developed separately for propagation mode (1) and propagation mode (2) interference paths. In this context, the contours from which the coordination contour was developed are called main contours, and the auxiliary contours for propagation mode (1) and propagation mode (2) are referenced to the appropriate main contour. The various assumptions used for developing auxiliary contours to the propagation mode (1) contour, or the propagation mode (2) contour, can also be applied to supplementary contours. Hence, auxiliary contours may be drawn for both a main or a supplementary contour.

FIGURE 1

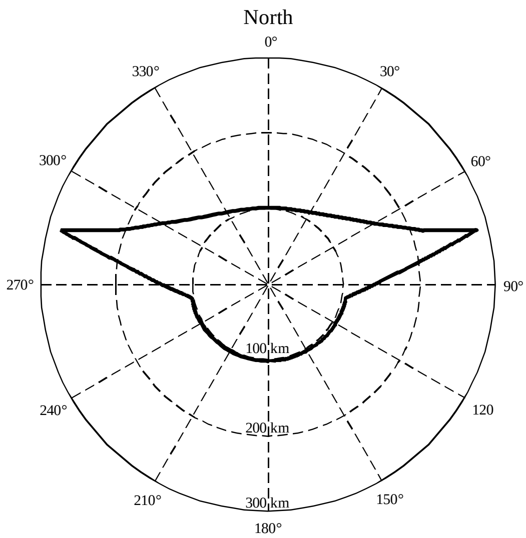
Examples of coordination contours for each of the sharing scenarios listed in § 1.4



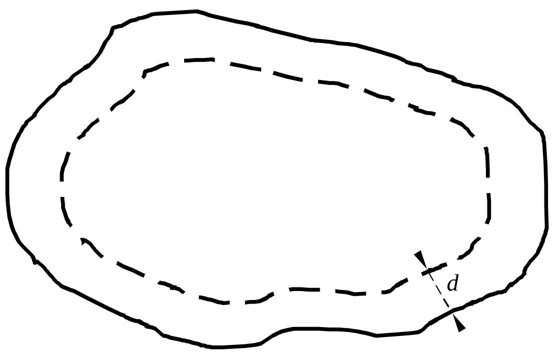
a) Example of the coordination contour for an earth station operating with a GSO space station in § 1.4.1 and § 1.4.3. The coordination contour is marked by the outer line and is comprised of a propagation mode (1) contour and a circular propagation mode (2) contour. The propagation mode (1) contour could also be an example of an earth station with a non-tracking directional antenna operating with a non-GSO space station in § 1.4.2



b) Example of the coordination contour for an earth station with a tracking antenna operating with a non-GSO space station in § 1.4.2 and § 1.4.3



c) Example of the coordination contour for an earth station operating in bidirectionally allocated frequency bands in § 1.4.4. The coordination contour has been developed from a propagation mode (1) contour for a coordinating earth station operating with a non-GSO space station with respect to unknown earth stations operating with GSO space stations. For a propagation mode (2) contour for the GSO-GSO case see Annex 5



d) Example of the coordination contour for an earth station operating in a specified service area in § 1.4.5, § 1.4.6 and § 1.4.7. The coordination contour is marked by the solid outer line and the specified service area by the broken inner line. The coordination distance, *d*, may be a constant value, or vary with azimuth, depending on the sharing scenario and the type of radiocommunication service

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Supplementary contours are always drawn on a separate map as they apply to other types of radio system within the same radiocommunication service, or to radio systems in different radiocommunication services. However, as auxiliary contours apply to the various assumptions used in developing the main, or supplementary, contour they are always drawn on the same map that contains the corresponding main, or supplementary, contour.

While the use of supplementary or auxiliary contours allows less conservative assumptions with regard to the interference path and operational constraints to be taken into consideration, earth stations may transmit or receive a variety of classes of emissions. Hence, the earth station parameters to be used in the determination of the coordination contour, and any supplementary or auxiliary contours, are those which lead to the greatest distances for each earth station antenna beam and each allocated frequency band which the coordinating earth station shares with other radiocommunication systems.

2 Determination of the earth station coordination area with respect to terrestrial stations

This section contains the procedures for determining the coordination area for the case of earth stations sharing frequency bands with terrestrial stations. These procedures cover the cases for earth stations operating with space stations in the geostationary orbit, or in non-geostationary orbits, and are described in the following subsections.

For earth stations operating with space stations in non-geostationary orbits, consideration has to be given to the potential time-varying nature of the earth station's antenna gain towards the horizon.

2.1 Earth stations operating with geostationary space stations

For an earth station operating with a geostationary space station, the value of G_t and G_r towards the horizon is considered to be constant with time. The percentage of time associated with L_b in equation (1) is the same as the time percentage, p, associated with $P_r(p)$. When determining the coordination area between a coordinating earth station operating with a geostationary space station and terrestrial systems, the coordination distance on any azimuth is the greater of the propagation mode (1) and propagation mode (2) required distances. The required distances for propagation mode (1) and propagation mode (2) are determined using the procedures described in § 2.1.1 and § 2.1.2 respectively, after taking into consideration the following discussion on station-keeping.

When the north/south station-keeping of a geostationary space station is relaxed, the orbit of the space station becomes inclined with an inclination that increases gradually with time. This movement of the space station from its nominal position may require small corresponding adjustments in the elevation angle of the earth station antenna beam. Hence, to avoid considering the time variation in antenna gain in the direction of the horizon, the coordination area of an earth station operating with a space station in a slightly inclined geostationary orbit is determined for the minimum angle of elevation and the associated azimuth at which the space station is visible to the earth station (see Annex 3).

2.1.1 Determination of the coordinating earth station's propagation mode (1) contour

Determination of the propagation mode (1) contour is based on great circle propagation mechanisms and it is assumed, for the interference path, that all the terrestrial stations are pointing directly at the coordinating earth station's location. The required distance, on each azimuth, for propagation mode (1) is that distance which will result in a value of propagation mode (1) predicted path loss that is equal to the propagation mode (1) minimum required loss, $L_b(p)$ (dB), as defined in § 1.3.

$$L_b(p) = P_t + G_e + G_x - P_r(p) \qquad \text{dB} \tag{4}$$

where:

P_t and $P_r(p)$: as defined in § 1.3

G_e: gain of the coordinating earth station antenna (dBi) towards the horizon at the horizon elevation angle and azimuth under consideration

G_x: maximum antenna gain (dBi) assumed for the terrestrial station. Tables 7 and 8 give values for G_x for the various frequency bands.

The propagation mode (1) required distance is determined using the procedures described in § 4, and the detailed methods in Annex 1. Specific guidance relevant to the application of the procedures is provided in § 4.4.

2.1.2 Determination of the coordinating earth station's propagation mode (2) contour

The required distance for hydrometeor scatter is that distance that will result in a propagation mode (2) predicted path loss equal to the propagation mode (2) minimum required loss $L(p)$, as defined in equation (3). This propagation mode (2) required distance is determined using the guidance in § 5, and the detailed methods in Annex 2.

For an earth station operating with a geostationary space station having a slightly inclined orbit, the rain-scatter coordination contours for each of the satellite's two most extreme orbit positions are determined individually, using the relevant elevation angles and their associated azimuths to the satellite. The rain scatter area is the total area contained within the two resulting overlapping coordination contours.

2.2 Earth stations operating with non-geostationary space stations

For an earth station that operates with non-geostationary space stations and whose antennas track the space stations, the antenna gain in the direction of the horizon on any azimuth varies with time. The method used to determine the coordination contour is the time invariant gain (TIG) method.

This method uses fixed values of antenna gain based on the maximum assumed variation in horizon antenna gain on each azimuth under consideration. In considering the horizon gain of the antenna for either a transmitting or a receiving earth station, only the horizon antenna gain values during the operational time are to be considered. The horizon antenna gain may be determined using Annex 4. Reference or measured antenna radiation patterns may be used as described in Annex 3. The values of horizon antenna gain defined below are used for each azimuth when applying equation (4) to determine the propagation mode (1) required distances:

$$
\begin{aligned}
G_e &= G_{max} && \text{for} && (G_{max} - G_{min}) \leq 20 \text{ dB} \\
G_e &= G_{min} + 20 && \text{for } 20 \text{ dB} < && (G_{max} - G_{min}) < 30 \text{ dB} \\
G_e &= G_{max} - 10 && \text{for} && (G_{max} - G_{min}) \geq 30 \text{ dB}
\end{aligned}
\tag{5}
$$

where:

G_e: gain of the coordinating earth station antenna (dBi) towards the horizon at the horizon elevation angle and azimuth under consideration in equation (4)

G_{max}, G_{min}: maximum and minimum values of the horizon antenna gain (dBi), respectively, on the azimuth under consideration.

The maximum and minimum values of the horizon antenna gain, on the azimuth under consideration, are derived from the antenna pattern and the maximum and minimum angular separation of the antenna main beam axis from the direction of the physical horizon at the azimuth under consideration.

Where a single value of minimum elevation angle for the main beam axis of the earth station antenna is specified for all azimuths, the minimum and maximum values of the horizon gain can be determined, for each azimuth under consideration, from the antenna pattern and the horizon elevation angle at that azimuth. The plot of the horizon elevation angle against azimuth is called the horizon profile of the earth station.

Additional constraints may be included in the determination of the maximum and minimum values of the horizon antenna gain where an earth station is operating with a constellation of non-geostationary satellites at a latitude for which no satellite is visible at the earth station's specified minimum elevation angle over a range of azimuths. Over this range of azimuth angles, the minimum elevation angle of the earth station antenna main beam axis is given by the minimum elevation angle at which any satellite of the constellation is visible at that azimuth. The azimuthal dependence of this minimum satellite visibility elevation angle may be determined from consideration of the orbital altitude and inclination of the satellites in the constellation, without recourse to simulation, using the procedure in § 1.1 of Annex 4. In this case, the horizon antenna gain to be used in the method depends on the profile of the composite minimum elevation angle. This minimum composite elevation angle at any azimuth is the greater of the minimum satellite visibility elevation angle, at the azimuth under consideration, and the specified minimum elevation angle for the earth station which is independent of the azimuth.

Thus, at each azimuth under consideration, the maximum horizon antenna gain will be determined from the minimum value of the angular separation between the earth station horizon profile at this azimuth and the profile of the minimum composite elevation angle. Similarly, the minimum horizon antenna gain will be determined from the maximum value of the angular separation from the earth station horizon profile at this azimuth to the profile of the minimum composite elevation angle. The procedure for calculating the minimum and maximum angular separations from the profile of the minimum composite elevation angle is given in § 1.2 of Annex 4.

The propagation mode (1) required distance is then determined using the procedures described in § 4, and the detailed methods in Annex 1. Specific guidance relevant to the application of the propagation calculations is provided in § 4.4.

3 Determination of the coordination area between earth stations operating in bidirectionally allocated frequency bands

This section describes the procedures to be used for determination of the coordination area for an earth station transmitting in a frequency band allocated to space services in both Earth-to-space and space-to-Earth directions.

There are various coordination scenarios, involving only non-time-varying antenna gains, or only time-varying antenna gains (both earth stations operate with non-geostationary space stations) or, one time-varying antenna gain and one non-time-varying antenna gain.

The following subsections describe the methods for the determination of coordination area which are specific to each of these bidirectional cases. The procedures applicable to the coordination scenario where both earth stations operate with geostationary space stations are given in § 3.1. The other bidirectional coordination scenarios are considered in § 3.2, where particular attention is given to the approaches for using the horizon antenna gain of the receiving earth station for each of the possible coordination scenarios in the appropriate procedure of § 2.

Table 9 provides the parameters that are to be used in the determination of the coordination area. Table 9 also indicates whether, in each band, the receiving earth stations operate with geostationary or non-geostationary space stations. In some bands, receiving earth stations may operate with both geostationary and non-geostationary space stations. Table 2 indicates the number of coordination contours which need to be drawn for each coordination scenario and the section(s) containing the applicable calculation methods. Once drawn, each coordination contour must be appropriately labelled.

TABLE 2

Coordination contours required for each bidirectional scenario

Coordinating earth station operating to a space station in the	**Unknown receiving earth station operating with a space station in the**	**Section containing the method to determine G_t and G_r**	**Contours required**	
			No.	**Details**
Geostationary orbit	Geostationary orbit	§ 3.1	1	A coordination contour comprising both propagation mode (1) and propagation mode (2) contours
	Non-geostationary orbit	§ 3.2.1	1	A propagation mode (1) coordination contour
	Geostationary or non-geostationary orbits [1]	§ 3.1.1 and 3.2.1	2	Two separate coordination contours, one for the geostationary orbit (propagation mode (1) and mode (2) contours) and one for the non-geostationary orbit (propagation mode (1) contour)
Non-geostationary orbit	Geostationary orbit	§ 3.2.2	1	A propagation mode (1) coordination contour
	Non-geostationary orbit	§ 3.2.3	1	A propagation mode (1) coordination contour
	Geostationary or non-geostationary orbits [1]	§ 3.2.2 and 3.2.3	2	Two separate propagation mode (1) coordination contours, one for the geostationary orbit and one for the non-geostationary orbit

[1] In this case, the bidirectional frequency band may contain allocations in the Earth-to-space direction for space stations in both the geostationary orbit and non-geostationary orbits. Hence, the coordinating administration will not know whether the unknown receiving earth stations are operating with space stations in the geostationary orbit or non-geostationary orbit.

3.1 Coordinating and unknown earth stations operating with geostationary space stations

When both the coordinating and the unknown earth stations operate with space stations in the geostationary orbit, it is necessary to develop a coordination contour comprising both propagation mode (1) and propagation mode (2) contours, using the procedures described in § 3.1.1 and 3.1.2, respectively.

3.1.1 Determination of the coordinating earth station's propagation mode (1) contour

The procedure for the determination of the propagation mode (1) contour in this case differs from that described in § 2.2 in two ways. First, the parameters to be used for the unknown receiving earth station are those in Table 9. Second, and more significantly, the knowledge that both earth stations operate with geostationary satellites can be used to calculate the worst-case value of the horizon antenna gain of the receiving earth station towards the transmitting earth station for each azimuth at the transmitting earth station. The propagation mode (1) required distance is that distance which will result in a value of propagation mode (1) predicted path loss which is equal to the propagation mode (1) minimum required loss, $L_b(p)$ (dB), as defined in § 1.3, and repeated here for convenience.

$$L_b(p) = P_t + G_t + G_r - P_r(p) \qquad \text{dB} \qquad (6)$$

where:

P_t and $P_r(p)$: as defined in § 1.3

G_t: gain of the coordinating (transmitting) earth station antenna (dBi) towards the horizon at the horizon elevation angle and the azimuth under consideration

G_r: the horizon antenna gain of the unknown receiving earth station towards the transmitting earth station on the specific azimuth from the coordinating earth station. Values are determined by the procedure in § 2.1 of Annex 5, based on parameters from Table 9.

To facilitate the determination of the values of G_r to be used at an azimuth from the transmitting earth station, several simplifying approximations must be made:

– that the horizon elevation of the receiving earth station is zero degrees on all azimuths;

– that the receiving earth station operates with a space station that has zero degrees orbital inclination and may be located anywhere on the geostationary orbit that is above the minimum elevation angle, given in Table 9, for the location of the receiving earth station;

– that the latitude of the receiving earth station is the same as that of the transmitting earth station;

– that plane geometry can be used to interrelate the azimuth angles at the respective earth stations, rather than using the great circle path.

The first three assumptions provide the basis for determining the horizon antenna gain of the receiving earth station on any azimuth. The assumption of 0° horizon elevation angle is conservative since the increase in horizon antenna gain due to a raised horizon would, in practice, be more than offset by any real site shielding[7]. The last two assumptions in the list simplify the calculation of the sum of G_t and G_r along any azimuth. Since the propagation

[7] While no site shielding can be assumed for the receiving earth station, any site shielding that may exist at the transmitting earth station is considered by taking into account the horizon elevation angle in accordance with § 1 of Annex 1.

mode (1) required distances are small, in global geometric terms these approximations may introduce a small error in the determination of the horizon antenna gain of the receiving earth station antenna that, in any case, will not exceed 2 dB. Because of the assumption of plane geometry, for a given azimuth at the transmitting earth station the appropriate value of the horizon antenna gain of the receiving earth station is the value on the reciprocal (i.e. ±180°, see § 2.1 of Annex 5) azimuth at the receiving earth station.

The propagation mode (1) required distance is then determined using the procedures described in § 4, and the detailed methods in Annex 1. Specific guidance relevant to the application of the propagation calculations is provided in § 4.4.

3.1.2 Determination of the coordinating earth station's propagation mode (2) contour

The procedure for the determination of the propagation mode (2) contour for a transmitting earth station operating with a geostationary space station uses the same simplifying approximations as made in § 3.1.1, but it is based on a geometrical construction that avoids the requirement for a complex propagation model (see § 3 of Annex 5). Auxiliary contours cannot be used in this method, as the calculations are not based on the propagation mode (2) required loss.

The propagation mode (2) contour is determined using the elevation angle and the azimuth from the coordinating transmitting earth station to the space station, together with the following two considerations:

– the minimum coordination distance (see § 4.2), which will be the required distance for some azimuths; and

– a worst-case required distance determined by the hydrometeor scatter geometry for a receiving earth station located in either of two 6° azimuth sectors. Within these sectors, the receiving earth station is assumed to be operating at the minimum elevation angle to a space station in the geostationary orbit and its main beam intersects the beam for the coordinating transmitting earth station at the point where the latter beam passes through the rain height, h_R. Although the scattering can occur anywhere between the coordinating earth station and this point, the intersection of the two beams at this point represents the worst-case interference scenario. Hence, it results in the worst-case distance requirement for receiving earth stations located in the two azimuth sectors.

For an earth station operating with a space station in an inclined orbit, the lowest expected operational antenna elevation angle and its associated azimuth are used in the calculations.

The propagation mode (2) contour is determined using the method in § 3 of Annex 5.

3.2 Coordinating or unknown earth stations operating with non-geostationary space stations

To determine the coordination area, the method described in § 2.2 is used. For the cases where a coordinating (transmitting) earth station operates with non-geostationary space stations, the following procedures assume that the earth station antenna is tracking the space station, otherwise see § 1.4.2. Table 9 provides values of horizon antenna gain to be used in the calculations.

One or more of the following three procedures may be needed to determine the required propagation mode (1) coordination contours of Table 2. Propagation mode (2) contours are not required for any of the cases where either of the earth stations operates with space stations in non-geostationary orbits.

3.2.1 A coordinating earth station operating with a geostationary space station with respect to unknown earth stations operating with non-geostationary space stations

When the coordinating earth station operates with a space station in the geostationary orbit and the unknown earth stations operate with space stations in non-geostationary orbits, the propagation mode (1) coordination area is determined using the procedures described in § 2.1.1. The only modification needed is to use the horizon antenna gain, G_r, of the unknown receiving earth station in place of the terrestrial station gain, G_x. The appropriate values for this gain and the appropriate system parameters are contained in Table 9.

3.2.2 A coordinating earth station operating with non-geostationary space stations with respect to unknown earth stations operating with geostationary space stations

When the coordinating earth station operates to space stations in non-geostationary orbits and the unknown earth stations operate with space stations in the geostationary orbit, the horizon antenna gain, G_r, for the unknown receiving earth station is determined in accordance with the simplifying approximations of § 3.1.1, as elaborated in § 2.1 of Annex 5, and the parameters of Table 9. Determination of the propagation mode (1) coordination area then follows the procedure of § 2.2 by using the appropriate horizon gain of the receiving earth station at each azimuth under consideration and the appropriate system parameters from Table 9.

3.2.3 Coordinating and unknown earth stations operating with non-geostationary space stations

When the coordinating earth station operates with space stations in non-geostationary orbits and the unknown earth stations operate with space stations in non-geostationary orbits, the propagation mode (1) coordination area is determined using the procedure described in § 2.2. The only modification is to use the horizon antenna gain, G_r, of the unknown receiving earth station in place of the terrestrial station antenna gain. The appropriate values for this gain and the appropriate system parameters are given in Table 9.

4 General considerations for the determination of the propagation mode (1) required distance

For the determination of the propagation mode (1) required distances, the applicable frequency range has been divided into three parts. The propagation calculations for the VHF/UHF frequencies between 100 MHz and 790 MHz are based upon propagation mode (1) predicted path loss curves. From 790 MHz to 60 GHz the propagation modelling uses tropospheric scatter, ducting and layer reflection/refraction models. At higher frequencies up to 105 GHz, the model is based on a free-space loss and a conservative assumption for gaseous absorption. The possible range of time percentages is different in the different propagation models.

After taking site shielding (§ 1 of Annex 1) into consideration, for the coordinating earth station only, the following methods are used to determine the propagation mode (1) required distances:

– For frequencies between 100 MHz and 790 MHz, the method described in § 2 of Annex 1.

– For frequencies between 790 MHz and 60 GHz, the method described in § 3 of Annex 1.

– For frequencies between 60 GHz and 105 GHz, the method described in § 4 of Annex 1.

The three methods referred to above rely on a value of propagation mode (1) minimum required loss, determined according to the appropriate system parameters in Tables 7, 8 and 9.

4.1 Radio-climatic information

For the calculation of the propagation mode (1) required distance, the world has been classified in terms of a radio-meteorological parameter representing clear-air anomalous propagation conditions. The percentage of time β_e for which these clear-air anomalous propagation conditions exist, is latitude dependent and is given by:

$$\beta_e = \begin{cases} 10^{1.67 - 0.015\,\zeta_r} & \text{for } \zeta_r \le 70° \quad (7) \\ 4.17 & \text{for } \zeta_r > 70° \quad (8) \end{cases}$$

with:

$$\zeta_r = \begin{cases} |\zeta| - 1.8 & \text{for } |\zeta| > 1.8° \quad (9) \\ 0 & \text{for } |\zeta| \le 1.8° \quad (10) \end{cases}$$

where ζ is the latitude of the earth station's location (degrees).

For frequencies between 790 MHz and 60 GHz, the path centre sea level surface refractivity, N_0, is used in the propagation mode (1) calculations. This can be calculated using:

$$N_0 = 330 + 62.6\,\mathrm{e}^{-\left(\frac{\zeta - 2}{32.7}\right)^2} \tag{11}$$

4.2 Minimum coordination distance for propagation modes (1) and (2)

The minimum coordination distance can be calculated in two steps. First calculate distance d_x using:

$$d_x = 100 + \frac{(\beta_e - 40)}{2} \qquad \text{km} \tag{12}$$

where β_e is given in § 4.1.

Then calculate the minimum coordination distance at any frequency, f (GHz) in the range 100 MHz to 105 GHz using:

$$d_{min} = \begin{cases} 100 + \dfrac{(\beta_e - f)}{2} & \text{km} \quad \text{for} \quad f < 40 \ \text{GHz} & (13) \\ \dfrac{(54 - f)\,d_x + 10(f - 40)}{14} & \text{km} \quad \text{for} \quad 40\,\text{GHz} \le f < 54 \ \text{GHz} & (14) \\ 10 & \text{km} \quad \text{for} \quad 54\,\text{GHz} \le f < 66 \ \text{GHz} & (15) \\ \dfrac{10(75 - f) + 45(f - 66)}{9} & \text{km} \quad \text{for} \quad 66\,\text{GHz} \le f < 75 \ \text{GHz} & (16) \\ 45 & \text{km} \quad \text{for} \quad 75\,\text{GHz} \le f < 90 \ \text{GHz} & (17) \\ 45 - \dfrac{(f - 90)}{1.5} & \text{km} \quad \text{for} \quad 90\,\text{GHz} \le f \le 105 \ \text{GHz} & (18) \end{cases}$$

The distance from which all iterative calculations start (for both propagation mode (1) and propagation mode (2)), is the minimum coordination distance, d_{min}, as given in equations (13) to (18).

4.3 Maximum coordination distance for propagation mode (1)

In the iterative calculation described in Annex 1, it is necessary to set an upper limit, d_{max1}, to the propagation mode (1) coordination distance.

For frequencies less than or equal to 60 GHz and propagation paths entirely within a single Zone, the distance shall not exceed the maximum coordination distance given in Table 3 for that Zone.

For mixed paths, the required distance can comprise one or more contributions from Zones A1, A2, B and C. The aggregate distance for any one zone must not exceed the value given in Table 3. The overall required distance must not exceed the value in Table 3 for the zone in the mixed path having the largest Table 3 value. Thus, a path comprising both Zones A1 and A2 must not exceed 500 km.

TABLE 3

Maximum coordination distances for propagation mode (1) for frequencies below 60 GHz

Zone	d_{max1} (km)
A1	500
A2	375
B	900
C	1 200

For frequencies above 60 GHz, the maximum coordination distance, d_{max1}, is given by:

$$d_{max1} = 80 - 10 \log \left(\frac{p}{50} \right) \tag{19}$$

where p is defined in § 1.3.

4.4 Guidance on application of propagation mode (1) procedures

As explained in § 1.3, for those cases where earth stations are sharing with terrestrial stations, it is appropriate to apply a correction factor, C_i (dB), to the worst-case assumptions on system parameters and interference path geometry. This correction factor takes into account the fact that the assumption that all the worst-case values will occur simultaneously is unrealistic when determining the propagation mode (1) required distances.

The characteristics of terrestrial systems depend on the frequency band, and the value of the correction factor to be applied follows the frequency dependence given in equation (20). At frequencies between 100 MHz and 400 MHz, and between 60 GHz and 105 GHz, sharing between earth stations and terrestrial systems is a recent development and there is little established practical experience, or opportunity to analyse operational systems. Hence, the value of the correction factor is 0 dB in these bands. Between 400 MHz and 790 MHz and between 4.2 GHz and 60 GHz, the value of the correction factor is reduced in proportion to the logarithm of the frequency, as indicated in equation (20).

The value of the nominal correction to be used at any frequency *f* (GHz) is therefore given by:

$$X(f) = \begin{cases} 0 & \text{dB} \quad \text{for} \quad f \le 0.4 \ \text{GHz} \\ 3.3833X(\log f + 0.3979) & \text{dB} \quad \text{for} \quad 0.4 \ \text{GHz} < f \le 0.79 \ \text{GHz} \\ X & \text{dB} \quad \text{for} \quad 0.79 \ \text{GHz} < f \le 4.2 \ \text{GHz} \\ -0.8659X(\log f - 1.7781) & \text{dB} \quad \text{for} \quad 4.2 \ \text{GHz} < f \le 60 \ \text{GHz} \\ 0 & \text{dB} \quad \text{for} \quad f > 60 \ \text{GHz} \end{cases} \tag{20}$$

where:

X: 15 dB for a transmitting earth station and 25 dB for a receiving earth station.

In principle, the value of the nominal correction factor, $X(f)$, is distance and path independent. However, there are a number of issues relating to interference potential at the shorter distances, and it is not appropriate to apply the full nominal correction at these distances. The correction factor C_i is therefore applied proportionally with distance along the azimuth under consideration, starting with 0 dB at d_{min}, such that the full value of $X(f)$ is achieved at a nominal distance of 375 km from the earth station.

Hence, the correction is applied using the correction constant $Z(f)$ (dB/km) where:

$$Z(f) = \frac{X(f)}{375 - d_{min}} \qquad \text{dB/km} \tag{21}$$

The correction factor C_i (dB) is calculated in equations (28b) and (52) from the correction constant $Z(f)$ (dB/km).

At distances greater than 375 km, the correction factor C_i to be applied is the value of C_i at 375 km distance.

In addition, the correction factor is applied to its highest value only on land paths. The correction factor is 0 dB for wholly sea paths. A proportion of the correction factor is applied on mixed paths. The amount of correction to be applied to a particular path is determined by the path description parameters used for the propagation mode (1) calculation (correction factors C_i and C_{2i} in § 2 and § 3 respectively of Annex 1). As the correction factor is distance dependent, it is applied automatically within the iterative calculation used to determine the propagation mode (1) required distance (see Annex 1).

The correction factor does not apply to the bidirectional case and therefore in the determination of the bidirectional coordination contour:

$$Z(f) = 0 \qquad \text{dB/km}$$

For the determination of propagation mode (1) auxiliary contours, the propagation mode (1) minimum required loss $L_b(p)$ for p% of time in equation (1) (see § 1.3) is replaced by:

$$L_{bq}(p) = L_b(p) + Q \qquad \text{dB} \tag{22}$$

where:

Q: auxiliary contour value (dB).

Note that auxiliary contour values are assumed to be negative (i.e. –5, –10, –15, –20 dB, etc.).

5 General considerations for the determination of the propagation mode (2) required distance

The determination of the contour for scattering from hydrometeors (e.g. rain scatter) is predicted on a path geometry that is substantially different from that of the great-circle propagation mechanisms. Hydrometeor scatter can occur where the beams of the earth station and the terrestrial station intersect (partially or completely) at, or below, the rain height h_R (see § 3 of Annex 2). It is assumed that at heights above this rain height the effect of scattering will be suppressed by additional attenuation, and it will not, therefore, contribute significantly to the interference potential. For the determination of the propagation mode (2) contour, it is assumed that the main beam of any terrestrial station exactly intersects the main beam of the coordinating earth station. The mitigating effects of partial beam intersections can be determined using propagation mode (2) auxiliary contours.

Since, to a first approximation, microwave energy is scattered isotropically by rain, interference can be considered to propagate equally at all azimuths around the common volume centred at the beam intersection (see § 1.3). Generally, the beam intersection will not lie on the great-circle path between the two stations. A common volume can therefore result from terrestrial stations located anywhere around the earth station, including locations behind the earth station.

The propagation mode (2) contour is a circle with a radius equal to the propagation mode (2) required distance. Unlike the case for propagation mode (1), the propagation mode (2) contour is not centred on the earth station's physical location, instead it is centred on a point on the earth's surface immediately below the centre of the common volume.

A common volume can exist, with equal probability, at any point along the earth station beam between the earth station's location and the point at which the beam reaches the rain height. To provide appropriate protection for/from terrestrial stations[8], the centre of the common volume is assumed to be half way between the earth station and the point at which its beam intersects the

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[8] This procedure does not apply for the case of an earth station sharing a frequency band with other earth stations operating in the opposite direction of transmission, as for that specific case the propagation mode (2) contour is based on a geometric construction.

rain height. The distance between the projection of this point on to the Earth's surface and the location of the earth station is known as Δd (see § 4 of Annex 2). The centre of the propagation mode (2) contour is therefore Δd (km) from the earth station on the azimuth of the earth station's main beam axis.

5.1 The required distance for propagation mode (2)

Propagation mode (2) required distances are measured along a radial originating at the centre of the rain scatter common volume. The calculation requires iteration for distance, starting at the same minimum distance as that defined for propagation mode (1) until either the required propagation mode (2) minimum required loss, or a latitude-dependent propagation mode (2) maximum calculation distance, is achieved. The propagation mode (2) calculations use the method described in Annex 2. The calculations only need to be performed in the frequency range 1 000 MHz to 40.5 GHz. Outside this frequency range, rain scatter interference can be neglected and the propagation mode (2) required distance is set to the minimum coordination distance given by equations (13) to (18).

ANNEX 1

Determination of the required distance for propagation mode (1)

1 Adjustments for earth station horizon elevation angle and distance

For propagation mode (1), the required distance depends on the characteristics of the physical horizon around the earth station. The horizon is characterized by the horizon distance d_h (see below), and the horizon elevation angle ε_h. The horizon elevation angle is defined here as the angle (degrees), viewed from the centre of the earth station antenna, between the horizontal plane and a ray that grazes the physical horizon in the direction concerned. The value of ε_h is positive when the physical horizon is above the horizontal plane and negative when it is below.

It is necessary to determine horizon elevation angles and distances for all azimuths around an earth station. In practice it will generally suffice to do this in azimuth increments of 5°. However, every attempt should be made to identify, and take into consideration, minimum horizon elevation angles that may occur between those azimuths examined in 5° increments.

For the purposes of the determination of the propagation mode (1) required distance it is useful to separate the propagation effects related to the local horizon around the earth station which, on some or all azimuths, may be determined by nearby hills or mountains, from the propagation effects on the remainder of the path. This is achieved by referencing the propagation model to a

0° horizon elevation angle for the coordinating earth station, and then to include a specific term A_h to deal with the known horizon characteristics of the earth station being coordinated. Where appropriate, A_h modifies the value of the path loss, on each azimuth, from which the propagation mode (1) required distance is derived.

There are two situations in which the level of attenuation for the propagation mode (1) path loss with respect to the reference 0° case can change:

– The first is where the coordinating earth station has a positive horizon elevation angle (on a particular azimuth). In this case, it will benefit from additional diffraction propagation losses over the horizon (generally referred to as site shielding). As a result, the attenuation A_h is positive and the value of the required path loss is reduced, with respect to the reference 0° horizon elevation angle case (see equations (27a) and (27b)).

– The second situation is where the coordinating earth station is at a location above the local foreground, and has a negative (downward) horizon elevation angle on a particular azimuth. In this case, a measure of additional protection is necessary because the path angular distance along the radial is reduced and hence the path loss for a given distance will be lower than for the zero degree elevation angle case. It is convenient to deal with this effect as part of the site shielding calculation. As a result, the attenuation A_h will be negative and the value of the required path loss is increased, with respect to the reference 0° horizon elevation angle case.

The contribution made by the attenuation arising from the coordinating earth station's horizon characteristics to the propagation mode (1) minimum required loss modifies the value of path loss that then needs to be determined in the three propagation mode (1) models. The attenuation A_h is calculated for each azimuth around the coordinating earth station as follows.

The distance of the horizon, d_h, from the earth station's location, is determined by:

$$d_h = \begin{cases} 0.5 \text{ km} & \text{if no information is available about the horizon distance, or} \\ & \text{if the distance is} < 0.5 \text{ km} \\ \text{horizon distance (km)} & \text{if this is within the range } 0.5 \text{ km} \le \text{horizon distance} \le 5.0 \text{ km} \\ 5.0 \text{ km} & \text{if the horizon distance is} > 5.0 \text{ km} \end{cases}$$

The contribution made by the horizon distance, d_h, to the total site shielding attenuation is given by A_d (dB) for each azimuth using:

$$A_d = 15\left[1 - \exp\left(\frac{0.5 - d_h}{5}\right)\right]\left[1 - \exp\left(-\varepsilon_h\ f^{1/3}\right)\right] \qquad \text{dB} \qquad (23)$$

where f is the frequency (GHz) throughout this Annex.

The total site shielding attenuation along each azimuth from the coordinating earth station is given by:

$$A_h = \begin{cases} 20\log(1 + 4.5\varepsilon_h f^{1/2}) + \varepsilon_h f^{1/3} + A_d & \text{dB} \quad \text{for} \quad \varepsilon_h \geq 0° \quad (24a) \\ 3\left[(f+1)^{1/2} - 0.0001 f - 1.0487\right]\varepsilon_h & \text{dB} \quad \text{for } 0° > \varepsilon_h \geq -0.5° \quad (24b) \\ -1.5\left[(f+1)^{1/2} - 0.0001 f - 1.0487\right] & \text{dB} \quad \text{for} \quad \varepsilon_h < -0.5° \quad (24c) \end{cases}$$

The value of A_h must be limited to satisfy the conditions:

$$-10 \leq A_h \leq (30 + \varepsilon_h) \qquad (25)$$

In equations (23), (24) and (25) the value of ε_h must always be expressed in degrees. The limits defined in equation (25) are specified because protection outside these limits may not be realized in practical situations.

2 Frequencies between 100 MHz and 790 MHz

The propagation model given in this section is limited to an average annual time percentage, p, in the range 1% to 50%.

An iterative process is used to determine the propagation mode (1) required distance. First, equation (27) is evaluated. Then, commencing at the minimum coordination distance, d_{min}, given by the method described in § 1.5.3 of the main body of this Appendix, equations (28) to (31) are iterated for distances d_i (where i = 0, 1, 2,...) incremented in steps of s (km) as described in § 1.3 of the main body of this Appendix. In each iteration, d_i is the distance considered. This process is continued until either of the following expressions becomes true:

$$L_2(p) \geq \begin{cases} L_1(p) & \text{for the main or supplementary contour} \\ L_{1q}(p) & \text{for the auxiliary contour} \end{cases} \qquad (26a)$$

or:

$$d_i \geq \begin{cases} d_{max1} & \text{for the main or supplementary contour} \\ d_1 & \text{for the auxiliary contour} \end{cases} \qquad (26b)$$

The required distance, d_1, or the auxiliary contour distance, d_q, are then given by the distance for the last iteration: i.e.

$$d_1 = d_i \tag{26c}$$

or:

$$d_q = d_i \tag{26d}$$

As the eventual mix of zones along a path is unknown, all paths are treated as if they are potential land and sea paths. Parallel calculations are undertaken, the first assuming the path is all land and a second assuming it is all sea. A non-linear interpolation is then performed, the output of which depends upon the current mix of land and sea losses in the distance, d_i. Where the current mix along the path includes sections of both warm sea and cold sea zones, all the sea along that path is assumed to be warm sea.

For the main or supplementary contour:

$$L_1(p) = L_b(p) - A_h \tag{27a}$$

For an auxiliary contour:

$$L_{1q}(p) = L_{bq}(p) - A_h \tag{27b}$$

where:

$L_b(p)$ (dB) and $L_{bq}(p)$ (dB): minimum required loss required for p% of the time for the main or supplementary contour and the auxiliary contour with value Q (dB), respectively (see equation (22)).

Iterative calculations

At the start of each iteration calculate the current distance for i = 0, 1, 2,…:

$$d_i = d_{min} + i \cdot s \tag{28a}$$

The correction factor, C_i (dB), (see § 4.4 of the main body of this Appendix) for the distance, d_i, is given by:

$$C_i = \begin{cases} Z(f)(d_i - d_{min}) & \text{dB} \quad \text{for the main or supplementary contour} \\ 0 & \text{dB} \quad \text{for the auxiliary contour} \end{cases} \tag{28b}$$

where $Z(f)$ is given by equation (21) in § 4.4 of the main body of this Appendix.

At distances greater than 375 km, the value of the correction factor (C_i in equation (28b)) to be applied is the value of C_i at the 375 km distance.

The loss, $L_{bl}(p)$, where it is assumed that the path is wholly land (Zones A1 or A2), is evaluated successively using:

$$L_{bl}(p) = 142.8 + 20 \log f + 10 \log p + 0.1\, d_i + C_i \tag{29}$$

The loss, $L_{bs}(p)$, where it is assumed that the path is wholly cold sea (Zone B) or warm sea (Zone C), is evaluated successively using:

$$L_{bs}(p_1)=\begin{cases}\left.\begin{array}{l}49.91\log\left(d_i+1840\,f^{1.76}\right)+1.195f^{0.393}(\log p)^{1.38}d_i^{0.597}\\+(0.01d_i-70)(f-0.1581)+(0.02-2\times10^{-5}p^2)\,d_i\\+9.72\times10^{-9}d_i^2p^2+20.2\end{array}\right\}\text{for ZoneB} & (30a)\\ \left.\begin{array}{l}49.343\log\left(d_i+1840\,f^{1.58}\right)+1.266(\log p)^{(0.468+2.598\,f)}\,d_i^{0.453}\\+(0.037d_i-70)(f-0.1581)+1.95\times10^{-10}d_i^2p^3+20.2\end{array}\right\}\text{for ZoneC} & (30b)\end{cases}$$

The predicted path loss at the distance considered is then given by:

$$L_2(p)=L_{bs}(p)+\left[1-\exp\left(-5.5\left(\frac{d_{tm}}{d_i}\right)^{1.1}\right)\right]\left(L_{bl}(p)-L_{bs}(p)\right) \qquad (31)$$

where:

d_{tm} (km): longest continuous land (inland + coastal) distance, i.e. Zone A1 + Zone A2 along the current path.

3 Frequencies between 790 MHz and 60 GHz

The propagation model given in this section is limited to an average annual time percentage (p) in the range 0.001% to 50%.

An iterative process is used to determine the propagation mode (1) required distance. First, equations (33) to (42) are evaluated. Then, commencing at the minimum coordination distance, d_{min}, equations (43) to (53) are iterated for distances d_i, where i = 0, 1, 2,..., incremented in steps of s (km) as described in § 1.3 of the main body of this Appendix. For each iteration, d_i is the distance considered. This process is continued until either of the following expressions becomes true:

$$\begin{array}{llll}(L_5(p)\ge L_3(p)) & \text{and} & (L_6(p)\ge L_4(p)) & \text{for the main or supplementary contour}\\(L_5(p)\ge L_{3q}(p)) & \text{and} & (L_6(p)\ge L_{4q}(p)) & \text{for the auxiliary contour}\end{array} \qquad (32a)$$

or:

$$d_i\ \ge\begin{cases}d_{max1} & \text{for the main or supplementary contour}\\d_1 & \text{for the auxiliary contour}\end{cases} \qquad (32b)$$

The required distance, d_1, or the auxiliary contour distance, d_q, is then given by the current distance for the last iteration, i.e.

$$d_1 = d_i \tag{32c}$$

or:

$$d_q = d_i \tag{32d}$$

Specific attenuation due to gaseous absorption

Calculate the specific attenuation (dB/km) due to dry air:

$$\gamma_o = \begin{cases} \left[7.19 \times 10^{-3} + \dfrac{6.09}{f^2 + 0.227} + \dfrac{4.81}{(f-57)^2 + 1.50} \right] f^2 \times 10^{-3} & \text{for } f \le 56.77 \text{ GHz} \quad (33a) \\ 10 & \text{for } f > 56.77 \text{ GHz} \quad (33b) \end{cases}$$

The specific attenuation due to water vapour is given as a function of ρ (the water vapour density (g/m^3)) by the following equation:

$$\gamma_w(\rho) = \left(0.050 + 0.0021\rho + \frac{3.6}{(f - 22.2)^2 + 8.5} \right) f^2 \rho \times 10^{-4} \tag{34}$$

Calculate the specific attenuation (dB/km) due to water vapour for the troposcatter propagation model using a water vapour density of 3.0 g/m^3:

$$\gamma_{wt} = \gamma_w(3.0) \tag{35a}$$

Calculate the specific attenuation (dB/km) due to water vapour for the ducting propagation model using a water vapour density of 7.5 g/m^3 for paths over land, Zones A1 and A2, using:

$$\gamma_{wdl} = \gamma_w(7.5) \tag{35b}$$

Calculate the specific attenuation (dB/km) due to water vapour for the ducting propagation model using a water vapour density of 10.0 g/m^3 for paths over sea, Zones B and C, using:

$$\gamma_{wds} = \gamma_w(10.0) \tag{35c}$$

Note that the value of 10 g/m^3 is used for both Zones B and C in view of the lack of data on the variability of water vapour density on a global basis, particularly the minimum values.

Calculate the frequency-dependent ducting specific attenuation (dB/km):

$$\gamma_d = 0.05 f^{1/3} \tag{36}$$

For the ducting model

Calculate the reduction in attenuation arising from direct coupling into over-sea ducts (dB):

$$A_c = \frac{-6}{(1 + d_c)} \tag{37}$$

where d_c (km) is the distance from a land based earth station to the coast in the direction being considered.

d_c is zero in other circumstances.

Calculate the minimum loss to be achieved within the iterative calculations:

$$A_1 = 122.43 + 16.5 \log f + A_h + A_c \tag{38}$$

For the main or supplementary contour:

$$L_3(p) = L_b(p) - A_1 \tag{39a}$$

For an auxiliary contour:

$$L_{3q}(p) = L_{bq}(p) - A_1 \tag{39b}$$

where:

$L_b(p)$ (dB) and $L_{bq}(p)$ dB: minimum required loss required for p% of the time for the main or supplementary contour and the auxiliary contour with value Q (dB) respectively (see equation (22)).

For the tropospheric scatter model

Calculate the frequency-dependent part of the losses (dB):

$$L_f = 25 \log(f) - 2.5 \left[\log\left(\frac{f}{2}\right) \right]^2 \tag{40}$$

Calculate the non-distance-dependent part of the losses (dB):

$$A_2 = 187.36 + 10\,\varepsilon_h + L_f - 0.15\,N_0 - 10.1\left(-\log\left(\frac{p}{50}\right)\right)^{0.7} \tag{41}$$

where:

ε_h: earth station horizon elevation angle (degrees)

N_0: path centre sea level surface refractivity (see equation (11), § 4.1 in the main body of this Appendix).

Calculate the minimum required value for the distance dependent losses (dB):

For the main, or supplementary, contour:

$$L_4(p) = L_b(p) - A_2 \tag{42a}$$

For an auxiliary contour:

$$L_{4q}(p) = L_{bq}(p) - A_2 \tag{42b}$$

where:

$L_b(p)$ (dB) and $L_{bq}(p)$ (dB): minimum required loss required for p% of the time for the main or supplementary contour and the auxiliary contour of value Q (dB) respectively (see equation (22)).

Iterative calculations

At the start of each iteration, calculate the distance considered for i = 0, 1, 2,...:

$$d_i = d_{min} + i \cdot s \tag{43}$$

Calculate the specific attenuation due to gaseous absorption (dB/km):

$$\gamma_g = \gamma_o + \gamma_{wdl}\left(\frac{d_t}{d_i}\right) + \gamma_{wds}\left(1 - \frac{d_t}{d_i}\right) \tag{44}$$

where:

d_t (km): current aggregate land distance, Zone A1 + Zone A2, along the current path.

Calculate the following zone-dependent parameters:

$$\tau = 1 - \exp\left[-\left(4.12 \times 10^{-4}\,(d_{lm})^{2.41}\right)\right] \tag{45}$$

where:

d_{lm} (km): longest continuous inland distance, Zone A2, along the path considered;

$$\mu_1 = \left[10^{\frac{-d_{tm}}{16-6.6\,\tau}} + \left[10^{-(0.496+0.354\,\tau)}\right]^5 \right]^{0.2} \tag{46}$$

where:

d_{tm} (km): longest continuous land (i.e. inland + coastal) distance, Zone A1 + Zone A2 along the path considered.

μ_1 shall be limited to $\mu_1 \leq 1$.

$$\sigma = -0.6 - 8.5 \times 10^{-9}\ d_i^{3.1}\ \tau \tag{47}$$

σ shall be limited to $\sigma \geq -3.4$.

$$\mu_2 = \left(2.48 \times 10^{-4}\ d_i^2\right)^{\sigma} \tag{48}$$

μ_2 shall be limited to $\mu_2 \leq 1$.

$$\mu_4 = \begin{cases} 10^{(-0.935\,+\,0.0176\,\zeta_r)\ \log \mu_1} & \text{for} \quad \zeta_r \leq 70° \quad (49a) \\ 10^{0.3\,\log \mu_1} & \text{for} \quad \zeta_r > 70° \quad (49b) \end{cases}$$

where ζ_r is given in equations (9) and (10), § 4.1 in the main body of this Appendix.

Calculate the path-dependent incidence of ducting, β, and a related parameter, Γ_1, used to calculate the time dependency of the path loss:

$$\beta = \beta_e \cdot \mu_1 \cdot \mu_2 \cdot \mu_4 \tag{50}$$

where β_e is given in equations (7) and (8), § 4.1 in the main body of this Appendix.

$$\Gamma_1 = \frac{1.076}{(2.0058 - \log \beta)^{1.012}}\ \exp\left[-\left(9.51 - 4.8\log\beta + 0.198\,(\log\beta)^2\right) \times 10^{-6}\ d_i^{1.13}\right] \tag{51}$$

Calculate the correction factor, C_{2i} (dB) (see § 4.4 in the main body of this Appendix) using:

$$C_{2i} = \begin{cases} Z(f)(d_i - d_{min})\tau & \text{dB} \quad \text{for the main or supplementary contour} \\ 0 & \text{dB} \quad \text{for the auxiliary contour} \end{cases} \tag{52}$$

where Z(f) is calculated using equation (21) in § 4.4 in the main body of this Appendix.

At distances greater than 375 km the value of the correction factor C_{2i} in equation (52) to be applied is the value of C_{2i} at the 375 km distance.

Calculate the distance-dependent part of the losses (dB) for ducting:

$$L_5(p) = (\gamma_d + \gamma_g)\, d_i + (1.2 + 3.7 \times 10^{-3}\, d_i) \log\left(\frac{p}{\beta}\right) + 12\left(\frac{p}{\beta}\right)^{\Gamma_1} + C_{2i} \tag{53}$$

and for tropospheric scatter:

$$L_6(p) = 20 \log(d_i) + 5.73 \times 10^{-4}\big(112 - 15 \cos(2\zeta)\big)\, d_i + (\gamma_o + \gamma_{wt})\, d_i + C_{2i} \tag{54}$$

For the determination of distances for auxiliary contours, $C_{2i} = 0$ dB.

4 Frequencies between 60 GHz and 105 GHz

This propagation model is valid for average annual percentage time (p) in the range from 0.001% to 50%.

An iterative process is used to determine the propagation mode (1) required distance. First, equations (55) to (59) are evaluated. Then commencing at the minimum coordination distance, d_{min}, equations (60) and (61) are iterated for distances d_i, where i = 0, 1, 2,..., incremented in steps of s (km) as described in § 1.3 of the main body of this Appendix. For each iteration, d_i is the distance considered.

This process is continued until either of the following expressions becomes true:

$$L_9(p) \geq \begin{cases} L_8(p) & \text{for the main or supplementary contour} \\ L_{8q}(p) & \text{for the auxiliary contour} \end{cases} \tag{54a}$$

or:

$$d_i \geq \begin{cases} d_{max1} & \text{for the main or supplementary contour} \\ d_1 & \text{for the auxiliary contour} \end{cases} \tag{54b}$$

The required distance, d_1, or the auxiliary contour distance d_q are then given by the current distance for the last iteration: i.e.

$$d_1 = d_i \tag{54c}$$

or:

$$d_q = d_i \tag{54d}$$

Calculate the specific attenuation (dB/km) for dry air in the frequency range 60 GHz to 105 GHz using:

$$\gamma_{om} = \begin{cases} \left[2 \times 10^{-4} \left(1 - 1.2 \times 10^{-5}\ f^{1.5}\right) + \dfrac{4}{(f - 63)^2 + 0.936} + \dfrac{0.28}{(f - 118.75)^2 + 1.771} \right] f^2\, 6.24 \times 10^{-4} & \text{dB/km} \quad \text{for} \quad f > 63.26\ \text{GHz} \quad (55a) \\ 10 \quad \text{dB/km} & \text{for} \quad f \leq 63.26\ \text{GHz} \quad (55b) \end{cases}$$

Calculate the specific attenuation (dB/km) for an atmospheric water vapour density of 3 g/m^3 using:

$$\gamma_{wm} = (0.039 + 7.7 \times 10^{-4}\ f^{0.5})\ f^2\ 2.369 \times 10^{-4} \tag{56}$$

Calculate a conservative estimate of the specific attenuation (dB/km) for gaseous absorption using:

$$\gamma_{gm} = \gamma_{om} + \gamma_{wm} \qquad \text{dB/km} \tag{57}$$

For the required frequency and the value of earth station site shielding, A_h (dB), as calculated using the method described in § 1 of this Annex, calculate the minimum loss to be achieved in the iterative calculations:

$$L_7(p) = 92.5 + 20 \log(f) + A_h \qquad \text{dB} \tag{58}$$

For the main or supplementary contour:

$$L_8(p) = L_b(p) - L_7 \qquad \text{dB} \tag{59a}$$

For an auxiliary contour:

$$L_{8q}(p) = L_{bq}(p) - L_7 \qquad \text{dB} \tag{59b}$$

where:

$L_b(p)$ dB and $L_{bq}(p)$ (dB): minimum required loss required for p% of the time for the main or supplementary contour and the auxiliary contour of value Q (dB) respectively (see equation (22)).

Iterative calculations

At the start of each iteration calculate the distance for $i = 0, 1, 2, ...$:

$$d_i = d_{min} + i \cdot s \tag{60}$$

Calculate the distance-dependent losses for the distance:

$$L_9(p) = \gamma_{gm}\ d_i + 20 \log (d_i) + 2.6 \left[1 - \exp\left(\frac{-d_i}{10}\right)\right] \log\left(\frac{p}{50}\right) \tag{61}$$

For frequencies above 60 GHz, the correction factor (see § 4.4 in the main body of this Appendix) is 0 dB. Therefore, no correction term has been added to equation (61).

ANNEX 2

Determination of the required distance for propagation mode (2)

1 Overview

The algorithm given below allows propagation mode (2) path loss, $L_r(p)$ (dB), to be obtained as a monotonic function of rainfall rate, $R(p)$ (mm/h), and with the hydrometeor scatter distance, r_i (km), as a parameter. The model is valid for average annual time percentage (p) in the range 0.001% to 10%. The procedure to determine the hydrometeor scatter contour is as follows:

a) The value of $R(p)$, is determined for the appropriate rain climatic Zones A to Q.

b) Values of $L_r(p)$, are then calculated for incremental values of r_i, starting at the minimum coordination distance d_{min}, in steps of s (km), as described in § 1.3 of the main body of this Appendix. The correct value of r_i is that for which the corresponding value of $L_r(p)$ equals or exceeds the propagation mode (2) minimum required loss $L(p)$. This value of r_i is the propagation mode (2) required distance and is denoted d_r.

c) If the iterative calculation results in r_i equalling or exceeding the appropriate maximum calculation distance (d_{max2}) given in § 2, then the calculation is terminated and d_r is assumed to be equal to d_{max2}. Hence the iteration stops when either of the following expressions becomes true:

$$L_r(p) \geq L(p) \tag{62a}$$

or:

$$r_i \geq d_{max2} \tag{62b}$$

d) The contour for propagation mode (2) is a circle of radius d_r (km) centred on a point along the azimuth of the earth station antenna main beam at a horizontal distance of Δd (km) from the earth station.

2 Maximum calculation distance

As discussed in § 1.5.3 of the main body of this Appendix, it is necessary to set upper limits to the maximum distance used in the iterative calculation of the required distance. The maximum calculation distance to be used for propagation mode (2) (d_{max2}) is latitude dependent and is given in the following equation:

$$d_{max2} = \sqrt{17\,000(h_R + 3)} \qquad \text{km}$$

where h_R is defined in equations (74) and (75).

3 Calculation of the propagation mode (2) contour

Determine $R(p)$, the rainfall rate (mm/h) exceeded on average for p% of a year. The world has been divided into a number of rain climatic zones (see Figs. 2, 3 and 4) which show different precipitation characteristics.

FIGURE 2

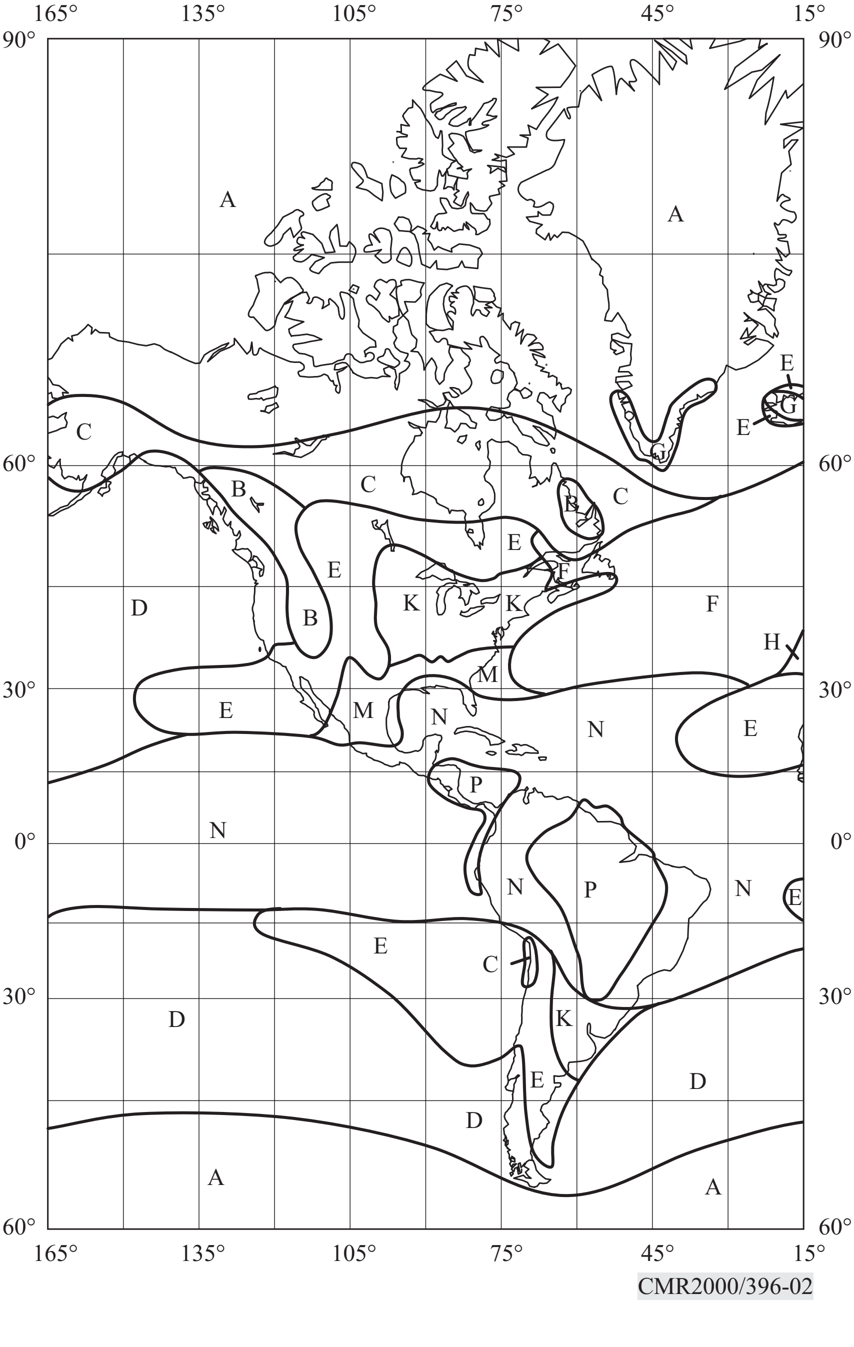

FIGURE 3

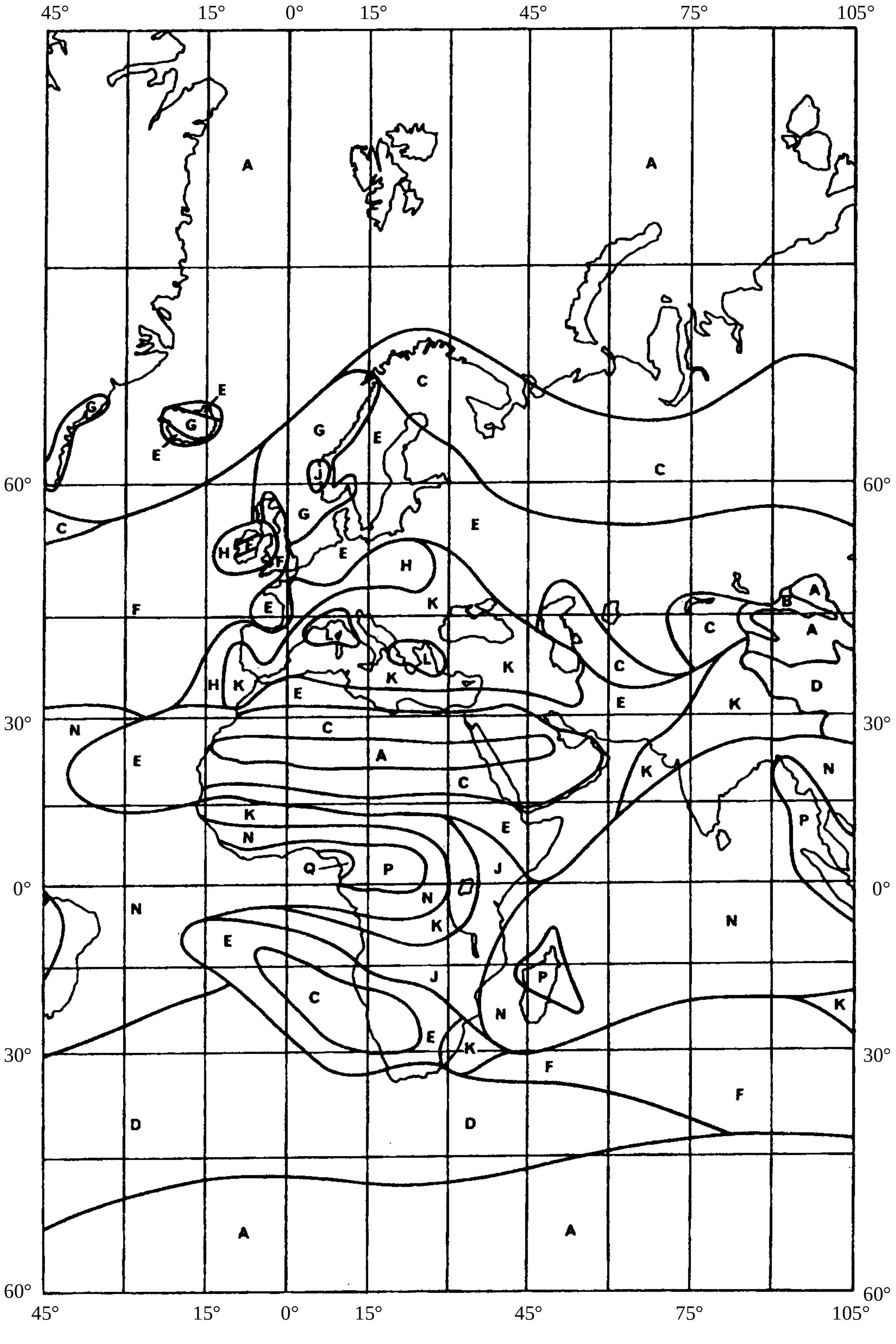

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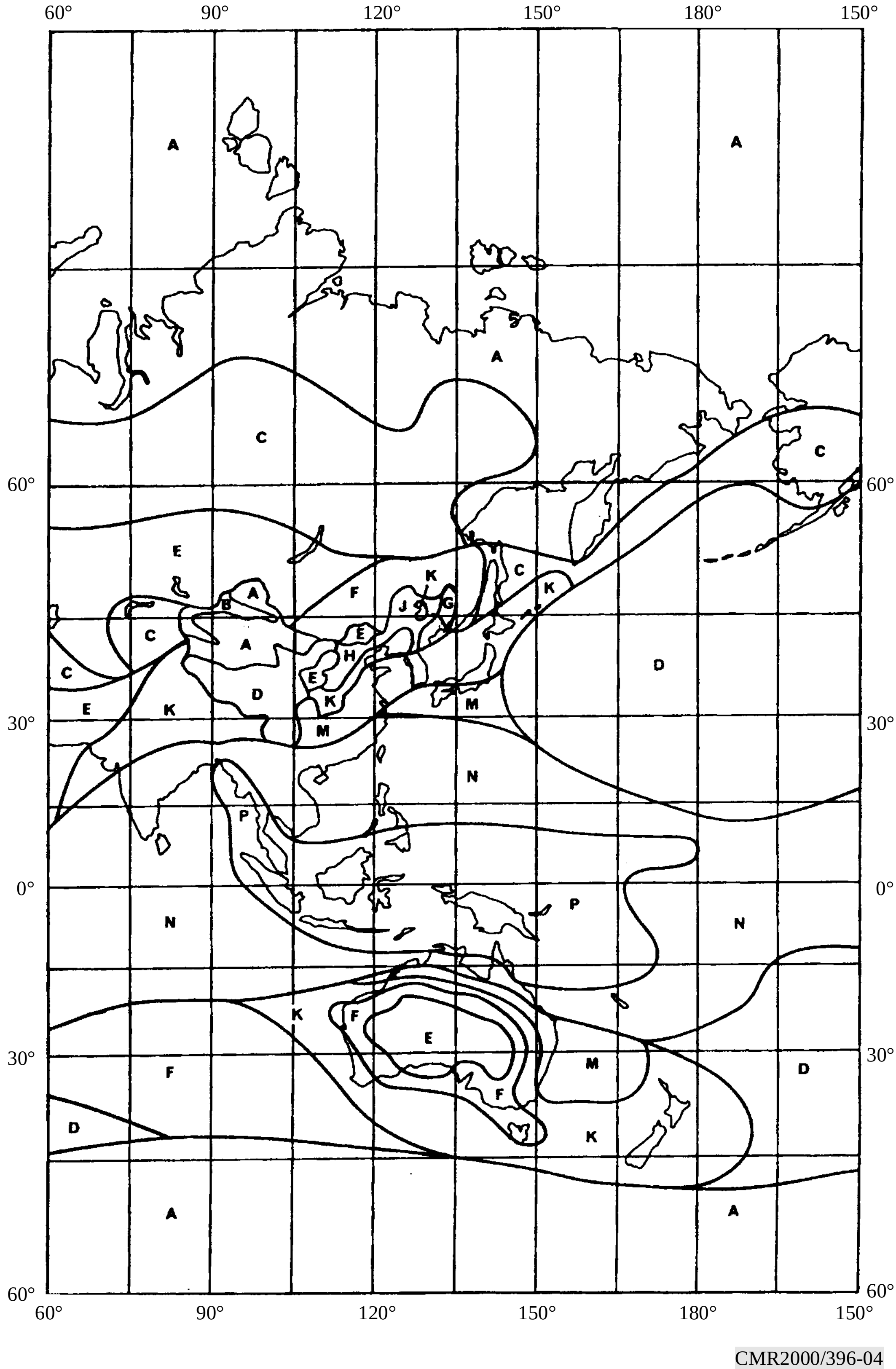
FIGURE 4



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The curves shown in Fig. 5 represent consolidated rainfall-rate distributions, each applicable to several of these rain climatic zones.

Determine which rain climatic zone is applicable to the location of the earth station:

– For $0.001\% < p < 0.3\%$ and the applicable rain climatic zone:

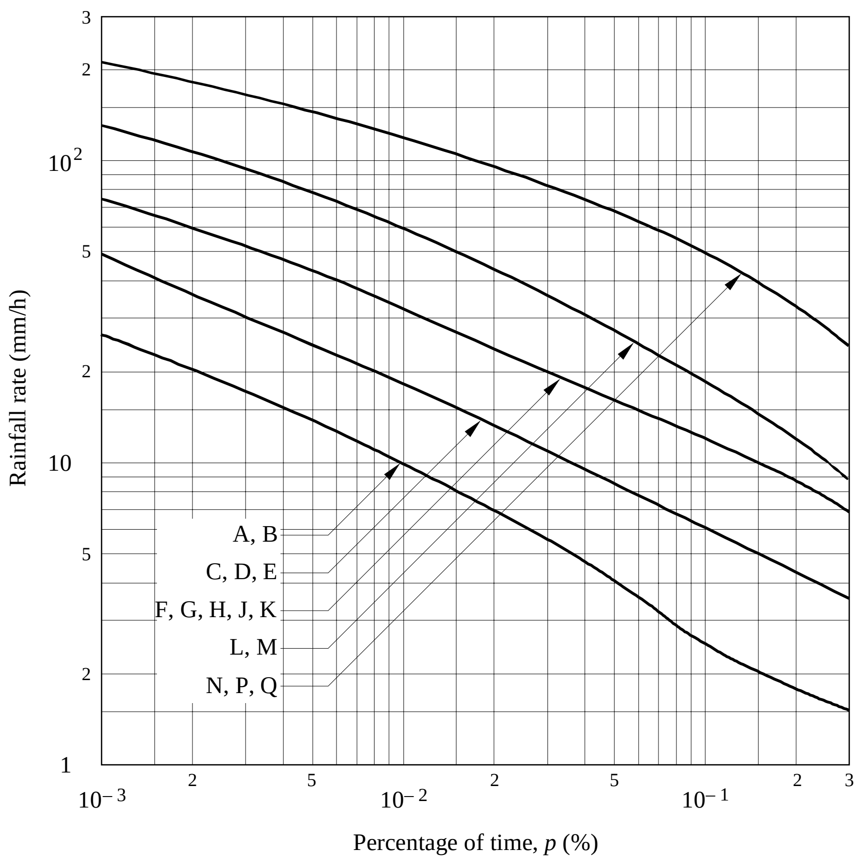
  Determine $R(p)$ either from Fig. 5 or from equations (63) to (67).

– For $p \geq 0.3\%$:

  Use equation (68) with values of $R(0.3\%)$ and p_c obtained from Table 4.

FIGURE 5

Consolidated cumulative distributions of rainfall rate for the rain climatic zones shown in Figs. 2, 3 and 4



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Rain climatic Zones A, B

$$R(p) = 1.1\, p^{-0.465} + 0.25 \left[\log\left(p/0.001\right) \log^3\left(0.3/p\right) \right] - \left[\left| \log\left(p/0.1\right) \right| + 1.1 \right]^{-2} \qquad \text{mm/h} \quad (63)$$

Rain climatic Zones C, D, E

$$R(p) = 2\, p^{-0.466} + 0.5 \left[\log\left(p/0.001\right) \log^3\left(0.3/p\right) \right] \qquad \text{mm/h} \quad (64)$$

Rain climatic Zones F, G, H, J, K

$$R(p) = 4.17\, p^{-0.418} + 1.6 \left[\log\left(p/0.001\right) \log^3\left(0.3/p\right) \right] \qquad \text{mm/h} \quad (65)$$

Rain climatic Zones L, M

$$R(p) = 4.9\, p^{-0.48} + 6.5 \left[\log\left(p/0.001\right) \log^2\left(0.3/p\right) \right] \qquad \text{mm/h} \quad (66)$$

Rain climatic Zones N, P, Q

$$R(p) = 15.6 \left(p^{-0.383} + \left[\log\left(p/0.001\right) \log^{1.5}\left(0.3/p\right) \right] \right) \qquad \text{mm/h} \quad (67)$$

TABLE 4

Values of R and p_c for the different rain climatic zones

Rain climatic zone	R (0.3%) (mm/h)	p_c (%)
A, B	1.5	2
C, D, E	3.5	3
F, G, H, J, K	7.0	5
L, M	9.0	7.5
N, P, Q	25.0	10

where:

p_c (%): reference time percentage above which the rainfall rate $R(p)$ can be assumed to be zero.

$$R(p) = R(0.3\%) \left[\frac{\log(p_c/p)}{\log(p_c/0.3)} \right]^2 \qquad (68)$$

Determine the specific attenuation (dB/km) due to rain using values of k and α from Table 5 in equation (70). Values of k and α at frequencies other than those in Table 5 can be obtained by interpolation using a logarithmic scale for frequency, a logarithmic scale for k and a linear scale for α.

TABLE 5

Values of *k* and α for vertical polarization as a function of the frequency

Frequency (GHz)	***k***	**α**
1	0.0000352	0.880
4	0.000591	1.075
6	0.00155	1.265
8	0.00395	1.31
10	0.00887	1.264
12	0.0168	1.20
14	0.029	1.15
18	0.055	1.09
20	0.0691	1.065
22.4	0.090	1.05
25	0.113	1.03
28	0.150	1.01
30	0.167	1.00
35	0.233	0.963
40	0.310	0.929
40.5	0.318	0.926

Let:

$$R = R(p) \tag{69}$$

Then the specific attenuation (dB/km) due to rain is given by:

$$\gamma_R = k\, R^{\alpha} \tag{70}$$

Calculate the effective diameter of the rain cell:

$$d_s = 3.5\, R^{-0.08} \tag{71}$$

Then, calculate the effective scatter transfer function:

$$R_{cv} = \frac{2.17}{\gamma_R\ d_s}\left(1 - 10^{\frac{-\gamma_R\ d_s}{5}}\right) \tag{72}$$

Calculate the additional attenuation outside the common volume:

$$\Gamma_2 = 631\, k\ R^{(\alpha\,-\,0.5)} \times 10^{-(R+1)^{0.19}} \tag{73}$$

Determine the rain height above ground, h_R (km):

For North America and Europe west of 60° E longitude:

$$h_R = 3.2 - 0.075\,(\zeta - 35) \qquad \text{for} \quad 35 \le \zeta \le 70 \tag{74}$$

where:

ζ: latitude of the coordinating earth station.

For all other areas of the world:

$$h_R = \begin{cases} 5 - 0.075\,(\zeta - 23) & \text{for} \quad \zeta > 23 \quad \text{Northern hemisphere} \quad (75a) \\ 5 & \text{for} \quad 0 \le \zeta \le 23 \quad \text{Northern hemisphere} \quad (75b) \\ 5 & \text{for} \quad 0 \ge \zeta \ge -21 \quad \text{Southern hemisphere} \quad (75c) \\ 5 + 0.1\,(\zeta + 21) & \text{for} \quad -71 \le \zeta < -21 \quad \text{Southern hemisphere} \quad (75d) \\ 0 & \text{for} \quad \zeta < -71 \quad \text{Southern hemisphere} \quad (75e) \end{cases}$$

Determine the specific attenuation due to water vapour absorption (a water vapour density of 7.5 g/m^3 is used):

$$\gamma_{wr} = \left[0.06575 + \frac{3.6}{(f - 22.2)^2 + 8.5} \right] f^{\,2}\; 7.5 \times 10^{-4} \tag{76}$$

3.1 Iterative calculations

Evaluate equations (77) to (82) inclusive for increasing values of r_i, where r_i is the current distance considered (km) between the region of maximum scattering and the possible location of a terrestrial station and i = 0, 1, 2,... Continue this process until either of the conditions given in equations (62a) and (62b) is true. Then the rain-scatter required distance d_r is the current value of r_i.

$$r_i = d_{min} + i \cdot s \tag{77}$$

Determine the loss above the rain height, L_{ar} (dB), applicable to scatter coupling:

$$L_{ar} = \begin{cases} 6.5\left[6\,(r_i - 50)^2 \times 10^{-5} - h_R \right] & \text{for} \quad 6\,(r_i - 50)^2 \times 10^{-5} > h_R \quad (78a) \\ 0 & \text{for} \quad 6\,(r_i - 50)^2 \times 10^{-5} \le h_R \quad (78b) \end{cases}$$

Calculate the additional attenuation for the departure from Rayleigh scattering:

$$A_b = \begin{cases} 0.005\,(f - 10)^{1.7} R^{0.4} & \text{for} \quad 10\,\text{GHz} < f < 40.5\,\text{GHz} \quad (79a) \\ 0 & \text{for} \quad f < 10\,\text{GHz or when } L_{ar} \neq 0 \quad (79b) \end{cases}$$

Calculate the effective path length for oxygen absorption:

$$d_o = \begin{cases} 0.7\, r_i + 32 & \text{for} \quad r_i < 340 \text{ km} \quad (80a) \\ 270 & \text{for} \quad r_i \geq 340 \text{ km} \quad (80b) \end{cases}$$

Calculate the effective path length for water vapour absorption:

$$d_v = \begin{cases} 0.7\, r_i + 32 & \text{for} \quad r_i < 240 \text{ km} \quad (81a) \\ 200 & \text{for} \quad r_i \geq 240 \text{ km} \quad (81b) \end{cases}$$

Determine the propagation mode (2) path loss, L_r (dB):

$$\begin{aligned} L_r = \; & 168 + 20 \log r_i - 20 \log f - 13.2 \log R - G_x + \\ & A_b - 10 \log R_{cv} + \Gamma_2 + L_{ar} + \gamma_o\, d_o + \gamma_{wr}\, d_v \end{aligned} \quad (82)$$

where:

γ_o: as given in equation (33)

G_x: terrestrial network antenna gain in Tables 7 or 8.

4 Construction of the propagation mode (2) contour

In order to determine the centre of the circular propagation mode (2) contour, it is necessary to calculate the horizontal distance to this point from the earth station, along the azimuth of the earth station antenna main beam axis. The distance, Δd (km), to the centre of the propagation mode (2) contour is given by:

$$\Delta d = \frac{h_R}{2 \tan \varepsilon_s} \quad (83)$$

where:

ε_s: earth station antenna main beam axis elevation angle

and

Δd: shall be limited to the distance (d_r – 50) km.

The propagation mode (2) required distance d_r must lie within the range between the minimum coordination distance d_{min} and the propagation mode (2) maximum calculation distance d_{max2}.

Draw the propagation mode (2) contour as a circle of radius d_r (km) around the centre determined above. The propagation mode (2) contour is the locus of points on this circle. However, if any part of the propagation mode (2) contour falls within the contour defined by the minimum coordination distance, this arc of the propagation mode (2) contour is taken to be identical to the contour based on the minimum coordination distance and the propagation mode (2) contour is then no longer circular.

ANNEX 3

Antenna gain towards the horizon for an earth station operating with a geostationary space station

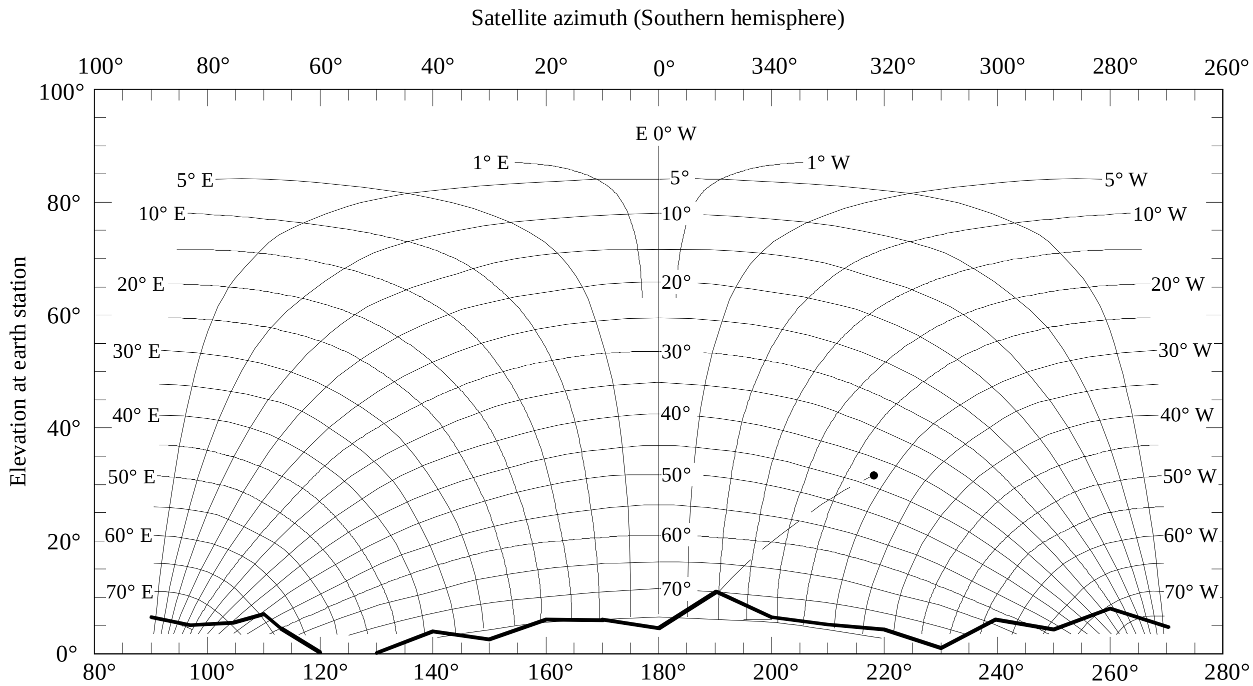
1 General

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 between the antenna main beam axis and the horizon in the direction under consideration. When the earth station is used to transmit to a space station in a slightly inclined orbit, all possible pointing directions of the antenna main beam axis need to be considered. For earth station coordination, knowledge of $\varphi(\alpha)$, the minimum possible value of the angular separation that will occur during the operation of the space station, is required for each azimuth.

When a geostationary space station maintains its location close to its nominal orbital position, the earth station's main beam axis elevation angle ε_s and the azimuth angle α_s to the space station from the earth station's latitude ζ are uniquely related. Fig. 6 shows the possible location arcs of positions of a space station on the geostationary orbit in a rectangular azimuth/elevation plot. It shows arcs corresponding to a set of earth station latitudes and the intersecting arcs correspond to points on the orbit with a fixed difference in longitude East or West of the earth station. Fig. 6 also shows a portion of the horizon profile $\varepsilon_h(\alpha)$. The off-axis angle $\varphi(\alpha)$ between the horizon profile at an azimuth of 190° and a space station located 28° W of an earth station at 43° N latitude is indicated by the great-circle arc shown dashed on Fig. 6.

FIGURE 6

Position arcs of geostationary satellites with horizon and the arc from the horizon at azimuth 190° to a satellite 28° W of an earth station at 43° N latitude



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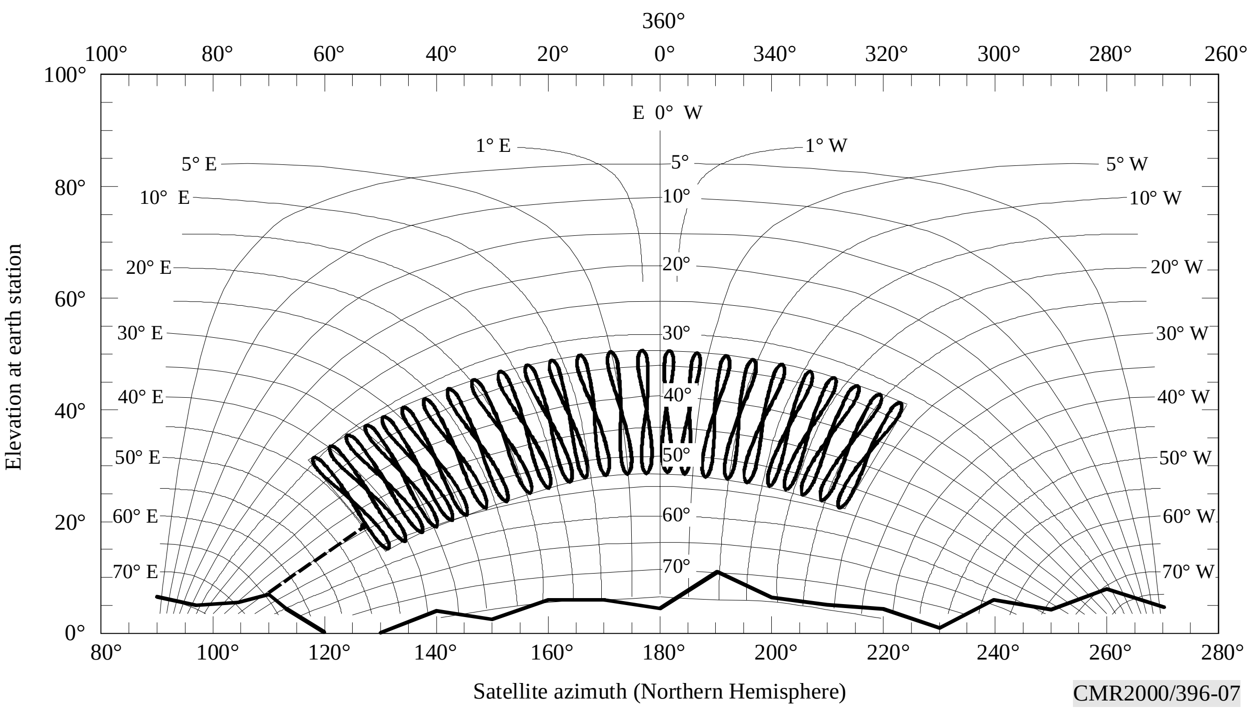
When the north/south station-keeping of a geostationary satellite is relaxed, the orbit of the satellite becomes inclined, with an inclination that increases gradually with time. As viewed from the earth, the position of the satellite traces a figure eight during each 24-hour period. Fig. 7 shows the variations in the trajectories of a set of satellites, each with 10° inclination, spaced by 3° along the geostationary orbit from 28° W to 44° E, with respect to an earth station at 43° N latitude. Fig. 7 also shows, with a dashed curve, the great-circle arc corresponding to the minimum off-axis angle φ(α) between a point on the trajectory of one of the satellites and the horizon profile at an azimuth of 110°.

FIGURE 7

Position arcs of geostationary satellites with horizon and the arc from the horizon at azimuth 110° to satellites with 10° inclination on the geostationary orbital arc from 28° W to 44° E of an earth station at 43° N latitude



For a transmitting earth station operating in a frequency band that is also allocated for bidirectional use by receiving earth stations operating with geostationary space stations, refer to § 2.1 of Annex 5.

2 Determination of the angular separation φ(α)

For the determination of the off-axis angle $\varphi(\alpha)$, two cases are distinguished. These depend on whether the orbit of the space station has no inclination, or is slightly inclined. The following equations may be used in both of these cases:

$$\psi_s(i,\delta) = \arccos\left(\sin\zeta \sin i + \cos\zeta \cos i \cos\delta\right) \tag{84}$$

$$\varepsilon_s(i,\delta) = \arcsin\left(\frac{K\cos\psi_s(i,\delta) - 1}{\left(1 + K^2 - 2K\cos\psi_s(i,\delta)\right)^{1/2}}\right) \tag{85}$$

$$\alpha_{0s}(i,\delta) = \arccos\left[\frac{\sin i - \cos\psi_s \sin\zeta}{\sin\psi_s \ \cos\zeta}\right] \tag{86}$$

$$\alpha_s(i,\delta) = \alpha_{0s}(i,\delta) \qquad \text{for a space station located east of the earth station } (\delta \geq 0) \tag{87}$$

$$\alpha_s(i,\delta) = 360° - \alpha_{0s}(i,\delta) \qquad \text{for a space station located west of the earth station } (\delta \leq 0) \tag{88}$$

$$\varphi(\alpha,i,\delta) = \arccos\left[\cos\varepsilon_h(\alpha)\cos\varepsilon_s(i,\delta)\cos\left(\alpha - \alpha_s(i,\delta)\right) + \sin\varepsilon_h(\alpha)\sin\varepsilon_s(i,\delta)\right] \tag{89}$$

where:

- ζ: latitude of the earth station (positive for north; negative for south)
- δ: difference in longitude between the earth station and a space station
- i: latitude of a sub-satellite point (positive for north; negative for south)
- $\psi_s(i, \delta)$: great-circle arc between the earth station and a sub-satellite point
- $\alpha_s(i, \delta)$: space station azimuth as seen from the earth station
- $\varepsilon_s(i, \delta)$: space station elevation angle as seen from the earth station
- $\varphi(\alpha, i, \delta)$: angle between the main beam and the horizon direction corresponding to the azimuth, α, under consideration when the main beam is steered towards a space station with a sub-satellite point at latitude, i, and longitude difference, δ
- α: azimuth of the direction under consideration
- ε_h: elevation angle of the horizon at the azimuth under consideration, α
- $\varphi(\alpha)$: angle to be used for horizon gain calculation at the azimuth under consideration, α
- K: orbit radius/earth radius, which for the geostationary orbit is assumed to be 6.62.

All arcs mentioned above are in degrees.

Case 1: Single space station, no orbital inclination

For a space station operating with no orbital inclination at an orbital position with difference in longitude δ_0, equations (84) to (89) may be applied directly using $i = 0$ to determine $\varphi(\alpha)$ for each azimuth α. Thus:

$$\varphi(\alpha) = \varphi(\alpha, 0, \delta_0) \tag{90}$$

where:

δ_0: difference in longitude between the earth station and the space station.

Case 2: Single space station, slightly inclined orbit

For a space station operating in a slightly inclined orbit on a portion of the geostationary arc with a nominal longitude difference of δ_0, the maximum orbital inclination over its lifetime, i_s, must be considered. Equations (84) to (89) may be applied to develop the minimum off-axis angle to each of four arcs in azimuth/elevation that bound the trajectory of the space station in angle and elevation. The bounding arcs correspond to the maximum and minimum latitudes of the sub-satellite points and the extremes of the difference in longitude between the earth and space stations when the space station is operating at its maximum inclination.

The determination of the minimum off-axis angles in equations (91) to (95) may be made by taking increments along a bounding contour. The step size in inclination i or longitude δ should be between 0.5° and 1.0° and the end points of the respective ranges should be included in the calculation.

The horizon profile $\varepsilon_h(\alpha)$ used in the determination of $\varphi(\alpha)$ is specified at increments in azimuth α that do not exceed 5°.

Thus:

$$\varphi(\alpha) = \min_{n = 1 \text{ to } 4} \varphi_n(\alpha) \tag{91}$$

with:

$$\varphi_1(\alpha) = \min_{\delta_0 - \delta_s \leq \delta \leq \delta_0 + \delta_s} \varphi(\alpha, -i_s, \delta) \tag{92}$$

$$\varphi_2(\alpha) = \min_{\delta_0 - \delta_s \leq \delta \leq \delta_0 + \delta_s} \varphi(\alpha, i_s, \delta) \tag{93}$$

$$\varphi_3(\alpha) = \min_{-i_s \leq i \leq i_s} \varphi(\alpha, i, \delta_0 - \delta_s) \tag{94}$$

$$\varphi_4(\alpha) = \min_{-i_s \leq i \leq i_s} \varphi(\alpha, i, \delta_0 + \delta_s) \tag{95}$$

$$\delta_s = (i_s / 15)^2 \tag{96}$$

where:

i_s: maximum operational inclination angle of the satellite orbit

δ_s: maximum longitude change from nominal value of the sub-satellite point of a satellite with orbital inclination i_s.

3 Determination of antenna gain

The relationship $\varphi(\alpha)$ is used to derive a function for the horizon antenna gain (dBi), $G(\varphi)$ 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 equal to or greater than 35, the following equation is used:

$$G(\varphi) = \begin{cases} G_{amax} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda} \varphi \right)^2 & \text{for } 0 < \varphi < \varphi_m \\ G_1 & \text{for } \varphi_m \leq \varphi < \varphi_r \\ 29 - 25 \log \varphi & \text{for } \varphi_r \leq \varphi < 36^\circ \\ -10 & \text{for } 36^\circ \leq \varphi \leq 180^\circ \end{cases} \quad (97)$$

$$G_1 = \begin{cases} -1 + 15 \log (D/\lambda) \quad \text{dBi} & \text{for } D/\lambda \geq 100 \\ -21 + 25 \log (D/\lambda) \quad \text{dBi} & \text{for } 35 \leq D/\lambda < 100 \end{cases}$$

$$\varphi_m = \frac{20\,\lambda}{D} \sqrt{G_{amax} - G_1} \qquad \text{degrees}$$

$$\varphi_r = \begin{cases} 15.85 \, (D/\lambda)^{-0.6} \quad \text{degrees} & \text{for } D/\lambda \geq 100 \\ 100 \, (\lambda/D) \quad \text{degrees} & \text{for } 35 \leq D/\lambda < 100 \end{cases}$$

Where a better representation of the actual antenna pattern is available, it may be used.

In cases where D/λ is not given, it may be estimated from the expression:

$$20 \log \frac{D}{\lambda} \approx G_{amax} - 7.7$$

where:

G_{amax}: main beam axis antenna gain (dBi)

D: antenna diameter (m)

λ: wavelength (m)

G_1: gain of the first side lobe (dBi).

ANNEX 4

Antenna gain toward the horizon for an earth station operating with non-geostationary space stations

This Annex presents methods which may be used to determine the antenna gain towards the horizon for an earth station operating to non-geostationary satellites using the TIG method described in § 2.2 of the main body of this Appendix.

1 Determination of the horizon antenna gain

In its simplest implementation, the TIG method depends on the minimum elevation angle of the beam axis of the earth station antenna (ε_{sys}), which is a system parameter that has the same value on all azimuths from the earth station. If the horizon elevation angle at an azimuth under consideration is ε_h (degrees), the minimum separation angle from the horizon at this azimuth to any possible pointing angle for the main beam axis of the antenna (φ_{min}) is equal to the difference between these two angles ($\varepsilon_{sys} - \varepsilon_h$), but it is not less than zero degrees. The maximum separation angle from the horizon at this azimuth to any possible pointing angle for the main beam axis of the antenna (φ_{max}) is equal to the difference between the sum of these two angles and 180° ($180 - \varepsilon_{sys} - \varepsilon_h$). The maximum and minimum values of horizon gain for the azimuth under consideration are obtained from the gain pattern of the earth station antenna at these off-axis angles. Where no pattern is available the pattern of § 3 of Annex 3 may be used.

Additional constraints may be included in the determination of the maximum and minimum values of horizon antenna gain where an earth station operates with a constellation of non-geostationary satellites that are not in near-polar orbit. In this case, depending on the latitude of the earth station, there may be portions of the hemisphere above the horizontal plane at the earth station in which no satellite will appear. To include these visibility limitations within this method, it is first necessary to determine, for a closely spaced set of azimuth angles around the earth station, the minimum elevation angle at which a satellite may be visible. This minimum satellite visibility elevation angle (ε_v) may be determined from consideration of the visibility of the edge of the shell formed by all possible orbits having the orbital inclination and altitude of the satellites in the constellation.

The lowest elevation angle towards which the main-beam axis of the earth station antenna will point on any azimuth is the minimum composite elevation angle (ε_c), which is equal to the greater of the minimum satellite visibility elevation angle (ε_v) and the minimum elevation angle of the earth station (ε_{sys}). After the minimum composite elevation angle has been determined for all azimuths by the procedure of § 1.1 of this Annex, the resulting profile of the minimum composite elevation angles can be used, in the procedure of § 1.2 of this Annex, to determine the maximum and minimum values of horizon gain at any azimuth.

Further information and an example of this method may be found in the latest version of Recommendation ITU-R SM.1448.

1.1 Determination of satellite visibility limits

The visibility limits of a constellation of satellites can be determined from the inclination angle of the most inclined satellite and the altitude of the lowest satellite in the constellation. For this determination, six cases may be distinguished, but not all of these may be applicable for a given constellation and a given earth station latitude. The azimuth and the corresponding lower limit on the elevation angle are developed by a parametric method using a set of points on the edge of the orbital shell of the constellation. The approach is to develop this relationship for azimuths to the east of a station in the northern hemisphere. Elevation angles for azimuths to the west of the station and for all azimuths for stations in the southern hemisphere are obtained by symmetry. The following equations, which are applicable to circular orbits only, may be used for the complete determination of the horizon antenna gain in all practical cases:

$$\psi(\delta) = \arccos\left(\sin\zeta_e \sin i_s + \cos\zeta_e \cos i_s \cos\delta\right) \tag{98}$$

$$\varepsilon_v(\delta) = \arcsin\left[\frac{K_1 \cos[\psi(\delta)] - 1}{\left(1 + K_1^2 - 2K_1 \cos[\psi(\delta)]\right)^{1/2}}\right] \tag{99}$$

$$\alpha_0(\delta) = \arccos\left[\frac{\sin i_s - \cos[\psi(\delta)]\sin\zeta_e}{\sin[\psi(\delta)]\cos\zeta_e}\right] \tag{100}$$

with:

$$\alpha(\delta) = \begin{cases} \alpha_0(\delta) \text{ and} & \\ 360° - \alpha_0(\delta) & \text{for earth stations north of the Equator} \\ 180° - \alpha_0(\delta) \quad \text{and} & \\ 180° + \alpha_0(\delta) & \text{for earth stations south of the Equator} \end{cases} \tag{101}$$

where:

i_s: orbital inclination of the satellites in the constellation assumed to be positive and between 0° and 90°

ζ_e: modulus of the latitude of the earth station

δ: difference in longitude from the earth station to a point on the edge of the orbital shell of the constellation

$\psi(\delta)$: great-circle arc between the earth station and a point on the surface of the Earth directly below the point on the edge of the orbital shell of the constellation

$\alpha(\delta)$: azimuth from the earth station to a point on the edge of the orbital shell

$\alpha_0(\delta)$: principal azimuth, an azimuth between 0° and 180°, from an earth station to a point on the edge of the orbital shell

$\varepsilon_v(\delta)$: elevation angle from the earth station to a point on the edge of the orbital shell

K_1: orbit radius/Earth radius for the lowest altitude satellite in the constellation (Earth radius = 6 378.14 km)

$\psi_m = \arccos(1/K_1)$.

All arcs mentioned above are in degrees.

For any latitude on the surface of the Earth, the azimuth for which the minimum elevation angle to a satellite can be greater than zero, and the corresponding elevation angles, may be determined by implementing the calculations under the following case(s). No more than two of these cases will be applicable for any latitude. For situations not specifically addressed in the following cases, no satellite is visible at elevation angles at or below 90° on any azimuth.

Case 1: For: $\zeta_e \leq i_s - \psi_m$

For this case, a satellite may be visible to the horizon for all azimuths about the earth station ($\varepsilon_v = 0$).

Case 2: For: $i_s - \psi_m < \zeta_e \leq \arcsin(\sin i_s \cos \psi_m)$

For this case, the azimuth angles and elevation are developed parametrically by choosing a set of values of δ, uniformly spaced on the interval 0 to $\delta_{1,}$ and applying equations (98) to (101). For this purpose the spacing between values is not to exceed 1.0°, and the end points are to be included.

$$\delta_1 = \arccos\left[\frac{\cos\psi_m - \sin\zeta_e \sin i_s}{\cos\zeta_e \cos i_s}\right]$$

At any principal azimuth ($\alpha_0(\delta)$) that is not included in the set, the minimum elevation angle is zero ($\varepsilon_v = 0$), except for azimuths where Case 6 additionally applies.

Case 3: For: arcsin (sin i_s cos ψ_m) < $\zeta_e < i_s$ and $\zeta_e < 180° - \psi_m - i_s$

For this case, the azimuth angles and elevation are developed parametrically by choosing a set of values of δ, uniformly spaced on the interval 0 to δ_2, and applying equations (98) to (101). For this purpose the spacing between values is not to exceed 1.0°, and the end points are to be included.

$$\delta_2 = 2 \arctan \left[\frac{\sqrt{\sin^2 \psi_m - \cos^2 i_s \sin^2 \delta_1}}{\sin \zeta_e \cos i_s \sin \delta_1} \right] - \delta_1$$

At any principal azimuth ($\alpha_0(\delta)$) that is not included in the set, the minimum elevation angle is zero ($\varepsilon_v = 0$), except for azimuths where Case 6 additionally applies.

Case 4: For: $i_s \leq \zeta_e < i_s + \psi_m$ and $\zeta_e < 180° - i_s - \psi_m$

For this case, the minimum elevation angle is given explicitly in terms of the principal azimuth angle α_0, as follows:

$$\varepsilon_v = \begin{cases} 90° & \text{for} \quad 0 \leq \alpha_0 < \alpha_2 \\ 0 & \text{for} \quad \alpha_2 \leq \alpha_0 \leq 180° \end{cases}$$

where:

$$\alpha_2 = \arccos \left[\frac{\sin i_s - \cos \psi_m \sin \zeta_e}{\sin \psi_m \cos \zeta_e} \right]$$

Note that a minimum elevation angle of 90° in this formulation indicates that no satellite is visible at elevation angles at or below 90° on these azimuths. Furthermore, within the range of principal azimuths where the minimum elevation angle is zero, Case 6 may additionally apply.

Case 5: For $180° - i_s - \psi_m \leq \zeta_e \leq 90°$

For this case, a satellite may be visible to the horizon for all azimuths about the earth station ($\varepsilon_v = 0$).

Case 6: For $\zeta_e < \psi_m - i_s$

This case may occur additionally with Case 2, Case 3 or Case 4 and a satellite may be visible only above a minimum elevation angle for other principal azimuths.

For this case, the other principal azimuths and the corresponding elevation angles are developed parametrically by choosing a set of values of δ, uniformly spaced on the interval 0 to δ_3, and applying equations (98) to (101) with i_s replaced by $-i_s$. For this purpose the spacing between values is not to exceed 1.0º and the end points are to be included.

$$\delta_3 = \arccos\left[\frac{\cos\psi_m + \sin\zeta_e \sin i_s}{\cos\zeta_e \cos i_s}\right]$$

1.2 Determination of minimum and maximum horizon gain from the minimum visible elevation angle profile

The horizon gain of the earth station antenna is determined from the profile of values of the minimum composite elevation angle (ε_c). At any azimuth, the minimum composite elevation angle is the greater of the minimum satellite visibility elevation angle at that azimuth (ε_v) and the minimum elevation angle for the earth station (ε_{sys}). The following procedure may be used to determine the maximum and minimum values of horizon antenna gain for each azimuth under consideration.

The following equation may be used to determine the angular separation between the horizon profile, at an azimuth angle α and horizon elevation angle ε_h, and a point on the profile of the minimum composite elevation angle, where the minimum composite elevation angle is ε_c at an azimuth angle of α_c:

$$\varphi(\alpha, \alpha_c) = \arccos\left[\sin\varepsilon_h(\alpha)\sin(\varepsilon_c(\alpha_c)) + \cos\varepsilon_h(\alpha)\cos(\varepsilon_c(\alpha_c))\cos(\alpha - \alpha_c)\right] \qquad (102)$$

where:

α: azimuth of the direction under consideration

$\varepsilon_h(\alpha)$: elevation angle of the horizon at the azimuth under consideration, α

$\varepsilon_c(\alpha_c)$: minimum composite elevation angle at the azimuth, α_c

α_c: azimuth corresponding to ε_c.

The minimum value of the separation angle φ_{min}, for the azimuth under consideration, is determined by finding the minimum value of $\varphi(\alpha, \alpha_c)$ for any azimuth α_c, and the maximum value, φ_{max}, is determined by finding the maximum value of $\varphi(\alpha, \alpha_c)$ for any azimuth α_c. The azimuth angles (α) are usually taken in increments of 5°; however, to accurately determine the minimum separation angle, the values of the minimum composite elevation angle, ε_c, need to be determined for a spacing of 1° or less in the azimuth α_c. Where the procedures in § 1.1 of this Annex do not provide a profile of minimum composite elevation angle with a close enough spacing in azimuth angles, linear interpolation may be used to develop the necessary intermediate values. The maximum and minimum horizon antenna gains, G_{max} and G_{min}, to be used in the equations of § 2.2 of the main body of this Appendix for the azimuth under consideration are obtained by applying the off-axis angles, φ_{min} and φ_{max}, respectively, in the earth station antenna pattern. If the earth station antenna pattern is not known then the antenna pattern in § 3 of Annex 3 is used. In many cases, φ_{max} will be large enough on all azimuths so that G_{min} will be equal to the minimum gain of the antenna pattern at all azimuths.

ANNEX 5

Determination of the coordination area for a transmitting earth station with respect to receiving earth stations operating with geostationary space stations in bidirectionally allocated frequency bands

1 Introduction

The propagation mode (1) coordination area of a transmitting earth station with respect to unknown receiving earth stations operating with geostationary space stations requires the determination of the horizon gain of the antenna of the receiving earth station at each azimuth of the transmitting earth station. Different methods then need to be applied to determine the coordination area of the coordinating earth station, depending on whether it operates with geostationary or non-geostationary space stations. When both the coordinating earth station and the unknown receiving earth stations operate with geostationary space stations, it is also necessary to determine a propagation mode (2) coordination contour.

The coordination area of a transmitting earth station, with respect to unknown receiving earth stations that operate to non-geostationary space stations, can be determined by minor modifications to the methods applicable to the determination of coordination area of transmitting earth stations with respect to terrestrial stations. (See § 3.2.1 and § 3.2.3 of the main body of the Appendix.)

2 Determination of the bidirectional coordination contour for propagation mode (1)

For a transmitting earth station operating in a frequency band that is also allocated for bidirectional use by receiving earth stations operating with geostationary space stations, further development of the procedures in Annex 3 is needed. It is necessary to determine the horizon gain of the unknown receiving earth station, the horizon gain to be used at each azimuth at the coordinating (transmitting) earth station, for the determination of the bidirectional coordination area.

2.1 Calculation of horizon gain for unknown receiving earth stations operating with geostationary space stations

The value of G_r, the horizon gain of the receiving earth station, for each azimuth, α, at the transmitting earth station is found by the following steps:

Step 1: The receiving earth station may be operating with any satellite in the geostationary orbit above a minimum elevation angle, ε_{min}, contained in Table 9. The maximum difference in longitude (δ_b (degrees)) between the receiving earth station and its associated space station occurs at this minimum elevation angle, ε_{min}, and is given by:

$$\delta_b = \arccos\left(\frac{\sin\left(\varepsilon_{min} + \arcsin\left(\frac{\cos(\varepsilon_{min})}{K}\right)\right)}{\cos(\zeta)}\right) \qquad (103)$$

where:

ζ: latitude of the receiving earth station, which is assumed to be the same as the transmitting earth station

K: ratio of the radius of the satellite orbit to the radius of the Earth, equal to 6.62.

Step 2: For each azimuth, α, at the transmitting earth station:

– determine the azimuth α_r from the receiving earth station to the transmitting earth station:

$$\alpha_r = \alpha + 180° \qquad \text{for } \alpha < 180°$$

$$\alpha_r = \alpha - 180° \qquad \text{for } \alpha \geq 180°$$

– for each azimuth α_r, determine the minimum angular separation, $\varphi(\alpha_r)$, between the receiving earth station main beam axis and the horizon at this azimuth using Case 1 in § 2 of Annex 3. For this evaluation, $\varphi(\alpha_r)$ is the minimum value of $\varphi(\alpha_r, 0, \delta_0)$, where the values of δ_0 are between $-\delta_b$ and $+\delta_b$ in steps of 1° or less, making sure to include the end points.

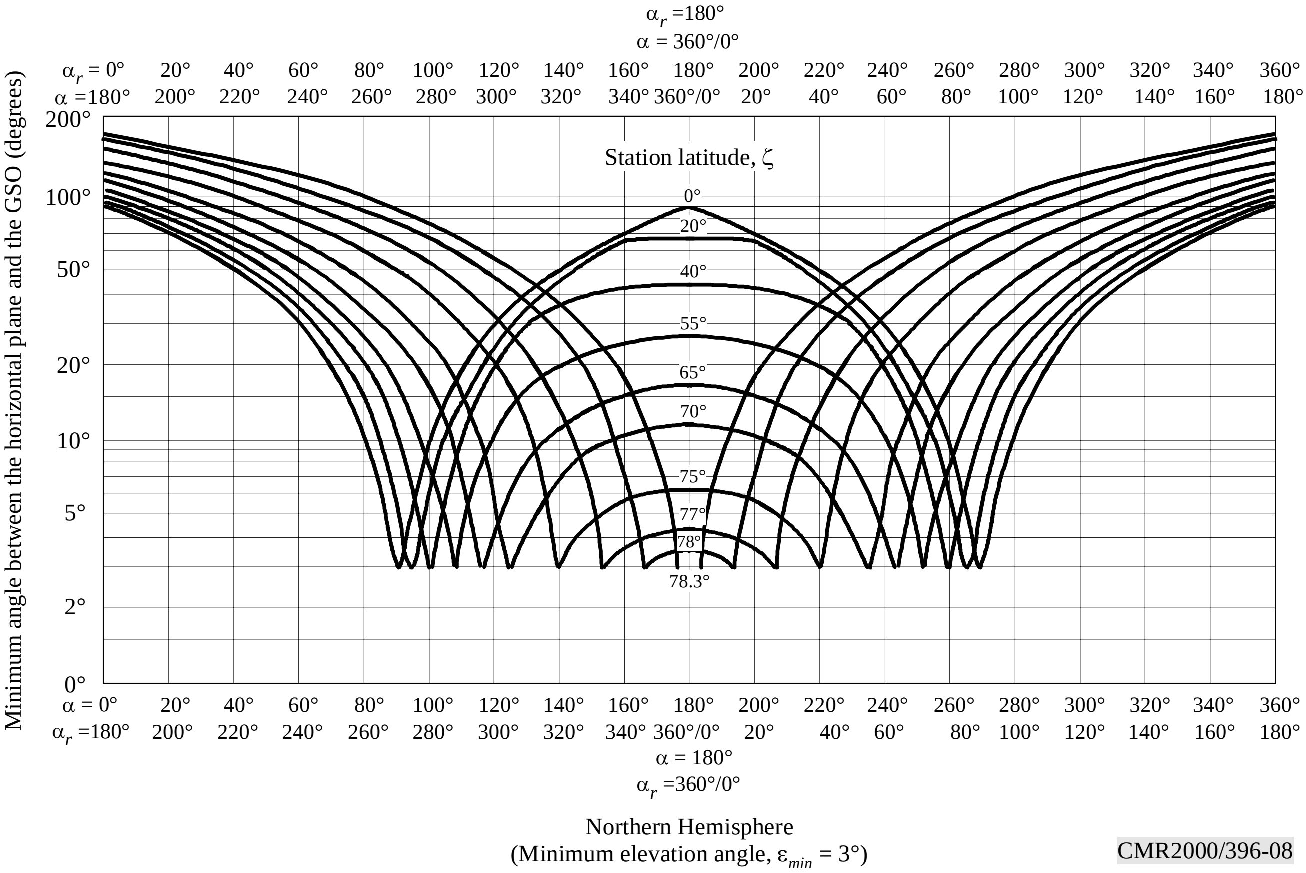
The minimum angular separation, $\varphi(\alpha_r)$, may be used with the gain pattern in § 3 of Annex 3 to determine the horizon gain for this azimuth, α, unless a different gain pattern is referenced in Table 9.

Figure 8 shows plots of the minimum angular separation between the horizon at zero degrees elevation on an azimuth α_r and a satellite on the geostationary orbit at an elevation above 3°. Plots are shown for a set of values of the station latitude, ζ, which is assumed to be the same for both transmitting and receiving earth stations. Figure 8 also provides a scale showing the corresponding azimuth, α, of the transmitting earth station.

Further information and an example may be found in the latest version of Recommendation ITU-R SM.1448.

FIGURE 8

Illustration of minimum angular distance between points on the geostationary-satellite orbit (GSO) and the horizontal plane



3 Determination of the bidirectional rain scatter contour

The procedure for the determination of the bidirectional rain scatter area, as described in § 3.1.2 of the main body of this Appendix, is as follows:

The horizontal distance d_s (km) from the coordinating earth station to the point at which the main beam axis attains the rain height h_R is calculated by:

$$d_s = 8\,500 \left(\sqrt{\tan^2 \varepsilon_s + h_R / 4\,250} - \tan \varepsilon_s \right) \qquad \text{km} \qquad (104)$$

where the rain height, h_R, can be determined from equations (74) or (75) in Annex 2 and ε_s is the minimum elevation angle of the transmitting earth station.

The maximum calculation distance, d_{emax}, to be used in the determination of the propagation mode (2) contour, for the case of a coordinating earth station operating in bidirectionally allocated frequency bands, is dependent on the rain height. It is the greater distance determined from:

$$d_{emax} = 130.4\sqrt{h_R} \qquad \text{km} \qquad \text{or } d_{min}$$

where the minimum coordination distance, d_{min}, is given in § 4.2 of the main body of this Appendix.

The point, at the distance d_s from the earth station, on the azimuth α_s of the coordinating earth station's main beam axis, is the geographic point immediately below the main beam axis intersection with the rain height, and is the reference point from which the maximum calculation distance d_{emax} is determined (see Fig. 9).

If the maximum calculation distance, d_{emax}, is greater than the minimum coordination distance, d_{min}, then calculate the maximum latitude at which a receiving earth station may operate with a geostationary satellite with a minimum elevation angle ε_{min}:

$$\zeta_{max} = \arccos\left[\frac{\cos(\varepsilon_{min})}{K}\right] - \varepsilon_{min} \tag{105}$$

where:

ε_{min}: given in Table 9

K: ratio of the radius of the satellite orbit to the radius of the Earth, equal to 6.62.

If the coordinating earth station latitude in the northern hemisphere is greater than ζ_{max}, or if the coordinating earth station latitude in the southern hemisphere is less than $-\zeta_{max}$ or –71°, then the rain scatter contour is a circle of radius d_{min}, centred on the transmitting earth station.

For all other cases, the coordination area is developed by the following procedure:

Step 1: The unknown receiving earth station is assumed to be operating with a satellite at the minimum elevation angle ε_{min}. It is also assumed that the receiving earth station is relatively close to the coordinating earth station in geometric terms and hence a plane geometry approximation can be applied within the coordination area. If the receiving earth station's main beam axis passes through the intersection of the coordinating earth station's main beam axis with the rain height, the azimuths from the point on the ground immediately below this intersection to the possible locations of a receiving earth station are given by:

$$\alpha_{w1} = \arccos\left[\frac{\tan\zeta}{\tan\zeta_{max}}\right]$$

and

$$\alpha_{w2} = 360° - \alpha_{w1}$$

where ζ is the latitude of the transmitting earth station.

Step 2: Mark on a map of an appropriate scale the coordinating earth station's location and draw from this location a line of distance, d_s, along the azimuth, α_s, to the point below the coordinating earth station's main beam axis intersection with the rain height.

Step 3: From the main beam axis intersection point in Step 2, mark on the map the distance, d_{emax}, along the two azimuths, α_{w2} and α_{w1}, and on each azimuth at the distance, d_{emax}, draw two equal distance arcs of width 3° clockwise and counter-clockwise. The two arcs, each having a total width of 6°, are the first boundary elements of the bidirectional rain scatter area.

Step 4: Mark a circle of radius equal to the minimum coordination distance, d_{min}, around the coordinating earth station's location, and then draw straight lines from the northern edges of the two arc segments tangential to the northern rim of the circle, and from the southern edges of the two arc segments tangential to the southern rim of the circle.

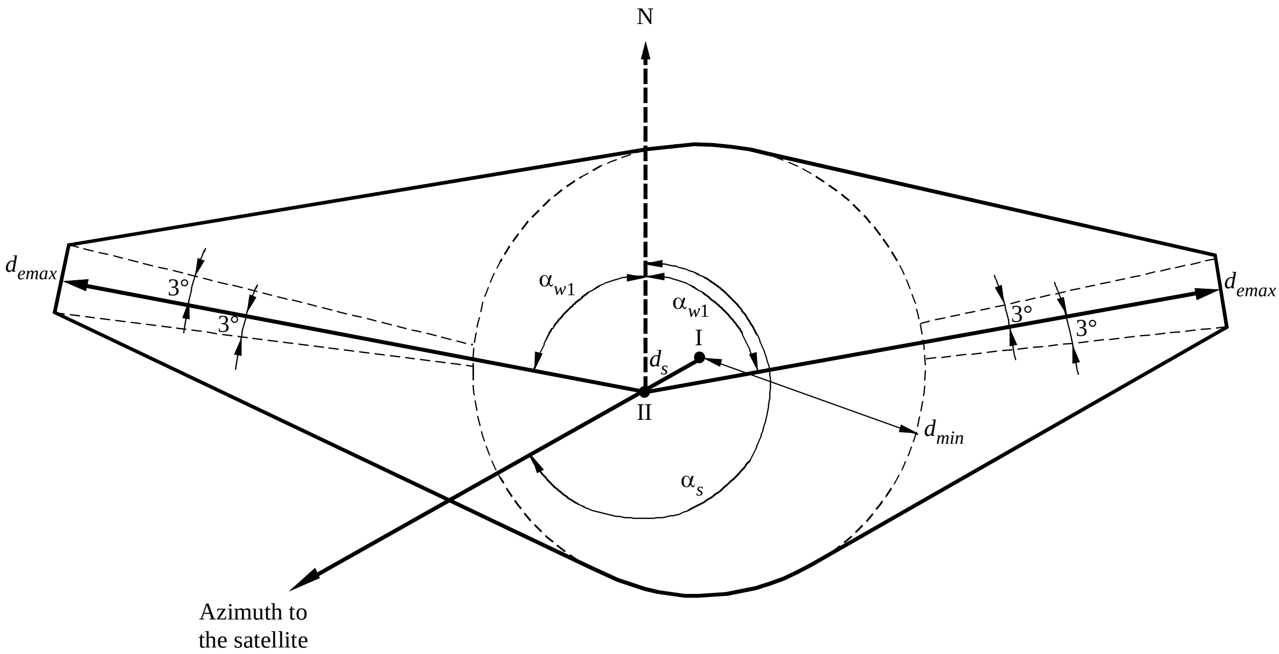
The area bounded by the two 6° wide arcs, the four straight lines, and the circular sections (of which there is always at least one) between the two northern and the two southern tangent points with the straight lines, constitutes the bidirectional rain scatter area.

Figure 9 illustrates the construction of the bidirectional rain scatter area for a coordinating earth station. (The resulting rain scatter area contains the possible loci of all receiving earth station locations from which a beam path towards the geostationary-satellite orbit will intersect the main beam of the transmitting earth station antenna.).

FIGURE 9

Example of the bidirectionnal rain scatter area

(Not to scale)



I: location of the transmitting earth station

II: point where the earth station antenna main-beam axis reaches the altitude h_R

Assumptions:

ζ = 40° N
ε_s = 10°
α_s = 254°

CMR2000/396-09

ANNEX 6

Supplementary and auxiliary contours

1 Introduction

The material found in this Annex is intended to assist administrations in bilateral discussions.

2 Supplementary contours

The coordination area is determined with respect to the type of terrestrial station (or, in a frequency band with a bidirectional space allocation, an earth station operating in the opposite direction of transmission) that would yield the largest coordination distances. Therefore, in the case of terrestrial services, fixed stations using tropospheric scatter have been assumed to be operating in frequency bands that may typically be used by such radiocommunication systems; and fixed stations operating in line-of-sight configurations and using analogue modulation have been assumed to be operating in other frequency bands. However, other radiocommunication systems (e.g. other terrestrial stations), that typically have lower antenna gains, or otherwise less stringent system parameters, than those on which the coordination area is based, may also operate in the same frequency range. Therefore, it is possible for the administration seeking coordination to identify a supplementary contour using either the methods in § 2 or 3 of the main body of this Appendix, where they are applicable, or other agreed methods. Subject to bilateral agreement between administrations, these supplementary contours can assume the role of the coordination contour for an alternative type of radio system in the same service or another radiocommunication service.

When a supplementary contour is to be developed for other types of systems, for example digital fixed systems, the necessary system parameters may be found in one of the adjacent columns in Tables 7, 8 and 9. If no suitable system parameters are available then the value of the permissible interference power ($P_r(p)$) may be calculated using equation (127) of § 2 in Annex 7.

In addition, supplementary contours may be prepared by the administration seeking coordination in order to define smaller areas, based on more detailed methods, for consideration when agreed bilaterally between the concerned administrations. These contours can be a useful aid for the rapid exclusion of terrestrial stations or earth stations from further consideration. For earth stations operating with non-geostationary space stations, supplementary contours may be generated using the method in § 4 of this Annex.

Supplementary contours may comprise propagation mode (1) interference paths and, depending on the sharing scenario, propagation mode (2) interference paths. In addition, the propagation mode (1) element of a supplementary contour may, if appropriate for the radiocommunication service, utilize the same level of correction factor (see § 4.4 of the main body of this Appendix) that was applied in the determination of the coordination contour. However, all parts of each supplementary contour must fall on or between the contour defined by the minimum coordination distance and the corresponding propagation mode (1) or propagation mode (2) main contour.

3 Auxiliary contours

Practical experience has shown that, in many cases, the separation distance required for the coordinating earth station, on any azimuth, can in fact be substantially less than the coordination distance, since the worst-case assumptions do not apply to every terrestrial station or earth station. There are two main mechanisms that contribute to such a difference between the separation distance and the coordination distance:

– the terrestrial station antenna gain (or e.i.r.p.), or receiving earth station antenna gain, in the direction of the coordinating earth station is less than that assumed in calculating the coordination contour;

– appropriate allowance can be made, for example, for the effects of site shielding not included in the coordination distance calculations.

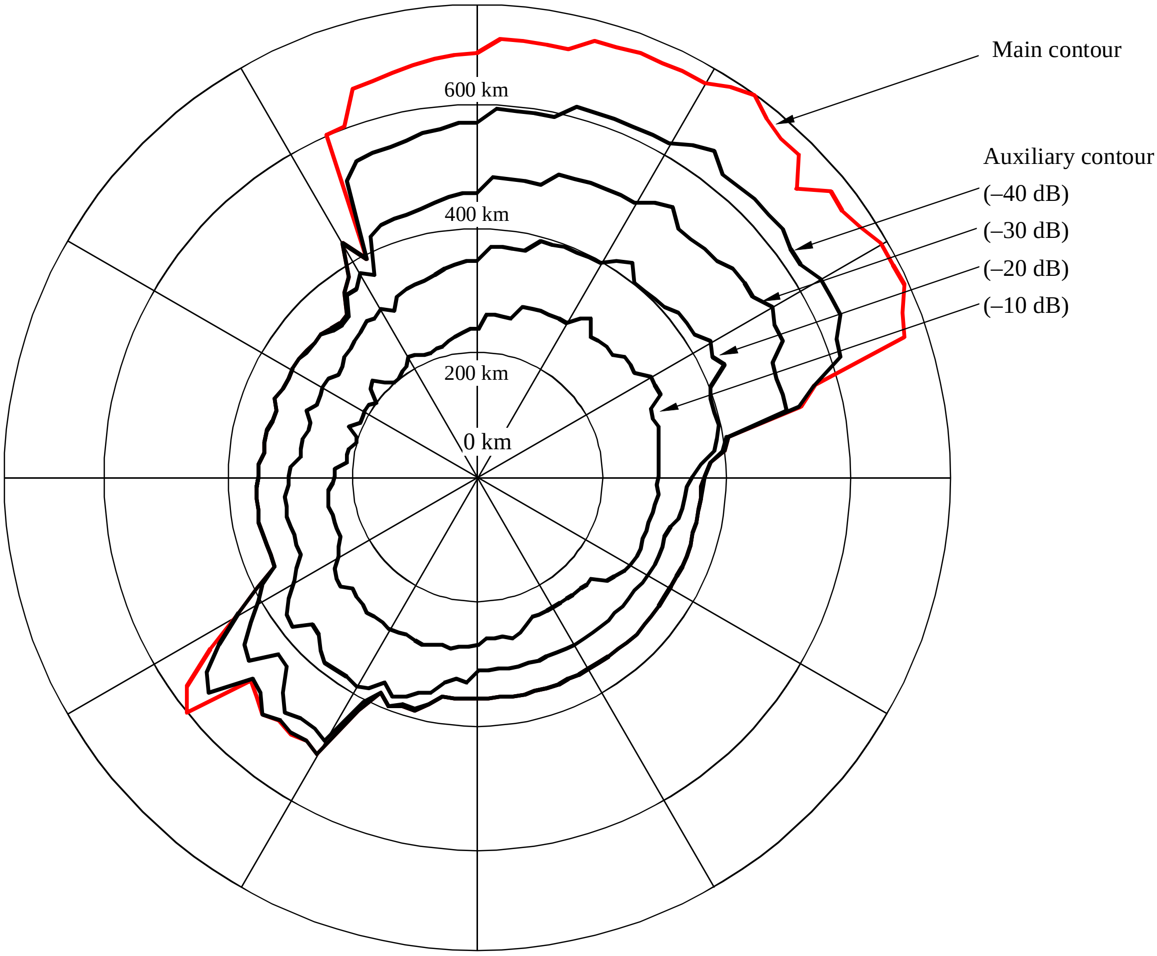
Auxiliary contours must use the same method as that used to determine the corresponding main or supplementary contour. In addition, all parts of each auxiliary contour must fall on or between the contour defined by the minimum coordination distance and the corresponding main or supplementary contour. Auxiliary contours may assist in eliminating from detailed coordination terrestrial stations or earth stations that are located in the coordination area and hence have been identified as potentially affected by the coordinating earth station. Any terrestrial station or earth station that lies outside an auxiliary contour and has an antenna gain towards the coordinating earth station that is less than the gain represented by the relevant auxiliary contour need not be considered further as a significant source, or subject, of interference.

3.1 Auxiliary contours for propagation mode (1)

Propagation mode (1) auxiliary contours are calculated with values for the propagation mode (1) minimum required loss in equation (22) in § 4.4 of the main body of this Appendix that are progressively reduced by, for example, 5, 10, 15, 20 dB, etc., below the value derived from the parameters assumed in Tables 7, 8 and 9 for the corresponding main or supplementary propagation mode (1) contour, until the minimum coordination distance is reached. Propagation mode (1) auxiliary contour distances are calculated without the correction factor (see § 4.4 of the main body of this Appendix), and hence could be larger, on any azimuth, than the corresponding main, or supplementary, propagation mode (1) distance. To prevent this, in those cases where a correction factor applies to the main or supplementary contour, the maximum propagation mode (1) auxiliary contour distance on any azimuth is limited to the corresponding main or supplementary propagation mode (1) distance. In effect this means that the correction factor will limit the possible range of auxiliary contour values so that only those auxiliary contours with values greater than the applied correction factor will be shown within the main or supplementary contour (see Figure 10). For example, if the value of correction factor applicable to the propagation mode (1) main or supplementary contour is 10 dB, then the first auxiliary contour drawn would be for a reduction in minimum required loss of 5 dB and hence the auxiliary contour value would be –15 dB (by convention, auxiliary contours are shown as negative quantities as they represent a reduction in the terrestrial, or receiving earth station, antenna gain, or the terrestrial station e.i.r.p.).

FIGURE 10

Propagation mode (1) main contour and auxiliary contours



The propagation mode (1) auxiliary contours are shown for –10, –20, –30 and –40 dB adjustments in the minimum required loss.

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Propagation mode (2) interference effects may still need to be considered even if propagation mode (1) interference effects have been eliminated from detailed coordination, as the propagation models are based on different interference mechanisms.

3.2 Auxiliary contours for propagation mode (2)

The propagation mode (2) contour around an earth station is calculated assuming the main beams of the coordinating earth station and the terrestrial station intersect exactly (see § 1.3 of the main body of this Appendix). However, it is unlikely that these antenna main beams will intersect exactly. It is therefore possible to generate propagation mode (2) auxiliary contours that take account of any offset in the pointing of the terrestrial station antenna beam from the direction of the coordinating earth station. This offset would result in partial beam intersections and hence a reduced interference potential. These propagation mode (2) auxiliary contours are calculated according to the method described in § 3.2.1 of this Annex.

Propagation mode (2) auxiliary contours are not generated for different values of antenna gain or e.i.r.p. but for different values of beam avoidance angle. Hence, if there is a need to consider both a lower value of antenna gain, or e.i.r.p., for the terrestrial station and propagation mode (2) auxiliary contours, it is first essential to consider the impact of the reduction in antenna gain, or e.i.r.p., on the propagation mode (2) contour. This is achieved by generating a supplementary contour (see § 2) corresponding to the lower value of antenna gain or e.i.r.p. for the terrestrial station, which is drawn on a separate map. Auxiliary mode (2) contours can then be generated inside this propagation mode (2) supplementary contour for different values of the beam avoidance angle. Hence, propagation mode (2) auxiliary contours may be most frequently applied in conjunction with a supplementary contour rather than with the coordination contour.

The correction factor discussed in § 1.3 of the main body of this Appendix does not apply to propagation mode (2) interference paths and hence is also not applicable to propagation mode (2) auxiliary contours. In addition propagation mode (2) auxiliary contours cannot be developed for the bidirectional case.

Propagation mode (2) auxiliary contours are prepared for appropriate values of terrestrial station main beam avoidance angle (see Fig. 11). When the antenna characteristics of the terrestrial stations are known, the appropriate antenna pattern[9] should be used when determining the propagation mode (2) auxiliary contours. If this is not available, the reference antenna pattern given in § 3.2.3 may be used.

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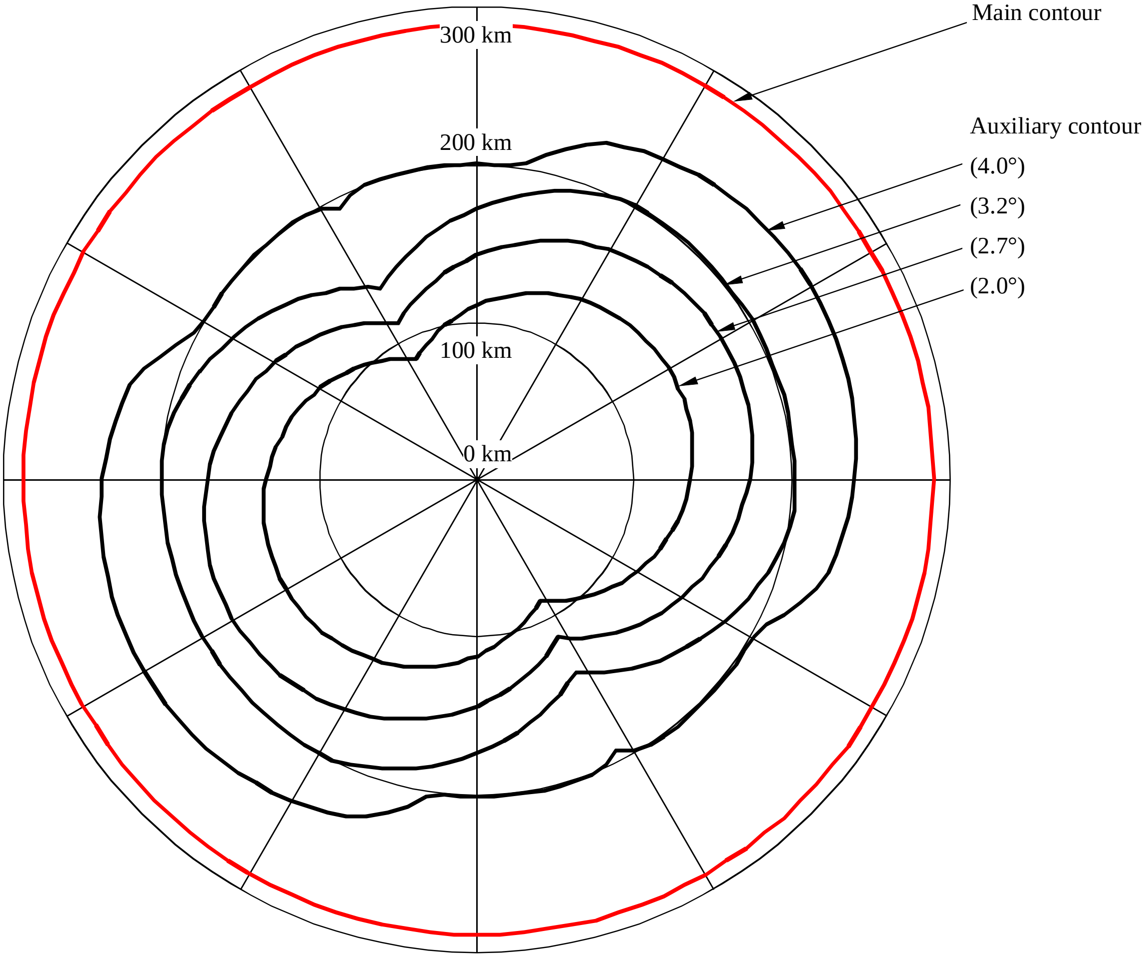
[9] The method requires the antenna pattern to be monotonic in terms of the reduction in gain either side of the main beam axis.

FIGURE 11

Propagation mode (2) main contour and auxiliary contours



The propagation mode (2) auxiliary contours are shown for terrestrial station main beam avoidance angles of 2.0º, 2.7º, 3.2º and 4.0º, respectively

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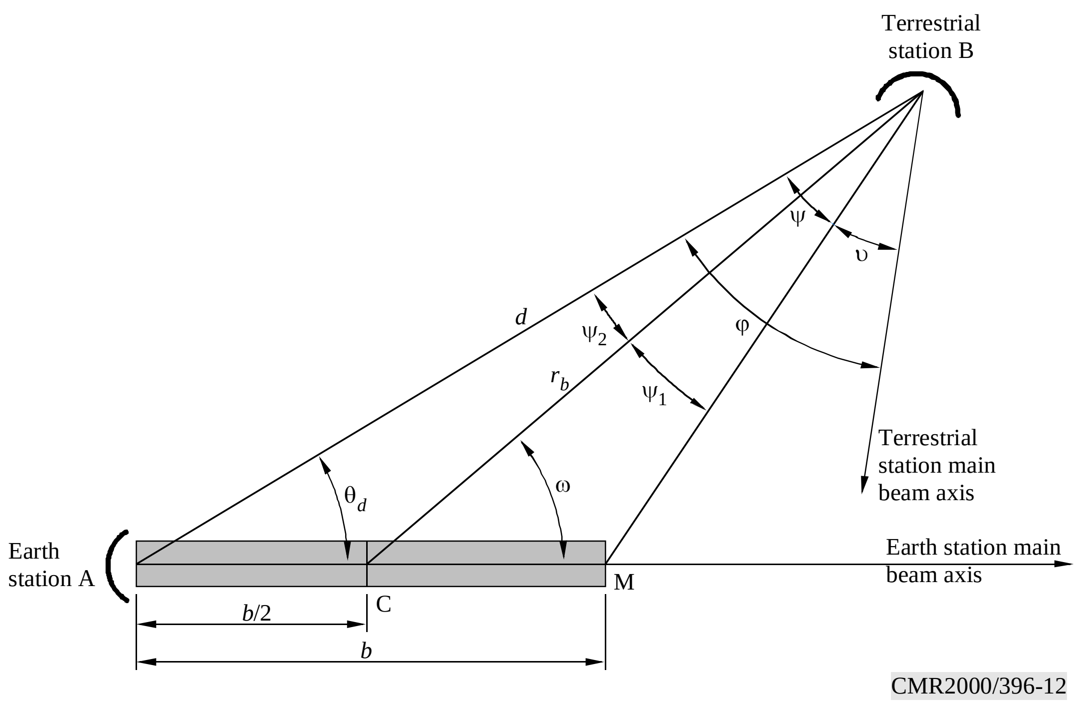
3.2.1 Determination of auxiliary contours for propagation mode (2)

Propagation mode (2) auxiliary contours allow the azimuthal offset of a terrestrial station antenna beam from the coordinating earth station's location to be taken into consideration. Figure 12 shows the hydrometeor scatter region projected on to the horizontal plane. In this Figure, the earth station and the terrestrial station are located at the points A and B, respectively, where the terrestrial station is on a radial defined by the angle ω from the point C at the centre of the propagation mode (2) main, or supplementary, contour. Point C is also the centre of the auxiliary contour.

FIGURE 12

Propagation geometry in the horizontal plane



The shaded area in Fig. 12 represents the critical region, along the earth station's main beam axis, between the earth station and the rain height. Within this critical region a common volume can be formed between the earth station beam and the beam of any terrestrial stations within the propagation mode (2) main, or supplementary, contour. This critical region's length is b and its maximum horizontal extent is at point M. Intersection of this critical region by the terrestrial station main beam axis would result in significant hydrometeor scatter interference via main lobe-to-main lobe coupling.

For a given point within the propagation mode (2) main, or supplementary, contour, the angle subtended by the critical region is termed the critical angle, ψ. The protection angle, υ, represents the angle of the terrestrial station main beam axis away from the critical region. The beam avoidance angle between the terrestrial station's main beam axis and the earth station's location is φ. It is the sum of the two angles ψ and υ and it is this quantity that has a fixed value for a specific auxiliary contour. Each auxiliary contour is generated by varying the angle, ω, and deriving the distance, r_b, from point C to the auxiliary contour. As the angle ω increases from 0° to 360°, the angles ψ and υ change, but their sum remains the same.

The algorithm in § 3.2.2 of this Annex can be used to calculate the auxiliary propagation mode (2) contour for a given value of beam avoidance angle φ.

The method is based on iteratively decrementing the distance, r_b, between terrestrial station and the centre of the common volume, and starting at the main contour distance d_r, until either the shortest value of r_b is found for which the required minimum loss is achieved, or the minimum coordination distance is reached. For each value of r_b, the critical angle ψ is determined and then the protection angle υ is calculated. The terrestrial station antenna gain corresponding to υ and the current distance r_b are used to obtain the propagation mode (2) path loss in equation (82) in Annex 2.

The above process is repeated for each angle ω, to generate a complete auxiliary contour for a given value of beam avoidance angle φ. For some combinations of beam avoidance angle and angle ω, an auxiliary contour may coincide with the main, or supplementary, propagation mode (2) contour.

3.2.2 The step-by-step algorithm

Auxiliary propagation mode (2) contours are constructed by calculating distances along radials from the centre of the circular mode (2) main, or supplementary, contour, which is the point C, at the distance $b/2$ from the earth station along the azimuth of its main beam axis. The distance $b/2$ is equal to Δd, where Δd is given by equation (83) in Annex 2.

For the selected value of beam avoidance angle, φ, generate the auxiliary contour for values of angle, ω, ranging from 0° to 180° in steps of 1°, as follows:

a) Set r_b to the main, or supplementary, mode (2) contour distance d_r calculated as described in § 3.1 of Annex 2.

b) Compute ψ from:

$$\psi_1 = \arctan\left(\frac{b \sin \omega}{2r_b - b \cos \omega}\right) \tag{106}$$

$$\psi_2 = \arctan\left(\frac{b \sin \omega}{2r_b + b \cos \omega}\right) \tag{107}$$

$$\psi = \psi_1 + \psi_2 \tag{108}$$

c) If $\psi > \varphi$ then the auxiliary mode (2) contour coincides with the main or supplementary mode (2) contour for the current value of ω, and the calculation for that value of ω is completed, and go to step j). Otherwise proceed through the following steps d) to i) until one of the terminating conditions described in step f) and step i) is satisfied.

d) Decrement r_b by subtracting 0.2 km from its value.

e) Recalculate the critical angle ψ using equations (106), (107) and (108).

f) If $(0.5\ b \sin \omega / \sin \psi_2) < d_{min}$, the auxiliary mode (2) contour coincides with the minimum coordination distance d_{min} and the calculation for the current value of ω is completed – go to step j). Otherwise, proceed to step g).

g) Compute the protection angle $\upsilon = \varphi - \psi$.

h) Calculate $G(\upsilon)$, the terrestrial station antenna gain at the angle υ relative to the beam axis, using the reference antenna pattern given in this Annex.

i) In equation (82) in Annex 2, use the gain calculated in step h) in place of G_x and the value considered of r_b in place of r_i, and calculate the corresponding propagation mode (2) path loss L_r. If $L_r < L(p)$, then increment r_b by adding 0.2 km to its value and take this as the distance for the current radial. Otherwise, repeat from step d).

j) Once the value of r_b has been found for the current value of angle ω, calculate the angle θ_d from the location of the earth station, and if appropriate the distance, d, to that contour point using:

$$d = 0.5\, b \sin \omega \, / \, \sin \psi_2 \tag{109}$$

$$\theta_d = \omega - \psi_2 \tag{110}$$

An auxiliary propagation mode (2) contour is symmetrical about the earth station main beam axis. Thus, values of d and θ_d corresponding to the values of ω from 181° to 359° can be found by noting that results for a given value of ω are the same as for $(-\omega)$ or $(360° - \omega)$.

The step size for incrementing r_b used above, 0.2 km, is suitable for most situations. It controls the granularity of the result when viewed as a set of r_b values. For low values of earth station beam elevation, the granularity becomes more noticeable in the values of d and θ_d, and a smaller step size may be used.

3.2.3 Reference radiation patterns for line-of-sight radio-relay system antennas

The reference radiation pattern for line-of-sight radio-relay system antennas in this section is used for the unknown terrestrial station antenna in the propagation mode (2) auxiliary contour calculations when the actual antenna pattern is not available.

a) In cases where the ratio between the antenna diameter and the wavelength is greater than 100, the following equation is used:

$$G(\varphi) = G_{amax} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda} \varphi \right)^2 \qquad \text{for} \qquad 0 < \varphi < \varphi_m \tag{111}$$

$$G(\varphi) = G_1 \qquad \text{for} \qquad \varphi_m \leq \varphi < \varphi_r \tag{112}$$

$$G(\varphi) = 32 - 25 \log \varphi \qquad \text{for} \qquad \varphi_r \leq \varphi < 48° \tag{113}$$

$$G(\varphi) = -10 \qquad \text{for} \qquad 48 \leq \varphi \leq 180° \tag{114}$$

$$G_1 = 2 + 15 \log \frac{D}{\lambda} \tag{115}$$

$$\varphi_m = \frac{20\,\lambda}{D} \sqrt{G_{amax} - G_1} \tag{116}$$

$$\varphi_r = 15.85 \left(\frac{D}{\lambda} \right)^{-0.6} \tag{117}$$

b) In cases where the ratio between the antenna diameter and the wavelength is less than or equal to 100, the following equation is used:

$$G(\varphi) = G_{amax} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda} \varphi \right)^2 \qquad \text{for} \qquad 0 < \varphi < \varphi_m \tag{118}$$

$$G(\varphi) = G_1 \qquad \text{for} \qquad \varphi_m \leq \varphi < 100 \frac{\lambda}{D} \tag{119}$$

$$G(\varphi) = 52 - 10 \log \frac{D}{\lambda} - 25 \log \varphi \qquad \text{for} \qquad 100 \frac{\lambda}{D} \leq \varphi < 48° \tag{120}$$

$$G(\varphi) = 10 - 10 \log \frac{D}{\lambda} \qquad \text{for} \qquad 48° \leq \varphi \leq 180° \tag{121}$$

c) In cases where only the maximum antenna gain is known, D/λ can be estimated from the following expression:

$$20 \log \frac{D}{\lambda} \approx G_{amax} - 7.7 \tag{122}$$

where:

G_{amax}: main beam axis antenna gain (dBi)

D: antenna diameter (m)

λ: wavelength (m)

G_1: gain of the first side lobe (dBi).

4 Determination of a supplementary contour using the time-variant gain (TVG) method

The TVG method requires the cumulative distribution of the time-varying horizon antenna gain of an earth station operating with a non-geostationary space station. In comparison to the TIG method, the TVG method usually produces smaller distances, but requires greater effort in determining the cumulative distribution of the horizon gain of the earth station antenna for each azimuth to be considered.

The TVG method closely approximates the convolution of the distribution of the horizon gain of the earth station antenna and the propagation mode (1) path loss. This method may produce slightly smaller distances than those obtained by an ideal convolution. An ideal convolution cannot be implemented due to the limitations of the current model for propagation mode (1). The propagation mode (1) required distance, at the azimuth under consideration, is taken as the largest distance developed from a set of calculations, each of which is based on equation (4) of the main body of this Appendix. For convenience, in these calculations, this equation may be rewritten for the *n*th calculation in the following form:

$$L_b(p_v) - G_e(p_n) = P_t + G_x - P_r(p) \qquad \text{dB} \qquad (123)$$

with the constraint:

$$p_v = \begin{cases} 100\, p / p_n & \text{for } p_n \geq 2\,p \\ 50 & \text{for } p_n < 2\,p \end{cases} \qquad \%$$

where:

P_t, $P_r(p)$: as defined in equations in § 1.3 of the main body of this Appendix where p is the percentage of time associated with permissible interference power $P_r(p)$

G_x: maximum antenna gain assumed for the terrestrial station (dBi). Tables 7 and 8 give values for G_x for the various frequency bands

$G_e(p_n)$: the horizon gain of the coordinating earth station antenna (dBi) that is exceeded for p_n% of the time on the azimuth under consideration

$L_b(p_v)$: the propagation mode (1) minimum required loss (dB) for p_v% of the time; this loss must be exceeded by the propagation mode (1) predicted path loss for all but p_v% of the time.

The values of the percentages of time, p_n, to be used in equation (123) are determined in the context of the cumulative distribution of the horizon antenna gain. This distribution needs to be developed for a predetermined set of values of horizon antenna gain spanning the range from the minimum to the maximum values for the azimuth under consideration. The notation $G_e(p_n)$ denotes the value of horizon antenna gain for which the complement of the cumulative distribution of the horizon antenna gain has the value corresponding to the percentage of time p_n. The p_n value is the percentage of time that the horizon antenna gain exceeds the *n*th horizon antenna gain value. The procedure in § 4.1 may be used to develop this distribution.

For each value of p_n, the value of horizon antenna gain for this time percentage, $G_e(p_n)$, is used in equation (123) to determine a propagation mode (1) minimum required loss. The propagation mode (1) predicted path loss is to exceed this propagation mode (1) required loss for no more than p_v% of the time, as specified by the constraint associated with equation (123). A series of propagation mode (1) distances are then determined using the procedures described in § 4 of the main body of this Appendix.

The propagation mode (1) required distance is then the maximum distance in the series of propagation mode (1) distances that are obtained for any value of p_n, subject to the constraint associated with equation (123). A detailed description of the method for using equation (123) to determine the propagation mode (1) required distance is provided in § 4.2.

Further information, including examples, may be found in the latest version of Recommendation ITU-R SM.1448.

4.1 Determination of the horizon antenna gain distribution for the TVG method

The TVG method for the determination of an earth station's supplementary contour requires the determination of the horizon antenna gain statistics for all azimuths (in suitable increments, e.g. 5°) around the earth station. In considering the horizon antenna gain of the antenna for either a transmitting or a receiving earth station, only the horizon antenna gain values during the operational time are to be considered. In developing the cumulative distributions of horizon antenna gain, the percentages of time are percentages of operational time. Thus, there may be periods of time for which no horizon antenna gain is specified.

The determination of the horizon antenna gain distribution requires both earth station and orbital information including whether or not station keeping is used to maintain a single orbital path (repeating/non-repeating ground track system). The cumulative distribution of the time-varying horizon gain of a transmitting or a receiving earth station antenna operating with non-geostationary space stations is calculated as follows:

Step 1: Simulate the constellation of non-geostationary space stations over a sufficiently long period, with a time step appropriate for orbit altitude, to obtain a valid representation of the antenna gain variations. For repeating ground track constellations, simulate the orbital path for each satellite visible from the earth station over a period of the ground track. For non-repeating ground track constellations, simulate the orbit of each satellite in the constellation over a period long enough to get a stable representation of the distribution.

Step 2: At each time step, determine the azimuth and elevation angle of each satellite that is both visible at the earth station and above the minimum elevation angle at which the earth station operates. In addition to the minimum elevation angle, other criteria could be used to avoid certain geometric configurations, e.g. geostationary orbit arc avoidance (no transmission between an earth station and a non-geostationary satellite that is within $\pm X°$ from the geostationary orbit arc).

Step 3: At each step, and for each satellite in communication with the earth station, use the actual earth station antenna pattern, or a formula giving a good approximation of it, to calculate the gain towards the horizon at each azimuth and elevation angle around the earth station.

Step 4: Choose a gain increment g (dB) and partition the gain range by a number of gain levels between G_{min} and G_{max}, i.e. $G = \{G_{min}, G_{min} + g, G_{min} + 2g,..., G_{max}\}$.

These gain levels determine a set of gain intervals so that the nth gain interval ($n = 1, 2, 3, \ldots$) includes gain values equal to, or greater than, $G_{min} + (n - 2)$g and less than $G_{min} + (n - 1)g$.

A value of $g = 0.1$ to 0.5 dB is recommended.

For each azimuth on the horizon around the earth station, accumulate the time that the horizon gain takes a value in each gain interval of width g (dB).

Step 5: The probability density function (pdf) on each azimuth is determined by dividing the time in each gain interval by the total simulation time.

Step 6: Determine the cumulative distribution function (cdf) of horizon antenna gain at each azimuth by accumulating the gain density function at that azimuth. The value of the required cdf at any specific gain value is the percentage of time that the gain is less than, or equal to, that gain value.

4.2 Determination of the supplementary contour distance using the TVG method

This calculation is based on a cumulative distribution of the horizon gain of the earth station antenna for each azimuth to be considered (in suitable angular increments e.g. 5°). Appropriate distributions for this purpose may be developed by the method in § 4.1. The process for calculating the supplementary contour distance for each azimuth is described in the following procedure.

Step 1: From the complementary cumulative distribution of the horizon antenna gain, for the azimuth under consideration, determine the percentage of time p_n that the horizon gain exceeds the level G_{en}, where:

$$G_{en} = G_{min} + (n-1)g \qquad (n = 1, 2, 3,...) \qquad (124)$$

with:

G_{min}: minimum value of horizon gain, and

g: gain increment.

Step 2: For each percentage p_n that is equal to or greater than $2p$%, the percentage of time to be used in determining the propagation mode (1) path loss is p_v.

$$p_v = 100\ p/p_n \qquad \% \qquad \text{for } p_n \geq 2p\% \qquad (125)$$

For each percentage of time, determine the distance, d_n (km), for which the propagation mode (1) predicted path loss is equal to the propagation mode (1) minimum required loss, using the propagation model in accordance with § 4 of the main body of this Appendix and the equation:

$$L_{bn}(p_v) = P_t + G_{en} + G_x - P_r(p) \qquad \text{dB} \qquad (126)$$

The values of p_v must be within the range of percentage of time of the propagation mode (1) model (see § 1.5.1 of the main body of this Appendix).

Step 3: The propagation mode (1) required distance for the azimuth under consideration is the largest of the distances, d_n (km), calculated in Step 2, except when this largest distance is attained for the smallest value of p_n that is equal to or greater than $2p$ in accordance with equation (125) in Annex 6. In such cases, the propagation mode (1) required distance for the azimuth under consideration is the distance determined from equation (126) in Annex 6 with $G_{en} = G_{max}$ and $p_v = 50\%$ where G_{max} is the maximum value of horizon antenna gain.

Step 4: The propagation mode (1) supplementary contour distance for the azimuth under consideration is the required distance as determined in Step 3, except that the distance must be between the minimum coordination distance, d_{min}, and the maximum coordination distance, d_{max1}. These limits are given in § 4.2 and § 4.3 of the main body of this Appendix, respectively.

ANNEX 7

System parameters and predetermined coordination distances for determination of the coordination area around an earth station

1 Introduction

Tables 7 to 9 contain the system parameter values required by the methods in the main body of this Appendix to determine the coordination area around an earth station when the band is shared with terrestrial radiocommunication services or other earth stations operating in the opposite direction of transmission.

Table 7 is limited to those system parameter values required for the case of a transmitting earth station sharing with terrestrial services; Table 8 is limited to those parameter values required for the case of a receiving earth station sharing with terrestrial services; Table 9 is limited to those parameter values required for the case of a transmitting earth station which is sharing in a bidirectionally allocated band with other earth stations operating in the opposite direction of transmission.

These system parameter tables include primary allocations to the space and terrestrial services in Article **S5** in all bands between 100 MHz and 105 GHz. Some of the columns have incomplete information. In some cases, this is because there is no requirement to calculate coordination distances as pre-determined coordination distances apply. In other cases, the service allocations are new and the systems may not be introduced for some years. Hence, the system parameters are the subject of ongoing development within the ITU-R Study Groups.

Parameters specific to the earth station, for which coordination is being sought, are provided to the Radiocommunication Bureau in the format specified in Appendix **S4** as part of the notification and coordination procedures.

The row in each table entitled “method to be used” directs the user to the appropriate section of the main body of this Appendix which describes the methods to be followed for the determination of the coordination area.

Note that the earth station for which the coordination area is to be determined is identified by the service designation given in the first row of each table.

When a supplementary contour is to be developed, for example for digital fixed systems, the necessary system parameters may be found in one of the adjacent columns in Tables 7, 8 and 9. If no suitable system parameters are available, then the value of the permissible interference power ($P_r(p)$) may be calculated using equation (127) in § 2.

The predetermined coordination distances specified in Table 10 are used for transmitting and receiving earth stations, in cases defined by the corresponding frequency sharing situation.

2 Calculation of the permissible interference power of an interfering emission

Tables 7, 8 and 9 contain values for the parameters which are required for the calculation of the permissible interference power of the interfering emission (dBW), in the reference bandwidth, to be exceeded for no more than p% of the time at the receiving antenna terminal of a station subject to interference, from a single source of interference, using the general formula:

$$P_r(p) = 10 \log (k\, T_e\, B) + N_L + 10 \log (10^{M_s/10} - 1) - W \qquad \text{dBW} \qquad (127)$$

where:

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

T_e: thermal noise temperature of the receiving system (K), at the terminal of the receiving antenna (see § 2.1 of this Annex)

N_L: link noise contribution (see § 2.2 of this Annex)

B: reference bandwidth (Hz), i.e. the bandwidth in the receiving station that is subject to the interference and over which the power of the interfering emission can be averaged

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

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

n: number of equivalent, equal level, equal probability entries of interference, assumed to be uncorrelated for small percentages of the time

M_s: link performance margin (dB) (see § 2.3 of this Annex)

W: a thermal noise equivalence factor (dB) for interfering emissions in the reference bandwidth; it is positive when the interfering emissions would cause more degradation than thermal noise (see § 2.4 of this Annex).

In certain cases, an administration may have reason to believe that, for its receiving earth station, a departure from the values associated with the earth station, as listed in Table 8, may be justified. Attention is drawn to the fact that for specific systems the bandwidths B or, for example 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 8.

2.1 Calculation of the noise temperature of the receiving system

The noise temperature (K) of the receiving system, referred to the output terminals of the receiving antenna, may be determined (unless specifically given in Table 7) from:

$$T_e = T_a + (\ell_{t1} - 1)\,290 + \ell_{t1}\; T_r \qquad \text{K} \qquad (128)$$

where:

- T_a: noise temperature (K) contributed by the receiving antenna
- ℓ_{t1}: numerical loss in the transmission line (e.g. a waveguide) between the antenna terminal and the receiver front end
- T_r: noise temperature (K) of the receiver front end, including all successive stages at the front end input.

For radio-relay receivers and where the waveguide loss of a receiving earth station is not known, a value of $\ell_{t1} = 1.0$ is used.

In case of determination of the coordination contours between two earth stations operating in the opposite direction of transmission, the following earth station receiving system noise temperatures should be used if the value is not provided in Table 9. This assumption is necessary because the receiving earth station takes the place of a receiving terrestrial station in the calculations.

TABLE 6

Frequency range (GHz)	**T_e (K)**
$f < 10$	75
$10 < f < 17$	150
$f > 17$	300

2.2 Determination of the factor N_L

The factor N_L is the noise contribution to the link. In the case of a satellite transponder, it includes the uplink noise, intermodulation, etc. In the absence of table entries, it is assumed:

$$N_L = 1 \text{ dB for fixed-satellite links}$$

$$= 0 \text{ dB for terrestrial links}$$

2.3 Determination of the factor M_S

The factor M_S is the factor by which the link noise under clear-sky conditions would have to be raised in order to equal the permissible interference power.

2.4 Determination of the factor *W*

The factor *W* (dB) is the level of the radio-frequency thermal noise power relative to the received power of an interfering emission which, in the place of the former and contained in the same (reference) bandwidth, would produce the same interference (e.g. an increase in the voice or video channel noise power, or in the bit error ratio). The factor *W* generally depends on the characteristics of both the wanted and the interfering signals.

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

3 Horizon antenna gain for a receiving earth station with respect to a transmitting earth station

For the determination of the coordination area of a transmitting earth station with respect to a receiving earth station in a bidirectionally allocated band, it is necessary to calculate the horizon antenna gain of the unknown earth station. In cases where the unknown receiving earth stations operate with geostationary satellites, Table 9 provides the necessary receiving earth station parameters for the calculation procedure, which is described in § 2.1 of Annex 5.

In the case where the unknown receiving earth station operates with non-geostationary satellites, the horizon antenna gain to be used for all azimuths is provided in Table 9. The tabulated values were determined by using the method described in § 2.2 of the main body of this Appendix, which uses the maximum and minimum values of horizon antenna gain. For this purpose the maximum horizon antenna gain is the gain of the antenna for an off-axis angle equal to the minimum operating elevation angle. The minimum horizon antenna gain is the gain at large off-axis angles, usually more than 36° or 48°.

In determining the TIG horizon antenna gain entries in Table 9, the difference between the maximum and minimum horizon antenna gain did not exceed 30 dB. Consequently, the TIG horizon antenna gain was taken as the lesser of the maximum horizon antenna gain or 20 dB more than the minimum horizon antenna gain. For the purpose of determining the TIG horizon antenna gain, the reference antenna pattern of § 3 of Annex 3 was used, except in cases noted in the tables where a different pattern was deemed to be more appropriate.

TABLE 7a

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

Transmitting space radiocommunication service designation		**Mobile-satellite**		**Mobile-satellite, space operation**	**Earth exploration-satellite, meteorological satellite**		**Space operation**	**Space research, space operation**	**Mobile-satellite**	**Space operation**		**Mobile-satellite, radio-determination-satellite**	**Mobile-satellite**		**Mobile-satellite**		**Space operation, space research**		**Mobile-satellite**		**Space research, space operation, Earth exploration-satellite**
Frequency bands (MHz)		121.45-121.55		148.0-149.9	401-403		433.75-434.25	449.75-450.25	806-840	1 427-1 429		1 610-1 626.5	1 675-1 700		1 675-1 710		1 750-1 850		1 980-2 025		2 025-2 110 2 110-2 120 (Deep space)
Receiving terrestrial service designations		Aeronautical mobile		Fixed, mobile	Fixed, mobile, meteorological aids		Amateur, radio-location fixed, mobile	Fixed, mobile, radio-location	Fixed, mobile broadcasting, aeronautical radionavigation	Fixed, mobile		Aeronautical radionavigation	Meteoro-logical aids		Fixed, mobile		Fixed, mobile		Fixed, mobile		Fixed, mobile
Method to be used		§ 1.4.7		§ 2.1, § 2.2	§ 2.1, § 2.2		§ 2.1, § 2.2	§ 2.1, § 2.2	§ 1.4.6	§ 2.1, § 2.2		§ 1.4.6	§ 1.4.6		§ 1.4.6		§ 2.1, § 2.2		§ 1.4.6		§ 2.1, § 2.2
Modulation at terrestrial station [1]		A	N	A	A	N		A and N	A and N	A	N		A	N	A	N	A	N	A	N	A
Terrestrial station interference parameters and criteria	p_0 (%)			1.0				0.01	0.01	0.01	0.01				0.01	0.01	0.01	0.01	0.01		0.01
	n			1				2	2	2	2				2	2	2	2	2		2
	p (%)			1.0				0.005	0.005	0.005	0.005				0.005	0.005	0.005	0.005	0.005		0.005
	N_L (dB)			–				0	0	0	0				0	0	0	0	0		0
	M_s (dB)			–				20	20	33	33				33	33	33	33	26 [2]		26 [2]
	W (dB)			–				0	0	0	0				0	0	0	0	0		0
Terrestrial station parameters	G_x (dBi) [3]			8				16	16	33	33				35	35	35	35	49 [2]		49 [2]
	T_e (K)			–				750	750	750	750				750	750	750	750	500 [2]		500 [2]
Reference bandwidth	B (Hz)			4×10^3				12.5×10^3	12.5×10^3	4×10^3	10^6				4×10^3	10^6	4×10^3	10^6	4×10^3		4×10^3
Permissible interference power	$P_r(p)$ (dBW) in B			–153				–139	–139	–131	–107				–131	–107	–131	–107	–140		–140

1 A: analogue modulation; N: digital modulation.

2 The parameters for the terrestrial station associated with transhorizon systems have been used. Line-of-sight radio-relay parameters associated with the frequency band 1 675-1 710 MHz may also be used to determine a supplementary contour.

3 Feeder losses are not included.

TABLE 7b

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

Transmitting space radiocommunication service designation		**Fixed-satellite, mobile-satellite**	**Fixed-satellite**	**Fixed-satellite**	**Fixed-satellite**		**Space operation, space research**		**Fixed-satellite, mobile-satellite, meteorological-satellite**		**Fixed-satellite**		**Fixed-satellite**		**Fixed-satellite**	**Fixed-satellite [3]**	**Fixed-satellite**	**Fixed-satellite [3]**
Frequency bands (GHz)		2.655-2.690	5.091-5.150	5.725-5.850	5.725-7.075		7.100-7.235 [5]		7.900-8.400		10.7-11.7		12.5-14.8		13.75-14.3	15.43-15.65	17.7-18.4	19.3-19.7
Receiving terrestrial service designations		Fixed, mobile	Aeronautical radio-navigation	Radio-location	Fixed, mobile		Fixed, mobile		Fixed, mobile		Fixed, mobile		Fixed, mobile		Radiolocation radionavigation	Aeronautical radionavigation	Fixed, mobile	Fixed, mobile
Method to be used		§ 2.1		§ 2.1	§ 2.1		§ 2.1, § 2.2		§ 2.1		§ 2.1		§ 2.1, § 2.2				§ 2.1, § 2.2	§ 2.2
Modulation at terrestrial station [1]		A			A	N	A	N	A	N	A	N	A	N			N	N
Terrestrial station interference parameters and criteria	p_0 (%)	0.01			0.01	0.005	0.01	0.005	0.01	0.005	0.01	0.005	0.01	0.005			0.005	0.005
	n	2			2	2	2	2	2	2	2	2	2	2			2	2
	p (%)	0.005			0.005	0.0025	0.005	0.0025	0.005	0.0025	0.005	0.0025	0.005	0.0025			0.0025	0.0025
	N_L (dB)	0			0	0	0	0	0	0	0	0	0	0			0	0
	M_s (dB)	26 [2]			33	37	33	37	33	37	33	40	33	40			25	25
	W (dB)	0			0	0	0	0	0	0	0	0	0	0			0	0
Terrestrial station parameters	G_x (dBi) [4]	49 [2]	6		46	46	46	46	46	46	50	50	52	52			48	48
	T_e (K)	500 [2]			750	750	750	750	750	750	1 500	1 100	1 500	1 100			1 100	1 100
Reference bandwidth	B (Hz)	4×10^3	150×10^3		4×10^3	10^6	4×10^3	10^6	4×10^3	10^6	4×10^3	10^6	4×10^3	10^6			10^6	10^6
Permissible interference power	$P_r(p)$ (dBW) in B	–140	–160		–131	–103	–131	–103	–131	–103	–128	–98	–128	–98			–113	–113

[1] A: analogue modulation; N: digital modulation.

[2] The parameters for the terrestrial station associated with transhorizon systems have been used. Line-of-sight radio-relay parameters associated with the frequency band 5 725-7 075 MHz may also be used to determine a supplementary contour with the exception that G_x = 37 dBi.

[3] Feeder links of non-geostationary-satellite systems in the mobile-satellite service.

[4] Feeder losses are not included.

[5] Actual frequency bands are 7 100-7 155 MHz and 7 190-7 235 MHz for space operation service and 7 145-7 235 MHz for the space research service.

TABLE 7c

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

Transmitting space radiocommunication service designation		**Fixed-satellite**	**Fixed-satellite [2]**	**Fixed-satellite [3]**	**Space research**	**Earth exploration-satellite, space research**	**Fixed-satellite, mobile-satellite, radionavigation-satellite**	**Fixed-satellite [2]**	**Fixed-satellite, mobile-satellite**	**Fixed-satellite**	**Fixed-satellite**
Frequency bands (GHz)		24.75-25.25 27.0-29.5	28.6-29.1	29.1-29.5	34.2-34.7	40.0-40.5	42.5-51.4	47.2-50.2	71.0-75.5	92.0-94.0	94.1-95.0
Receiving terrestrial service designations		Fixed, mobile	Fixed, mobile	Fixed, mobile	Fixed, mobile, radio-location	Fixed, mobile	Fixed, mobile, radionavigation	Fixed, mobile	Fixed, mobile	Fixed, mobile, radiolocation	Fixed, mobile, radiolocation
Method to be used		§ 2.1	§ 2.2	§ 2.2		§ 2.1, § 2.2	§ 2.1, § 2.2	§ 2.2	§ 2.1, § 2.2	§ 2.1, § 2.2	§ 2.1, § 2.2
Modulation at terrestrial station [1]		N	N	N		N	N	N	N	N	N
Terrestrial station interference parameters and criteria	p_0 (%)	0.005	0.005	0.005		0.005	0.005	0.001	0.002	0.002	0.002
	n	1	2	1		1	1	1	2	2	2
	p (%)	0.005	0.0025	0.005		0.005	0.005	0.001	0.001	0.001	0.001
	N_L (dB)	0	0	0		0	0	0	0	0	0
	M_s (dB)	25	25	25		25	25	25	25	25	25
	W (dB)	0	0	0		0	0	0	0	0	0
Terrestrial station parameters	G_x (dBi) [4]	50	50	50		42	42	46	45	45	45
	T_e (K)	2 000	2 000	2 000		2 600	2 600	2 000	2 000	2 000	2 000
Reference bandwidth	B (Hz)	10^6	10^6	10^6		10^6	10^6	10^6	10^6	10^6	10^6
Permissible interference power	$P_r(p)$ (dBW) in B	–111	–111	–111		–110	–110	–111	–111	–111	–111

[1] A: analogue modulation; N: digital modulation.

[2] Non-geostationary satellites in the fixed-satellite service.

[3] Feeder links to non-geostationary-satellite systems in the mobile-satellite service.

[4] Feeder losses are not included.

TABLE 8a

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

Receiving space radiocommunication service designation			**Space operation, space research**	**Meteoro-logical-satellite, mobile-satellite**	**Space research**	**Space research, space operation**	**Space operation**	**Mobile-satellite**	**Meteoro-logical-satellite**	**Mobile-satellite**	**Space research, space operation**	**Space operation**	**Meteoro-logical-satellite, Earth exploration-satellite**	**Space operation**	**Broad-casting-satellite**	**Mobile-satellite**	**Broadcasting-satellite (DAB)**	**Mobile-satellite, land-mobile satellite, maritime mobile-satellite**
Frequency bands (MHz)			137-138	137-138	143.6-143.65	174-184	163-167 272-273 [5]	335.4-399.9	400.15-401	400.15-401	400.15-401	401-402	460-470	549.75-550.25	620-790	856-890	1 452-1492	1 492-1 530 1 555-1 559 2 160-2 200 [1]
Transmitting terrestrial service designations			Fixed, mobile	Fixed, mobile	Fixed, mobile, radio-location	Fixed, mobile, broad-casting	Fixed, mobile	Fixed, mobile	Meteoro-logical aids	Meteoro-logical aids	Meteoro-logical aids	Meteoro-logical aids, fixed, mobile	Fixed, mobile	Fixed, mobile, broad-casting	Fixed, mobile, broad-casting	Fixed, mobile, broad-casting	Fixed, mobile, broadcasting	Fixed, mobile
Method to be used			§ 2.1	§ 2.1	§ 2.1	§ 2.1	§ 2.1	§ 1.4.6	§ 1.4.6	§ 1.4.6	–	§ 2.1	§ 2.1	§ 2.1	§ 1.4.5	§ 1.4.6	§ 1.4.5	§ 1.4.6
Modulation at earth station [2]			N		N		N				N	N					N	N
Earth station interference parameters and criteria	p_0 (%)		0.1		0.1		1.0		0.012		0.1	0.1	0.012					10
	n		2		2		1		1		2	2	1					1
	p (%)		0.05		0.05		1.0		0.012		0.05	0.05	0.012					10
	N_L (dB)		0		0		0		0		0	0						0
	M_s (dB)		1		1		1		4.3		1	1						1
	W (dB)		0		0		0		0		0	0						0
Terrestrial station parameters	E (dBW) in B [3]	A	–		–		15				–	–	5				38	37 [4]
		N	–		–		15				–	–	5				38	37
	P_t (dBW) in B	A	–		–		–1				–	–	–11				3	0
		N	–		–		–1				–	–	–11				3	0
	G_x (dBi)		–		–		16				–	–	16				35	37
Reference bandwidth	B (Hz)		1		1		10^3		177.5×10^3		1	1	85				25×10^3	4×10^3
Permissible interference power	$P_r(p)$ (dBW) in B		–199		–199		–173		–148		–208	–208	–178					–176

1 In the band 2 160-2 200 MHz, the terrestrial station parameters of line-of-sight radio-relay systems have been used. If an administration believes that, in this band transhorizon systems need to be considered, the parameters associated with the frequency band 2 500-2 690 MHz may be used to determine the coordination area.

2 A: analogue modulation; N: digital modulation.

3 E is defined as the equivalent isotropically radiated power of the interfering terrestrial station in the reference bandwidth.

4 This value is reduced from the nominal value of 50 dBW for the purposes of determination of coordination area, recognizing the low probability of high power emissions falling fully within the relatively narrow bandwidth of the earth station.

5 The fixed-service parameters provided in the column for 163-167 MHz and 272-273 MHz are only applicable to the band 163-167 MHz.

TABLE 8b

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

Receiving space radiocommunication service designation		**Space operation (GSO and non-GSO)**	**Radio-navigation-satellite**	**Meteoro-logical-satellite (non-GSO)**	**Meteoro-logical-satellite (GSO)**	**Space research near-Earth (non-GSO and GSO)**		**Space research deep space (non-GSO)**	**Space operation (non-GSO and GSO)**	**Earth exploration-satellite (GSO)**	**Broadcasting-satellite**	**Mobile-satellite, radio-determination-satellite**	**Fixed-satellite, broadcasting satellite**		**Fixed-satellite**	
						Unmanned	Manned									
Frequency bands (GHz)		1.525-1.535	1.559-1.610	1.670-1.710	1.670-1.710	1.700-1.710 2.200-2.290		2.290-2.300	2.200-2.290	2.200-2.290	2.310-2.360	2.4835-2.500 [6]	2.500-2.690		3.400-4.200	
Transmitting terrestrial service designations		Fixed	Fixed	Fixed, mobile, meteoro-logical aids	Fixed, mobile, meteorological aids	Fixed, mobile		Fixed, mobile	Fixed, mobile	Fixed, mobile	Fixed, mobile, radiolocation	Fixed, mobile, radiolocation	Fixed, mobile radiolocation		Fixed, mobile	
Method to be used		§ 2.1, § 2.2	§ 2.1	§ 2.2 and [1]	§ 2.1 and [1]	§ 2.1, § 2.2		§ 2.2	§ 2.1, § 2.2	§ 2.1	§ 1.4.5	§ 1.4.6	§ 1.4.5 and § 2.1		§ 2.1	
Modulation at earth station [2]		N		N	N	N		N	N	N		N	A	N	A	N
Earth station interference parameters and criteria	p_0 (%)	1.0		0.006	0.011	0.1	0.001	0.001	1.0	1.0		10	0.03	0.003	0.03	0.005
	n	1		3	2	2	1	1	2	2		1	3	3	3	3
	p (%)	1.0		0.002	0.0055	0.05	0.001	0.001	0.5	0.5		10	0.01	0.001	0.01	0.0017
	N_L (dB)	0		0	0	0		0	0			0	1	1	1	1
	M_s (dB)	1		2.8	0.9	1		0.5	1			1	7	2	7	2
	W (dB)	0		0	0	0		0	0			0	4	0	4	0
Terrestrial station parameters	E (dBW) in B [3] — A	50		92 [4]	92 [4]	–27 [4, 5]		–27 [5]	72	72 [4]		37	72 [4]	72 [4]	55	55
	E (dBW) in B [3] — N	37		–	–	–27		–27	76	76		37	76	76	42	42
	P_t (dBW) in B — A	13		40 [4]	40 [4]	–71 [4, 5]		–71 [5]	28	28 [4]		0	28 [4]	28 [4]	13	13
	P_t (dBW) in B — N	0		–	–	–71		–71	32	32		0	32	32	0	0
	G_x (dBi)	37		52	52	44		44	44	44		37	44	44	42	42
Reference bandwidth	B (Hz)	10^3		10^6	4×10^3	1		1	10^6	10^6		4×10^3	10^6	10^6	10^6	10^6
Permissible interference power	$P_r(p)$ (dBW) in B	–184		–142	–177	–216		–222	–154	–154		–176				

1 See Table 10.

2 A: analogue modulation; N: digital modulation.

3 E is defined as the equivalent isotropically radiated power of the interfering terrestrial station in the reference bandwidth.

4 In this band, 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 3.4-4.2 GHz may be used to determine the coordination area, with the exception that E = 50 dBW for analogue terrestrial stations; and G_x = 37 dBi. However, for the space research service only, noting footnote [5] when transhorizon systems are not considered, E = 20 dBW and P_t = –17 dBW for analogue terrestrial stations, E = –23 dBW and P_t = –60 dBW for digital terrestrial stations; and G_x = 37 dBi.

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

6 In the band 2.4835-2.5 GHz the terrestrial station parameters of line-of-sight radio-relay systems have been used. If an administration believes that, in this band, transhorizon systems need to be considered, the parameters associated with the frequency band 2 500-2 690 MHz may be used to determine the coordination area.

TABLE 8c

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

Receiving space radiocommunication service designation	Fixed-satellite		Fixed-satellite, radio-determination satellite	Fixed-satellite	Fixed-satellite		Meteoro-logical-satellite [7, 8]	Meteoro-logical-satellite [9]	Earth exploration-satellite [7]	Earth exploration-satellite [9]	Space research [10]		Fixed-satellite		Broadcasting-satellite		Fixed-satellite [9]	Broad-casting-satellite	Fixed-satellite [7]
											Deep space								
Frequency bands (GHz)	4.500-4.800		5.150-5.216	6.700-7.075	7.250-7.750		7.450-7.550	7.750-7.850	8.025-8.400	8.025-8.400	8.400-8.450	8.450-8.500	10.7-12.75		12.5-12.75 [12]		15.4-15.7	17.7-17.8	17.7-18.8 19.3-19.7
Transmitting terrestrial service designations	Fixed, mobile		Aeronautical radionavigation	Fixed, mobile	Fixed, mobile		Fixed, mobile	Fixed, mobile	Fixed, mobile	Fixed, mobile	Fixed, mobile		Fixed, mobile		Fixed, mobile		Aeronau-tical radio-navigation	Fixed	Fixed, mobile
Method to be used	§ 2.1		§ 2.1	§ 2.2	§ 2.1		§ 2.1, § 2.2	§ 2.2	§ 2.1	§ 2.2	§ 2.2		§ 2.1, § 2.2		§ 1.4.5			§ 1.4.5	§ 2.1
Modulation at earth station [1]	A	N		N	A	N	N	N	N	N	N	N	A	N	A	N	–		N
Earth station interference parameters and criteria: p_0 (%)	0.03	0.005		0.005	0.03	0.005	0.002	0.001	0.083	0.011	0.001	0.1	0.03	0.003	0.03	0.003	0.003		0.003
n	3	3		3	3	3	2	2	2	2	1	2	2	2	1	1	2		2
p (%)	0.01	0.0017		0.0017	0.01	0.0017	0.001	0.0005	0.0415	0.0055	0.001	0.05	0.015	0.0015	0.03	0.003	0.0015		0.0015
N_L (dB)	1	1		1	1	1	–	–	1	0	0	0	1	1	1	1	1		1
M_s (dB)	7	2		2	7	2	–	–	2	4.7	0.5	1	7	4	7	4	4		6
W (dB)	4	0		0	4	0	–	–	0	0	0	0	4	0	4	0	0		0
Terrestrial station parameters: E (dBW) in B [2] A	92 [3]	92 [3]		55	55	55	55	55	55	55	25 [5]	25 [5]	40	40	55	55			35
E (dBW) in B [2] N	42 [4]	42 [4]		42	42	42	42	42	42	42	–18	–18	43	43	42	42		40	40
P_t (dBW) in B A	40 [3]	40 [3]		13	13	13	13	13	13	13	–17 [5]	–17 [5]	–5	–5	10	10			–10
P_t (dBW) in B N	0	0		0	0	0	0	0	0	0	–60	–60	–2	–2	–3	–3		–7	–5
G_x (dBi)	52 [3, 4]	52 [3, 4]		42	42	42	42	42	42	42	42	42	45	45	45	45		47	45
Reference bandwidth [6]: B (Hz)	10^6	10^6		10^6	10^6	10^6	10^7	10^7	10^6	10^6	1	1	10^6	10^6	27×10^6	27×10^6			10^6
Permissible interference power: $P_r(p)$ (dBW) in B				–151.2			–125	–125	–154 [11]	–142	–220	–216			–131	–131			

Notes to Table 8c:

[1] A: analogue modulation; N: digital modulation.

[2] E is defined as the equivalent isotropically radiated power of the interfering terrestrial station in the reference bandwidth.

[3] In this band, 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 3.4-4.2 GHz may be used to determine the coordination area.

[4] Digital systems assumed to be non-transhorizon. Therefore G_x = 42.0 dBi. For digital transhorizon systems, parameters for analogue transhorizon systems above have been used..

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

[6] In certain systems in the fixed-satellite service it may be desirable to choose a greater reference bandwidth B. 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.

[7] Geostationary-satellite systems.

[8] Non-geostationary satellites in the meteorological-satellite service notified in accordance with No. **S5.461A** may use the same coordination parameters.

[9] Non-geostationary-satellite systems.

[10] Space research earth stations in the band 8.4-8.5 GHz operate with non-geostationary satellites.

[11]

For large earth stations:	$P_r(p) = (G - 180)$	dBW		
For small earth stations:	$P_r(20\%) = 2\,(G - 26) - 140$	dBW	for	$26 < G \leq 29$ dBi
	$P_r(20\%) = G - 163$	dBW	for	$G > 29$ dBi
	$P_r(p)\% = G - 163$	dBW	for	$G \leq 26$ dBi

[12] Applies to the broadcasting-satellite service in unplanned bands in Region 3.

TABLE 8d

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

Receiving space radiocommunication service designation			Meteoro-logical-satellite	Fixed-satellite	Fixed-satellite [3]	Broad-casting-satellite	Earth exploration-satellite [4]	Earth exploration-satellite [5]	Space research (deep space)	Space research		Fixed-satellite [6]	Fixed-satellite [5]	Mobile-satellite	Broadcasting-satellite, fixed-satellite	Mobile-satellite	Radio-navigation	Broadcasting-satellite
										Unman-ned	Manned							
Frequency bands (GHz)			18.1-18.3	18.8-19.3	19.3-19.7	21.4-22.0	25.5-27.0	25.5-27.0	31.8-32.3	37.0-38.0		37.5-40.5	37.5-40.5	39.5-40.5	40.5-42.5	43.5-47.0	43.5-47.0	84-86
Transmitting terrestrial service designations			Fixed, mobile	Fixed, mobile	Fixed, mobile	Fixed, mobile	Fixed, mobile	Fixed, mobile	Fixed, radio-navigation	Fixed, mobile		Fixed, mobile	Fixed, mobile	Fixed, mobile	Broadcasting, fixed	Mobile	Mobile	Fixed, mobile, broadcasting
Method to be used			§ 2.1, § 2.2	§ 2.1, § 2.2	§ 2.2	§ 1.4.5	§ 2.2	§ 2.1	§ 2.1, § 2.2	§ 2.1, § 2.2		§ 2.2	§ 2.1	§ 1.4.6	§ 1.4.5, § 2.1	§ 1.4.6	–	§ 1.4.5
Modulation at earth station [1]			N	N	N		N	N	N	N		N	N	N	–	N		
Earth station interference parameters and criteria	p_0 (%)			0.003	0.01		0.25	0.25	0.001	0.1	0.001	0.02	0.003					
	n			2	1		2	2	1	1	1		2					
	p (%)			0.0015	0.01		0.125	0.125	0.001	0.1	0.001		0.0015					
	N_L (dB)			0	0		0	0	0	0		1	1					
	M_s (dB)			5	5		11.4	14	1	1		6.8	6					
	W (dB)			0	0		0	0	0	0		0	0					
Terrestrial station parameters	E (dBW) in B [2]	A		–	–		–	–	–	–		–	–	–	–			
		N	40	40	40	40	42	42	–28	–28		35	35	35	44	40	40	
	P_t (dBW) in B	A		–	–		–	–	–	–		–	–	–	–			
		N	–7	–7	–7	–7	–3	–3	–81	–73		–10	–10	–10	–1	–7	–7	
	G_x (dBi)		47	47	47	47	45	45	53	45		45	45	45	45	47	47	
Reference band-width [6]	B (Hz)			10^6	10^6		10^7	10^7	1	1		10^6	10^6	10^6	10^6			
Permissible interference power	$P_r(p)$ (dBW) in B			–140	–137		–120	–116	–216	–217		–140						

[1] A: analogue modulation; N: digital modulation.

[2] E is defined as the equivalent isotropically radiated power of the interfering terrestrial station in the reference bandwidth.

[3] Non-geostationary mobile-satellite service feeder links.

[4] Non-geostationary-satellite systems.

[5] Geostationary-satellite systems.

[6] Non-geostationary fixed-satellite service systems.

TABLE 9a

Parameters required for the determination of coordination distance for a transmitting earth station in bands shared bidirectionally with receiving earth stations

Space service designation in which the transmitting earth station operates		**Land mobile-satellite**	**Mobile-satellite**	**Land mobile-satellite**	**Earth exploration-satellite, meteorological-satellite**	**Mobile-satellite**		**Mobile-satellite**		**Fixed-satellite, mobile-satellite**	**Fixed-satellite** [3]		**Fixed-satellite**	**Fixed-satellite, meteorological-satellite**	**Fixed-satellite**
Frequency bands (GHz)		0.1499-0.15005	0.272-0.273	0.3999-0.40005	0.401-0.402	1.675-1.710		1.700-1.710		2.655-2.690	5.150-5.216		6.700-7.075	8.025-8.400	8.025-8.400
Space service designation in which the *receiving* earth station operates		Radio-navigation-satellite	Space operation	Radio-navigation-satellite	Space operation	Meteorological-satellite		Space research near-Earth		Fixed-satellite, broadcasting-satellite	Fixed-satellite	Radiodeter-mination-satellite	Fixed-satellite	Earth exploration-satellite	Earth exploration-satellite
								Unmanned [10]	Manned						
Orbit [6]			Non-GSO		Non-GSO	Non-GSO	GSO	Non-GSO			Non-GSO		Non-GSO	Non-GSO	GSO
Modulation at *receiving* earth station [1]			N		N	N	N	N	N				N	N	N
Receiving earth station interference parameters and criteria	p_0 (%)		1.0		0.1	0.006	0.011	0.1	0.001				0.005	0.011	0.083
	n		1		2	3	2	2	1				3	2	2
	p (%)		1.0		0.05	0.002	0.0055	0.05	0.001				0.0017	0.0055	0.0415
	N_L (dB)	0	0	0	0	0	0	0	0				1	0	1
	M_s (dB)	2	1	2	1	2.8	0.9	1	1	2	2	2	2	4.7	2
	W (dB)	0	0	0	0	0	0	0	0				0	0	0
Receiving earth station parameters	G_m (dBi) [2]	0	20	0	20	30	45				48.5		50.7		
	G_r (dBi) [4]	0	19	0	19	19 [9]	[8]	10	10		10		10	10	[8]
	ε_{min} [5]	3°	10°	3°	10°	5°	3°	5°	5°	3°	3°	3°	3°	5°	3°
	T_e (K) [7]	200	500	200	500	370	118			75	75	75	75		
Reference bandwidth	B (Hz)	4×10^3	10^3	4×10^3	1	10^6	4×10^3	1	1				10^6	10^6	10^6
Permissible interference power	$P_r(p)$ (dBW) in B	–172	–177	–172	–208	–145	–178	–216	–216				–151	–142	–154

Notes to Table 9a:

[1] A: analogue modulation; N: digital modulation.

[2] On-axis gain of the receive earth station antenna.

[3] Feeder links of non-geostationary-satellite systems in the mobile-satellite service.

[4] Horizon antenna gain for the receive earth station (refer to § 3 of the main body of this Appendix).

[5] Minimum elevation angle of operation in degrees (non-geostationary or geostationary).

[6] Orbit of the space service in which the receiving earth station operates (non-geostationary or geostationary).

[7] The thermal noise temperature of the receiving system at the terminal of the receiving antenna (under clear-sky conditions). Refer to § 2.1 of this Annex for missing values.

[8] Horizon antenna gain is calculated using the procedure of Annex 5. Where no value of G_m is specified, a value of 42 dBi is to be used.

[9] Non-geostationary horizon antenna gain, $G_e = G_{min} + 20$ dB (see § 2.2), with $G_{min} = 10 - 10 \log (D/\lambda)$, $D/\lambda = 13$ (refer to Annex 3 for definition of symbols).

[10] Unmanned space research is not a separate radiocommunication service and the system parameters are only to be used for the generation of supplementary contours.

TABLE 9b

Parameters required for the determination of coordination distance for a transmitting earth station in bands shared bidirectionally with receiving earth stations

Space service designation in which the transmitting earth station operates		**Fixed-satellite**			**Fixed-satellite**			**Fixed-satellite** [3]	**Fixed-satellite**	**Fixed-satellite**	**Fixed-satellite** [3]	**Fixed-satellite** [4]	**Earth exploration-satellite, space research**	
Frequency bands (GHz)		10.7-11.7			12.5-12.75			15.43-15.65	17.3-17.8	17.7-18.4	19.3-19.6	19.3-19.6	40.0-40.5	
Space service designation in which the *receiving* earth station operates		Fixed-satellite			Fixed-satellite			Fixed-satellite [3]	Broadcasting-satellite	Fixed-satellite, meteorological-satellite	Fixed-satellite [3]	Fixed-satellite [4]	Fixed-satellite, mobile-satellite	
Orbit [7]		GSO		Non-GSO	GSO		Non-GSO	Non-GSO		GSO	Non-GSO	GSO	GSO	Non-GSO
Modulation at *receiving* earth station [1]		A	N	N	A	N				N	N			
Receiving earth station interference parameters and criteria	p_0 (%)	0.03	0.003		0.03	0.003		0.003		0.003	0.01	0.003	0.003	
	n	2	2		2	2		2		2	1	2	2	
	p (%)	0.015	0.0015		0.015	0.0015		0.0015		0.0015	0.01	0.0015	0.0015	
	N_L (dB)	1	1		1	1		1		1	0	1	1	
	M_s (dB)	7	4		7	4		4		6	5	6	6	
	W (dB)	4	0		4	0		0		0	0	0	0	
Receiving earth station parameters	G_m (dBi) [2]			51.9			31.2	48.4		58.6	53.2	49.5	50.8	54.4
	G_r [5]	[9]	[9]	10	[9]	[9]	11 [11]	10		[9]	10	[10]	[9]	7 [12]
	ε_{min} [6]	5°	5°	6°	5°	5°	10°	5°		5°	5°	10°	10°	10°
	T_e (K) [8]	150	150		150	150		150		300	300	300	300	
Reference bandwidth	B (Hz)	10^6	10^6		10^6	10^6		2×10^6		10^6	10^6			
Permissible interference power	$P_r(p)$ (dBW) in B	–144	–144	–144	–144	–144	–144	–141		–138	–141			

Notes to Table 9b:

[1] A: analogue modulation; N: digital modulation.

[2] On-axis gain of the receive earth station antenna.

[3] Feeder links of non-geostationary-satellite systems in the mobile-satellite service.

[4] Geostationary-satellite systems.

[5] Horizon antenna gain for the receive earth station (refer to § 3 of the main body of the Appendix).

[6] Minimum elevation angle of operation in degrees (non-GSO or GSO).

[7] Orbit of the space service in which the receiving earth station operates (GSO or non-GSO).

[8] The thermal noise temperature of the receiving system at the terminal of the receiving antenna (under clear-sky conditions). Refer to § 2.1 of this Annex for missing values.

[9] Horizon antenna gain is calculated using the procedure of Annex 5. Where no value of G_m is specified, a value of 42 dBi is to be used.

[10] Horizon antenna gain is calculated using the procedure of Annex 5, except that the following antenna pattern may be used in place of that given in § 3 of Annex 3: $G = 32 - 25 \log \varphi$ for $1° \leq \varphi < 48°$; and $G = -10$ for $48° \leq \varphi < 180°$ (refer to Annex 3 for definition of symbols).

[11] Non-geostationary horizon antenna gain. $G_e = G_{max}$ (see § 2.2 of the main body of this Appendix) for $G = 36 - 25 \log (\varphi) > -6$ (refer to Annex 3 for definition of symbols).

[12] Non-geostationary horizon antenna gain. $G_e = G_{max}$ (see § 2.2 of the main body of this Appendix) for $G = 32 - 25 \log (\varphi) > -10$ (refer to Annex 3 for definition of symbols).

TABLE 10

Predetermined coordination distances

Frequency sharing situation		Coordination distance (in sharing situations involving services allocated with equal rights) (km)
Type of earth station	**Type of terrestrial station**	
Ground-based in the bands below 1 GHz to which No. **S9.11A** applies. Ground-based mobile in the bands within the range 1-3 GHz to which No. **S9.11A** applies	Mobile (aircraft)	500
Aircraft (mobile) (all bands)	Ground-based	500
Aircraft (mobile) (all bands)	Mobile (aircraft)	1 000
Ground-based in the bands: 400.15-401 MHz 1 675-1 700 MHz	Station in the meteorological aids service (radiosonde)	580
Aircraft (mobile) in the bands: 400.15-401 MHz 1 675-1 700 MHz	Station in the meteorological aids service (radiosonde)	1 080
Ground-based in the radiodetermination-satellite service (RDSS) in the bands: 1 610-1 626.5 MHz 2 483.5-2 500 MHz 2 500-2 516.5 MHz	Ground-based	100
Airborne earth station in the radiodetermination-satellite service (RDSS) in the bands: 1 610-1 626.5 MHz 2 483.5-2 500 MHz 2 500-2 516.5 MHz	Ground-based	400
Receiving earth stations in the meteorological-satellite service	Station in the meteorological aids service	The coordination distance is considered 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 (see Note 1)
Non-GSO MSS feeder-link earth stations (all bands)	Mobile (aircraft)	500

NOTE 1 – The coordination distance, d (km), for fixed earth stations in the meteorological-satellite service vis-à-vis stations in the meteorological aids service assumes a radiosonde altitude of 20 km and is determined as a function of the physical horizon elevation angle ε_h (degrees) for each azimuth, as follows:

$$d = 100 \qquad \text{for} \qquad \varepsilon_h \geq 11°$$

$$d = 582 \left(\sqrt{1 + (0.254\,\varepsilon_h)^2} - 0.254\,\varepsilon_h \right) \qquad \text{for} \qquad 0° < \varepsilon_h < 11°$$

$$d = 582 \qquad \text{for} \qquad \varepsilon_h \leq 0°$$

The minimum and maximum coordination distances are 100 km and 582 km, and correspond to physical horizon angles greater than 11° and less than 0°.

APPENDIX S13*

Distress and safety communications (non-GMDSS)

(see Article **S30**)

Part A1 – General provisions

(MOD)

§ 2 The procedure specified in this Appendix 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.

Part A6 – Special services relating to safety

Section IV – Narrow-band direct-printing telegraphy system for transmission of navigational and meteorological warnings and urgent information to ships (NAVTEX)

MOD

§ 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.

APPENDIX S17

Frequencies and channelling arrangements in the high-frequency bands for the maritime mobile service

PART B – Channelling arrangements

Section I – Radiotelephony

MOD

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 use of channels 1221 and 1621 for calling purposes shall cease as soon as possible and no later than 31 December 2003 (see Nos. **S52.221A** and **S52.222A**).

The remaining frequencies in Sub-Sections A, B, C-1 and C-2 are working frequencies.

Sub-Section A

Table of single-sideband transmitting frequencies (kHz) for duplex (two-frequency) operation

SUP

Footnote [2]

MOD

[8] For the conditions of use of the carrier frequency 12 290 kHz, see Nos. **S52.221A** and **S52.222A** and Appendix **S15**.

[9] For the conditions of use of the carrier frequency 16 420 kHz, see Nos. **S52.221A** and **S52.222A** and Appendix **S15**.

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)

MOD

4 MHz band[1]		6 MHz band		8 MHz band[2]		12 MHz band[3]	
Carrier frequency	**Assigned frequency**	**Carrier frequency**	**Assigned frequency**	**Carrier frequency**	**Assigned frequency**	**Carrier frequency**	**Assigned frequency**
4 146 4 149	4 147.4 4 150.4	6 224 6 227 6 230	6 225.4 6 228.4 6 231.4	8 294 8 297	8 295.4 8 298.4	12 353 12 356 12 362 12 365	12 354.4 12 357.4 12 363.4 12 366.4

MOD

16 MHz band[3]		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 16 531 16 534 16 540 16 543 16 546	16 529.4 16 532.4 16 535.4 16 541.4 16 544.4 16 547.4	18 825 18 828 18 831 18 834 18 837 18 840 18 843	18 826.4 18 829.4 18 832.4 18 835.4 18 838.4 18 841.4 18 844.4	22 159 22 162 22 165 22 168 22 171 22 174 22 177	22 160.4 22 163.4 22 166.4 22 169.4 22 172.4 22 175.4 22 178.4	25 100 25 103 25 106 25 109 25 112 25 115 25 118	25 101.4 25 104.4 25 107.4 25 110.4 25 113.4 25 116.4 25 119.4

ADD

[3] For use of frequencies 12 359 kHz and 16 537 kHz, see Nos. **S52.221A** and **S52.222A**.

APPENDIX S18

Table of transmitting frequencies in the VHF maritime mobile band

(See Article **S52**)

MOD

NOTE – For assistance in understanding the Table, see notes *a)* to *o)* below.

MOD

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	*m), o)*	156.075	160.675		x	x	x
02	*m), o)*	156.100	160.700		x	x	x
62	*m), o)*	156.125	160.725		x	x	x
03	*m), o)*	156.150	160.750		x	x	x
63	*m), o)*	156.175	160.775		x	x	x
04	*m), o)*	156.200	160.800		x	x	x
64	*m), o)*	156.225	160.825		x	x	x
05	*m), o)*	156.250	160.850		x	x	x
65	*m), o)*	156.275	160.875		x	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	*m)*	157.100	161.700		x	x	x
82	*m), o)*	157.125	161.725		x	x	x
23	*m), o)*	157.150	161.750		x	x	x
83	*m), o)*	157.175	161.775		x	x	x
24	*m), o)*	157.200	161.800		x	x	x
84	*m), o)*	157.225	161.825		x	x	x
25	*m), o)*	157.250	161.850		x	x	x
85	*m), o)*	157.275	161.875		x	x	x
26	*m), o)*	157.300	161.900		x	x	x
86	*m), o)*	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

Specific notes

MOD

m) These channels may be operated as single frequency channels, subject to special arrangement between interested or affected administrations.

ADD

o) These channels may be used to provide bands for initial testing and the possible future introduction of new technologies, subject to special arrangement between interested or affected administrations. Stations using these channels or bands for the testing and the possible future introduction of new technologies shall not cause harmful interference to, and shall not claim protection from, other stations operating in accordance with Article **S5**.

APPENDIX S26*

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

MOD

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;

– the limits of unwanted emission are met (see Appendix **S27**, No. **S27/**74).

* 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.

APPENDIX S27*

Frequency allotment Plan for the aeronautical mobile (R) service and related information

(See Article **S43**)

Section II – Allotment of frequencies in the aeronautical mobile (R) service

ARTICLE 1

MOD

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
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

ARTICLE 2

S27/222 Band **5 450-5 480 kHz (Reg. 2)** **5.4 MHz**

MOD

Frequency (kHz)	Authorized area of use*	Remarks*
1	2	3
5 466	R l0B 13I	

MOD

APPENDIX S30*

Provisions for all services and associated Plans and List 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)

MOD

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) (WARC-77).

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 (Geneva, 1983) (RARC Sat-R2).

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.

1.3A *1997 Conference:* World Radiocommunication Conference (Geneva, 1997), called in short WRC-97.

1.3B *2000 Conference:* World Radiocommunication Conference (Istanbul, 2000), called in short WRC-2000.

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* The expression “frequency assignment to a space station”, wherever it appears in this Appendix, shall be understood to refer to a frequency assignment associated with a given orbital position. See also Annex 7 for the orbital limitations.

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.

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.

1.6 *Frequency assignment in conformity with the Plan:*

– *a*ny frequency assignment which appears in the Regions 1 and 3 Plan; *or*

– any frequency assignment which appears in the Region 2 Plan or for which the procedure of Article 4 has been successfully applied.

1.7 *Additional use in Regions 1 and 3:* For the application of the provisions of this Appendix, additional uses in Regions 1 and 3 are:

– use of assignments with characteristics different from those appearing in the Regions 1 and 3 Plan and which are capable of causing more interference than the corresponding entries in the Plan;

– use of assignments in addition to those appearing in the Plan.

1.8 *Regions 1 and 3 List of additional uses (hereafter called in short the "List"):* The List of assignments for additional uses in Regions 1 and 3 as established by WRC-2000, as updated following the successful application of the procedure of § 4.1 of Article 4.

ARTICLE 2

Frequency bands

ADD

2.2 The use of the guardbands of the Plans in this Appendix, as defined in § 3.9 of Annex 5, to provide space operations functions in accordance with No. **S1.23** in support of the operation of geostationary-satellite networks in the broadcasting-satellite service shall be coordinated with the assignments subject to these Plans using the provisions of Article 7. Coordination among assignments intended to provide these functions and services not subject to a Plan shall be effected using the provisions of No. **S9.7** and the associated provisions of Articles **S9** and **S11**. Coordination of modifications to the Region 2 Plan or assignments to be included in the Regions 1 and 3 List with assignments intended to provide these functions shall be effected using § 4.1.1 *e)*, 4.2.3 *e)* or 4.2.3 *f)* as appropriate, of Article 4.

MOD

ARTICLE 3

Execution of the provisions and associated Plans

MOD

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 Regions 1 and 3 Plan 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.

3.3 The Regions 1 and 3 Plan is based on national coverage from the geostationary-satellite orbit. The associated procedures contained in this Appendix are intended to promote long-term flexibility of the Plan and to avoid monopolization of the planned bands and orbit by a country or a group of countries.

MOD

ARTICLE 4

Procedures for modifications to the Region 2 Plan or for additional uses in Regions 1 and 3[2]

4.1 Provisions applicable to Regions 1 and 3

4.1.1 An administration proposing to include a new or modified assignment in the List shall seek the agreement of those administrations whose services are considered to be affected, i.e. administrations:

a) of Regions 1 and 3 having a frequency assignment to a space station in the broadcasting-satellite service which is included in the Regions 1 and 3 Plan with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

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[1] Such stations may also be used for transmissions in the fixed-satellite service (space-to-Earth) in accordance with No. **S5.492**.

[2] The provisions of Resolution **49 (Rev.WRC-2000)** apply.

b) of Regions 1 and 3 having a frequency assignment included in the List or for which complete Appendix **S4** information has been received by the Bureau in accordance with the provisions of § 4.1.3, and any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

c) of Region 2 having a frequency assignment to a space station in the broadcasting-satellite service which is in conformity with the Region 2 Plan, or in respect of which proposed modifications to that Plan have been received by the Bureau in accordance with the provisions of § 4.2.6 with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

d) having no frequency assignment in the broadcasting-satellite service with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment, but in whose territory the power flux-density value exceeds the prescribed limit as a result of the proposed assignment, 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 proposed assignment exceeds the prescribed limit as a result of the proposed assignment; *or*

e) 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 for which complete coordination information has been received by the Bureau for coordination under No. **S9.7**, or under § 7.1 of Article 7.

4.1.2 The services of an administration are considered to be affected when the limits shown in Annex 1 are exceeded.

4.1.3 An administration intending to include a new or modified assignment in the List shall send to the Bureau, not earlier than eight years but preferably not later than two years before the date on which the assignment is to be brought into use, the relevant information listed in Appendix **S4**. An assignment in the List shall lapse if it is not brought into use by that date.[3]

4.1.4 If the information received by the Bureau under § 4.1.3 is found to be incomplete, the Bureau shall immediately seek from the administration concerned any clarification required and information not provided.

4.1.5 The Bureau shall determine, on the basis of Annex 1, the administrations whose frequency assignments are considered to be affected. The Bureau shall publish[4], in a Special Section of its International Frequency Information Circular (BR IFIC), the complete information received under § 4.1.3, together with the names of the affected administrations, the corresponding fixed-

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[3] The provisions of Resolution **533 (Rev.WRC-2000)** apply.

[4] If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication, after informing the administration concerned. The Bureau shall inform all administrations of such action and that the network specified in the publication in question no longer has to be taken into consideration by the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration, not later than 60 days prior to due date of the payment if payment has not been received by that date. This provision was identified in reply to Resolution 88 (Minneapolis, 1998) of the Plenipotentiary Conference and shall enter into force at a date to be determined by the forthcoming Plenipotentiary Conference.

satellite service networks, the corresponding broadcasting-satellite service assignments and terrestrial stations, as appropriate. The Bureau shall immediately send the results of its calculations to the administration proposing the assignment.

4.1.6 The Bureau shall send a telegram/fax to the administrations listed in the Special Section of the BR IFIC drawing their attention to the information it contains, and shall send them the results of its calculations.

4.1.7 An administration which considers that it should have been identified in the publication referred to under § 4.1.5 above shall, within four months of the date of publication of its relevant BR IFIC, and giving the technical reasons for so doing, request the Bureau to include its name in the publication. The Bureau shall study this information on the basis of Annex 1 and shall inform both administrations of its conclusions. Should the Bureau agree to the administration's request, it shall publish an addendum to the publication under § 4.1.5.

4.1.8 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.

4.1.9 Comments from administrations on the information published pursuant to § 4.1.5 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.

4.1.10 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 its BR IFIC referred to in § 4.1.5 shall be deemed to have agreed to the proposed assignment. This time-limit may be extended:

– for an administration that has requested additional information under § 4.1.8, by up to three months; or

– for an administration that has requested the assistance of the Bureau under § 4.1.21, by up to three months following the date at which the Bureau communicated the result of its action.

4.1.11 If, in seeking agreement, an administration modifies its initial proposal, it shall again apply the provisions of § 4.1 and the consequent procedure with respect to any other administration whose services might be affected as a result of modifications to the initial proposal.

4.1.12 If no comments have been received on the expiry of the periods specified in § 4.1.10, or if agreement has been reached with the administrations which have made comments and with which agreement is necessary, the administration proposing the new or modified assignment may continue with the appropriate procedure in Article 5, and shall so inform the Bureau, indicating the final characteristics of the frequency assignment together with the names of the administrations with which agreement has been reached.

4.1.13 The agreement of the administrations affected may also be obtained in accordance with this Article, for a specified period.

4.1.14 Where the proposed assignment involves developing countries, administrations shall seek all practicable solutions conducive to the economical development of the broadcasting-satellite systems of these countries.

4.1.15 The Bureau shall publish in a Special Section of its BR IFIC the information received under § 4.1.12, together with the names of any administrations with which the provisions of this Article have been successfully applied. The frequency assignment concerned shall be included in the List.

4.1.16 In case of disagreement on the part of an administration whose agreement has been sought, the requesting administration 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.

4.1.17 If no agreement is reached between the administrations concerned, the Bureau shall carry out any study that may be requested by either one of 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.

4.1.18 If, in spite of the application of § 4.1.16 and 4.1.17, there is still continuing disagreement and the notifying administration insists that the proposed assignment be included in the List, the Bureau shall enter the assignment provisionally in the List with an indication of those administrations whose assignments were the basis of the disagreement; however, the entry shall be changed from provisional to definitive recording in the List only if the Bureau is informed that the new assignment in the List has been in use, together with the assignment which was the basis for the disagreement, for at least four months without any complaint of harmful interference being made. When the assignment which was the basis of the disagreement is an assignment in the Plan, the second period of 15 years referred to in § 4.1.24 is subject to the written agreement of the administration concerned. Any action undertaken by WRC-03 to modify § 4.1.18 shall apply to all assignments entered provisionally in application of this provision between 3 June 2000 and the date of entry into force of the provisions of Appendices **S30** and **S30A**, as modified, if appropriate, by WRC-03. Without prejudice to any decision of WRC-03, the applications of § 4.1.18 in respect to a given assignment in the Plan shall be limited to three in the above period. The relevant studies requested by Resolution **540 (WRC-2000)** shall be carried out.

4.1.18*bis* When an assignment is entered in the List provisionally, the responsible administration is deemed to have undertaken to eliminate any harmful interference immediately after notification of that interference.

4.1.19 Should the assignments that were the basis of the disagreement not be brought into use within the period specified in No. **S11.44** (for non-planned services), or in § 4.1 (for assignments in the List or having initiated the procedure under § 4.1), as appropriate, then the status of the assignment in the List shall be reviewed accordingly.

4.1.20 Should harmful interference be caused by an assignment included in the List under § 4.1.18 to any recorded assignment in the Master Register which was the basis of the disagreement, the administration using the frequency assignment included in the List under § 4.1.18 shall, upon receipt of advice thereof, immediately eliminate this harmful interference.

4.1.21 An administration may, at any stage in the procedure described, or before applying it, request the assistance of the Bureau.

4.1.22 The relevant provisions of Article 5 shall be applied when frequency assignments are notified to the Bureau.

4.1.23 When a frequency assignment included in the List is no longer required, the administration concerned shall immediately so inform the Bureau. The Bureau shall publish this information in a Special Section of its BR IFIC and delete the assignment from the List.

4.1.24 No assignment in the List shall have a period of operation exceeding 15 years, counted from the date of bringing into use, or 2 June 2000, whichever is later. Upon request by the responsible administration received by the Bureau at the latest three years before the expiry of this period, this period may be extended by up to 15 years, on condition that all the characteristics of the assignment remain unchanged.

4.1.25 Where an administration already having included in the List two assignments (not including those systems notified on behalf of a group of named administrations and included in the List by WRC-2000), in the same channel and covering the same service area, proposes to include in the List a new assignment in the same channel over this same service area, it shall apply the following in respect of another administration which has no assignment in the List in the same channel and which proposes to include in the List a new assignment:

a) if the agreement of the former administration is required following the application of § 4.1 by the latter administration, in order to protect the new assignment proposed by the former administration from interference caused by the assignment proposed by the latter administration, both administrations shall make every possible effort to resolve the difficulties by means of mutually acceptable adjustments to their networks;

b) in case of continuing disagreement, and if the former administration has not communicated to the Bureau the information specified in Annex 2 to Resolution **49 (Rev.WRC-2000)**, this administration shall be deemed to have given its agreement to inclusion in the List of the assignment of the latter administration.

4.1.26 This procedure may be applied by the administration of a new ITU Member State in order to include new assignments in the List. Upon completion of the procedure, the next World Radiocommunication Conference may be requested to consider, among the assignments included in the List after the successful completion of this procedure, the inclusion in the Plan of up to 10 channels (for Region 1) and up to 12 channels (for Region 3), over the national territory of the new Member State.

4.1.27 When an administration has successfully applied this procedure and received all the agreements[5] required to include in the List assignments over its national territory, at an orbital location and/or in channels different from those appearing in the Plan for its country, it may request the next world radiocommunication conference to consider the inclusion in the Plan of up to 10 (for Region 1) and up to 12 (for Region 3) of these assignments, in replacement of its assignments appearing in the Plan.

4.1.28 The List, as updated, shall be published periodically by the Bureau.

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[5] In such a case, § 4.1.18 does not apply.

4.1.29 New or modified assignments in the List shall be limited to digital modulation.

4.2 Provisions applicable to Region 2

4.2.1 When an administration intends to make a modification[6] to the Region 2 Plan, i.e.:

a) to modify the characteristics of any of its frequency assignments to a space station in the broadcasting-satellite service which are shown in the Region 2 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 Region 2 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 Bureau (see Article 5).

4.2.2 The term "frequency assignment in conformity with the Plan" used in this and the following Articles is defined in Article 1.

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:

a) of Regions 1 and 3 having a frequency assignment to a space station in the broadcasting-satellite service which is in conformity with the Regions 1 and 3 Plan with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

b) of Regions 1 and 3 having a frequency assignment included in the List or for which complete Appendix **S4** information has been received by the Bureau in accordance with the provisions of § 4.1.3, and any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

c) 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 been received by the Bureau in accordance with the provisions of § 4.2.6; *or*

d) 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

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[6] For assignments using analogue modulation, 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.

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*

e) 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 for which complete coordination information has been received by the Bureau for coordination under No. **S9.7** or under § 7.1 of Article 7; *or*

f) 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 a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment, and:

– which is recorded in the Master Register; *or*

– for which complete coordination information has been received by the Bureau for coordination under No. **S9.7**[7] or under § 7.1 of Article 7;

g) whose services are considered to be affected.

4.2.4 Not used.

4.2.5 The services of an administration are considered to be affected when the limits shown in Annex 1 are exceeded.

4.2.6 An administration intending to make a modification to the Region 2 Plan shall send to the Bureau, not earlier than eight years but preferably not later than two years before the date on which the assignment is to be brought into use, the relevant information listed in Appendix **S4**. Modifications to that Plan involving additions under § 4.2.1 *b)* shall lapse if the assignment is not brought into use by that date.

4.2.7 If the information received by the Bureau under § 4.2.6 is found to be incomplete, the Bureau shall immediately seek from the administration concerned any clarification required and information not provided.

4.2.8 The Bureau shall determine, on the basis of Annex 1, the administrations whose frequency assignments are considered to be affected within the meaning of § 4.2.3. The Bureau shall publish[8], in a Special Section of its BR IFIC, the complete information received under § 4.2.6, together with the names of the affected administrations, the corresponding fixed-satellite service

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[7] Or under Resolution **33 (Rev.WRC-97)** for assignments for which the API or the request for coordination has been received by the Bureau prior to 1 January 1999.

[8] If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication, after informing the administration concerned. The Bureau shall inform all administrations of such action and that the network specified in the publication in question no longer has to be taken into consideration by the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration, not later than 60 days prior to due date of the payment if payment has not been received by that date. This provision was identified in reply to Resolution 88 (Minneapolis, 1998) of the Plenipotentiary Conference and shall enter into force at a date to be determined by the forthcoming Plenipotentiary Conference.

networks, the corresponding broadcasting-satellite service assignments and terrestrial stations, as appropriate. The Bureau shall immediately send the results of its calculations to the administration proposing the modification to the Region 2 Plan.

4.2.9 The Bureau shall send a telegram/fax to the administrations listed in the Special Section of its BR IFIC drawing their attention to the information it contains and shall send them the results of its calculations.

4.2.10 An administration which considers 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 in the list. 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 Region 2 Plan.

4.2.11 Any modification to a frequency assignment which is in conformity with the Region 2 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.

4.2.12 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.

4.2.13 Comments from administrations on the information published pursuant to § 4.2.8 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.

4.2.14 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 BR IFIC referred to in § 4.2.8 shall be deemed 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 § 4.2.12 or for an administration that has requested the assistance of the Bureau under § 4.2.22. In the latter case, the Bureau shall inform the administrations concerned of this request.

4.2.15 If, in seeking agreement, an administration modifies its initial proposal, it shall again apply the provisions of § 4.2 and the consequent procedure with respect to any other administration whose services might be affected as a result of modifications to the initial proposal.

4.2.16 If no comments have been received on the expiry of the periods specified in § 4.2.14, 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 so inform the Bureau, indicating the final characteristics of the frequency assignment together with the names of the administrations with which agreement has been reached.

4.2.17 The agreement of the administrations affected may also be obtained in accordance with this Article, for a specified period.

4.2.18 When the proposed modification to the Region 2 Plan involves developing countries, administrations shall seek all practicable solutions conducive to the economical development of the broadcasting-satellite systems of these countries.

4.2.19 The Bureau shall publish in a Special Section of its BR IFIC the information received under § 4.2.16 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 Region 2 Plan and will be considered as a frequency assignment in conformity with the Plan.

4.2.20 When an administration proposing to modify the characteristics of a frequency assignment or to make a new frequency assignment receives notice of disagreement on the part of 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.

4.2.21 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.

4.2.22 An administration may at any stage in the procedure described, or before applying it, request the assistance of the Bureau.

4.2.23 The relevant provisions of Article 5 shall be applied when frequency assignments are notified to the Bureau.

4.2.24 Cancellation of frequency assignments

When a frequency assignment in conformity with Region 2 Plan 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 BR IFIC and delete the assignment from the Region 2 Plan.

4.2.25 Master copy of the Region 2 Plan

4.2.25.1 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 set out 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 set out in this Article.

4.2.25.2 An up-to-date version of the Region 2 Plan shall be published by the Secretary-General 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

MOD

5.1.2 For any notification under § 5.1.1, an individual notice for each frequency assignment shall be drawn up as prescribed in Appendix **S4**, 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.

MOD

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[9].

MOD

5.1.5 Any notice made under § 5.1.1 which does not contain the characteristics specified in Appendix **S4** shall be returned by the Bureau immediately by airmail to the notifying administration with the relevant reasons.

MOD

5.1.6 Upon receipt of a complete notice, the Bureau shall include its particulars, with the date of receipt, in its BR IFIC, which shall contain the particulars of all such notices received since the publication of the previous Circular.

MOD

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), d)* and *e)* below);

b) with respect to its conformity with the appropriate Regional Plan or the Regions 1 and 3 List, as appropriate; *or*

c) with respect to the coordination requirements specified in the Remarks column of Article 10 or Article 11; *or*

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[9] Where appropriate, the notifying administration shall initiate the procedure for modifying the Plan concerned or for including assignments in the Regions 1 and 3 List in sufficient time to ensure that this limit is observed. For Region 2, see also Resolution **42 (Rev.Orb-88)** and § B of Annex 7.

d) with respect to its conformity with the appropriate Regional Plan or the Regions 1 and 3 List, however, having characteristics differing from those in the appropriate Regional Plan or in the Regions 1 and 3 List, 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 or in the Regions 1 and 3 List,

– use of other modulating signals in accordance with the provisions of § 3.1.3 of Annex 5,

– use of the assignment for transmission in the fixed-satellite service in accordance with No. **S5.492**,

– in the case of Region 2, use of an orbital position under the conditions specified in § B of Annex 7; *or*

e) with respect to its conformity with the provisions of Resolution **42 (Rev.Orb-88)**.

MOD

5.2.2 Where the Bureau reaches a favourable finding with respect to § 5.2.1 *a)*, 5.2.1 *b)* and 5.2.1 *c)*, 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.

MOD

5.2.2.1 Where the Bureau reaches a favourable finding with respect to § 5.2.1 *a)*, 5.2.1 *c)* and 5.2.1 *d)*, 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.

MOD

5.2.2.2 In the case of Region 2, where the Bureau reaches a favourable finding with respect to § 5.2.1 *a)* and 5.2.1 *c)*, but an unfavourable finding with respect to § 5.2.1 *b)* and 5.2.1 *d)*, 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.

ADD

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)* and 5.2.1 *c)* but an unfavourable finding with respect to § 5.2.1 *b)* and 5.2.1 *d)*, 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.

MOD

5.2.4 Where the Bureau reaches an unfavourable finding with respect to:

– § 5.2.1 *a), or*

– § 5.2.1 *c), or*

– § 5.2.1 *b)* and 5.2.1 *d)* and, where applicable, § 5.2.1 *e)*,

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.

MOD

5.2.9 The date in Column 2c shall be the date of bringing into use notified by the administration concerned.

MOD

ARTICLE 6

Coordination, notification and recording in the Master International Frequency Register of frequency assignments to terrestrial stations or to earth stations in the fixed-satellite service (Earth-to-space) affecting frequency assignments to broadcasting-satellite stations in the 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)[10]

6.1 The provisions of No. **S9.19** and the associated provisions under Articles **S9** and **S11** are applicable in respect of frequency assignments to broadcasting-satellite stations in the bands 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:

a) to transmitting terrestrial stations in the band 11.7-12.7 GHz in all Regions;

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[10] These procedures do not replace the procedures prescribed for terrestrial stations in Articles **S9** and **S11**.

b) to transmitting earth stations in the fixed-satellite service in the band 12.5-12.7 GHz (in Region 1).

6.2 In applying the procedures referred to in § 6.1, the provisions of Appendix **S5** are replaced by the following:

6.2.1 These procedures are to be applied in respect of administrations whose territory is included within the service area associated with:

a) assignments in conformity with the appropriate Regional Plan in Appendix **S30**;

b) assignments included in the Regions 1 and 3 List;

c) assignments for which the procedure of Article 4 has been initiated, as from the date of receipt of the complete Appendix **S4** information under § 4.1 or 4.2.

6.2.2 The criteria to be applied are those given in Annex 3.

MOD

ARTICLE 7

Coordination, notification and recording in the Master International Frequency Register of frequency assignments to stations in the fixed-satellite service (space-to-Earth) in the 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), and to stations in the broadcasting-satellite service in the band 12.5-12.7 GHz (in Region 3) when frequency assignments to broadcasting-satellite stations in the bands 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 are involved[11]

7.1 The provisions of **S9.7**[12] and the associated provisions under Articles **S9** and **S11** are applicable in respect of frequency assignments to broadcasting-satellite stations in the bands 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:

a) to transmitting space stations in the fixed-satellite service in the 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); and

b) to transmitting space stations in the broadcasting-satellite service in the band 12.5-12.7 GHz (in Region 3).

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[11] These provisions do not replace the procedures prescribed in Articles **S9** and **S11** when stations other than those in the planned broadcasting-satellite service are involved.

[12] The provisions of Resolution **33 (Rev.WRC-97)** are applicable to space stations in the broadcasting-satellite service for which the advance publication information or the request for coordination has been received by the Bureau prior to 1 January 1999.

7.2 In applying the procedures referred to in § 7.1, the provisions of Appendix **S5** are replaced by the following:

7.2.1 The frequency assignments to be taken into account are:

a) the assignments in conformity with the appropriate Regional Plan in Appendix **S30**;

b) the assignments included in the Regions 1 and 3 List;

c) the assignments for which the procedure of Article 4 has been initiated, as from the date of receipt of the complete Appendix **S4** information under § 4.1 or 4.2.

7.2.2 The criteria to be applied are those given in Annex 4.

ARTICLE 10

ADD

(Note to Table 2 of Article 10 of Appendix **S30**)

Note – Section 5 of Annex 1 was merged with Section 4 by WRC-2000. See also the Note to Table 3.

ADD

(Note to Table 3 of Article 10 of Appendix **S30**)

Note – The administrations listed in Table 3 were identified on the basis of the criteria adopted at the Regional Administrative Conference for the Planning of the Broadcasting-satellite Service in Region 2 (Geneva, 1983) (RARC Sat-R2), as shown in Table 2. WRC-2000 revised the criteria applicable to determine affected administrations. Therefore, the Bureau, when receiving a notification for an assignment in the Region 2 Plan, shall determine which countries are affected on the basis of the revised criteria adopted at WRC-2000, which may lead to a different set of affected administration(s) from that currently contained in Table 3.

SUP

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

ADD

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 administration 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 *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. 5 *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. 6 *Space station transmitting antenna pattern code.*

The codes used for the antenna pattern of the transmitting space station (downlink) antenna are defined as follows:

MOD13FRTSS	Figure 13 in Annex 5 (Recommendation ITU-R BO.1445)
R13TSS	Figure 9 and § 3.13.3 in Annex 5
R123FR	Figure 11 and § 3.13.3 in Annex 5

In cases where the “Space station transmitting 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 7. A particular shaped beam is identified by the combination of Column 1, Column 7 and Column 13. In such cases the maximum cross-polar gain is given under Column 8 in the "Cross-polar gain" field.

In cases where the "Space station transmitting antenna pattern code" field contains a code which starts with "CB_" characters, it is a composite beam. Any composite beam consists of two or more elliptical beams. Each composite beam is described in the special composite beam file as having the same name plus a GXT extension (e.g. the description of the CB_COMP_BM1 composite beam is stored in the CB_COMP_BM1.GXT file).

Col. 7 *Space station transmitting antenna shaped (non-elliptical and non-composite) beam identification*.

Col. 8 *Maximum space station transmitting antenna co-polar and cross-polar (in the case of shaped beam) isotropic gain (*dBi).

Col. 9 *Earth station receiving antenna pattern code and maximum antenna co-polar gain (*dBi).

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	Figure 7*bis* and § 3.7.2 in Annex 5 (Recommendation ITU-R BO.1213)

Col. 10 *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. 11 *e.i.r.p.* in the direction of maximum radiation (dBW).

Col. 12 *Designation of emission*.

Col. 13 *Identity of the space station*.

Col. 14 *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 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 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. 15 *Assignment status*.

The assignment status codes used for beams are defined as follows:

P	Assignment in the Plan which has not been brought into use and/or the date of bringing into use has not been confirmed to the Bureau. For this category of assignments, WRC-2000 protection ratios are applied (21 dB co-channel and 16 dB adjacent channel).
PE	Assignment in the Plan which is in conformity with Appendix **S30**, has been notified, brought into use and the date of bringing into use has been confirmed to the Bureau before 12 May 2000. For this category of assignments, WRC-97 protection ratios are applied (24 dB co-channel and 16 dB adjacent channel).

Col. 16 *Remarks*.

11.2 TEXT FOR NOTES IN THE REMARKS COLUMN OF THE PLAN

1 To be dedicated to the Islamic programme envisaged in WARC SAT-77 documents.

2 Not used.

3 Provisional beam. These assignments have been included in the Plan by WRC-97. These assignments are for exclusive use by Palestine, subject to the Israeli-Palestinian Interim Agreement of 28 September 1995, Resolution 741 of the Council notwithstanding and Resolution 99 (Minneapolis, 1998) of the Plenipotentiary Conference.

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 with respect to (see also the Note to § 11.2):

a) assignments in the Region 2 Plan on 12 May 2000; 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 12 May 2000 for recording in the Master Register and which subsequently receive a favourable finding based on the Plan as it existed on 12 May 2000; or *c)* assignments in the fixed-satellite service which:

– are recorded in the Master Register prior to 12 May 2000 with a favourable finding; or

– have been coordinated under the provisions of No. **S9.7** (or No. **1060**) or § 7.2.1 of Article 7 prior to 12 May 2000; or

– are in process of coordination under the provisions of No. **S9.7** (or No. **1060**) or § 7.2.1 of Article 7 prior to 31 July 2000 for which complete Appendix **S4** data (or Appendix **3** data, as appropriate) have been received by the Bureau under the relevant provisions of Article **S9** (or Article **11**, as appropriate):

  – filings received by the Bureau prior to 12 May 2000 at 1700 h (Istanbul time) shall be taken into account in the pertinent compatibility analysis to be carried out by the Bureau after WRC-2000 by applying the pfd criteria shown in Table 1; or

  – filings received by the Bureau after 12 May 2000 at 1700 h (Istanbul time), but before 31 July 2000, shall be taken into account by applying the sharing criteria of –138 dB(W/(m^2 · 27 MHz)) or the pfd criteria shown in Table 1, whichever is higher.

6 This assignment shall not claim protection from the assignments of the administrations which are in conformity with the Region 2 Plan on 12 May 2000 (see also the Note to § 11.2).

7 This assignment shall not claim protection from administrations having assignments in the fixed-satellite service (see also the Note to § 11.2):

a) which are recorded in the Master Register with a favourable finding prior to 12 May 2000;

b) for which complete Appendix **S4** data (or Appendix **3** data, as appropriate) under the relevant provisions of Article **S9** (or No. **1060**, or § 7.2.1 of Article 7, as appropriate) have been received prior to 12 May 2000, which have been brought into use prior to 12 May 2000 and for which the complete due diligence information, in accordance with Annex 2 to Resolution **49 (WRC-97)**, has been received prior to 12 May 2000.

8 This assignment shall not claim protection from the assignments of administrations for terrestrial services which are recorded in the Master Register with a favourable finding, or received by the Bureau prior to 12 May 2000 for recording in the Master Register and which subsequently receive a favourable finding based on the Plan as it existed on 12 May 2000 (see also the Note to § 11.2).

9 Provisional beam. These assignments have been included in the Plan by WRC-2000. These assignments are for exclusive use by East Timor.

TABLE 1

Symbol	Criteria
a	§ 3 of Annex 1 [1]
b	§ 4 of Annex 1 [1]
c	For Regions 1 and 3 broadcasting-satellite service → Region 2 fixed-satellite service: -160 dB(W/(m^2 · 27 MHz)) $0 \leq \theta < 0.054°$ $-137.46 + 17.74 \log \theta$ dB(W/(m^2 · 27 MHz)) $0.054° \leq \theta < 3.67°$ $-141.56 + 25 \log \theta$ dB(W/(m^2 · 27 MHz)) $3.67° \leq \theta < 11.54°$ -115 dB(W/(m^2 · 27 MHz)) $11.54° \leq \theta$ For Region 1 broadcasting-satellite service → Region 3 fixed-satellite service: -160 dB(W/(m^2 · 27 MHz)) $0 \leq \theta < 0.054°$ $-137.46 + 17.74 \log \theta$ dB(W/(m^2 · 27 MHz)) $0.054° \leq \theta < 3.67°$ $-141.56 + 25 \log \theta$ dB(W/(m^2 · 27 MHz)) $3.67° \leq \theta < 24.12°$ [2] -107 dB(W/(m^2 · 27 MHz)) $24.12° \leq \theta$ [2] where θ corresponds to the minimum geocentric angular separation taking into account the pertinent station-keeping accuracy of the interfering broadcasting-satellite service and the interfered-with fixed-satellite service space stations.

[1] These paragraphs and this Annex are contained in the Radio Regulations in force at the end of WRC-2000.

2 For the purpose of analysing the WRC-2000 Plan.

NOTE – In cases where assignments from the WRC-97 Plan without remarks were included in the WRC-2000 Regions 1 and 3 Plan without change, or with conversion of modulation from analogue to digital, or a change from normal roll-off to fast roll-off antenna characteristics, the coordination status afforded by the WRC-97 Plan shall be preserved.

In cases where assignments from the WRC-97 Plan with Remarks were included in the WRC-2000 Regions 1 and 3 Plan without change, or with conversion of modulation from analogue to digital, or a change from normal roll-off to fast roll-off antenna pattern, the compatibility will be reassessed using the revised criteria and methodology of WRC-2000 and the remarks of the WRC-97 Plan assignment will either be maintained or reduced on the basis of the results of this analysis.

In other cases the methodology described in Notes 5 to 8 shall be applied.

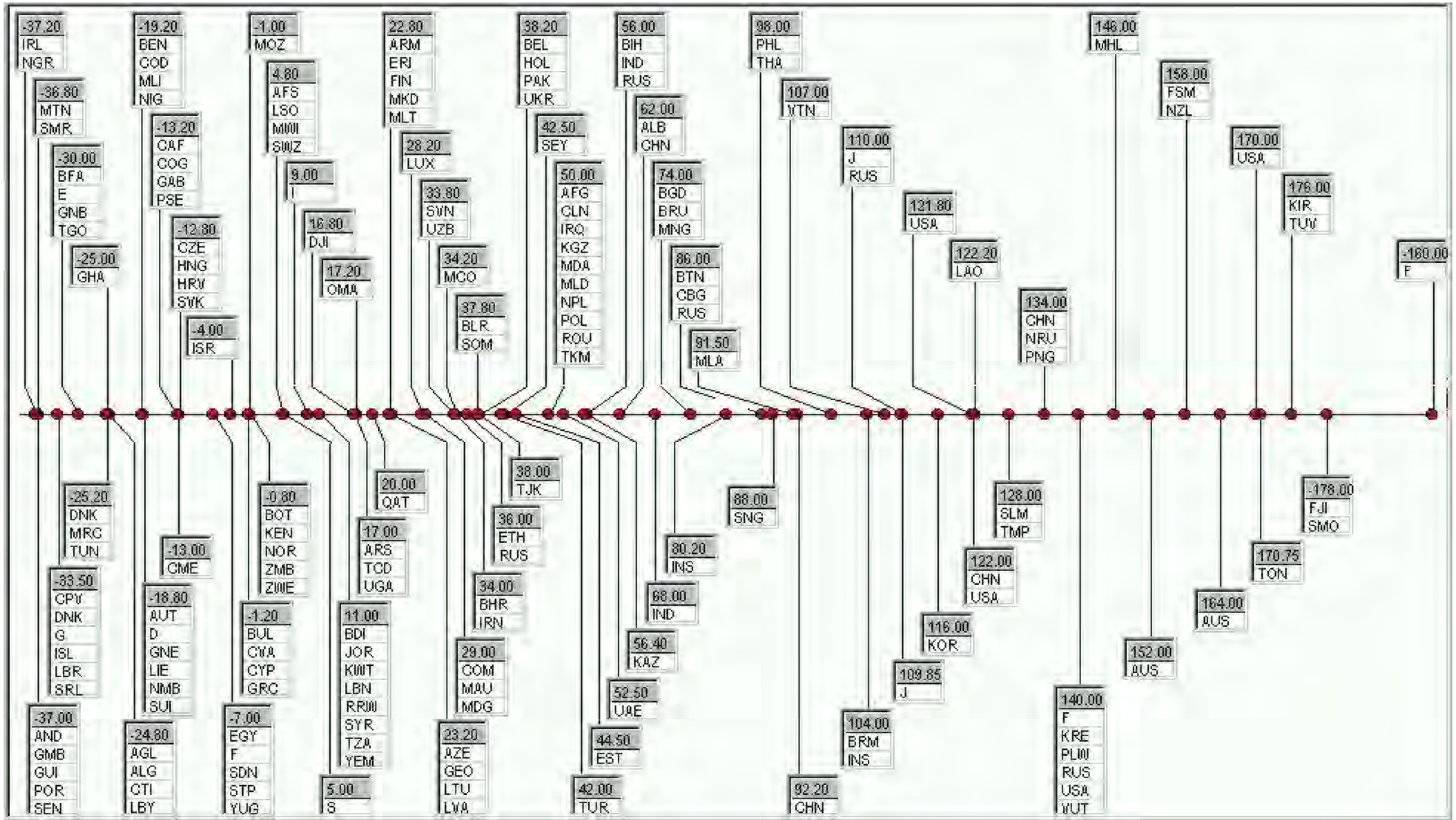
11.3 TABLE SHOWING CORRESPONDENCE BETWEEN CHANNEL NUMBERS AND ASSIGNED FREQUENCIES

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

Note – Assigned frequency = 11 708.30 + 19.18 n, where n is the channel number.

FIGURE 1

Allocation of orbital positions in the Regions 1 and 3 Plan
(position in degrees/administration symbols)



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Basic characteristics of the Regions 1 and 3 Plan (sorted by administration)

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16
Admin. symbol	Beam identification	Orbital Position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle						
AFG	AFG__100	50.00	65.88	33.86				CB_TSS_AFGA		42.71		MODRES	35.50	CL		58.4	27M0G7W			P	
AFS	AFS02100	4.80	24.50	-28.00	3.13	1.68	27.00	R13TSS		37.24		MODRES	35.50	CL		59.1	27M0G7W			P	
AGL	AGL29500	-24.80	16.06	-12.45	2.42	1.88	77.88	R13TSS		37.87		MODRES	35.50	CL		59.1	27M0G7W			P	
ALB	ALB29600	62.00	20.04	41.23	0.60	0.60	61.32	R13TSS		48.88		MODRES	35.50	CL		58.9	27M0G7W			P	
ALG	ALG__100	-24.80	1.86	27.60				CB_TSS_ALGA		39.59		MODRES	35.50	CL		54.5	27M0G7W			P	
AND	AND34100	-37.00	1.60	42.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CL		56.5	27M0G7W			P	
ARM	ARM06400	22.80	44.99	39.95	0.73	0.60	148.17	R13TSS		48.02		MODRES	35.50	CR		58.9	27M0G7W			P	
ARS	ARS__100	17.00	44.72	23.76				CB_TSS_ARSA		37.81		MODRES	35.50	CL		57.7	27M0G7W		54	P	
ARS	ARS34000	17.00	52.30	24.80	2.68	0.70	143.00	R13TSS		41.71		MODRES	35.50	CL		59.2	27M0G7W		54	P	
AUS	AUS00400	152.00	123.00	-24.20	3.06	2.17	102.00	R13TSS		36.22		MODRES	35.50	CR		58.2	27M0G7W		30	P	
AUS	AUS0040A	152.00	96.83	-12.19	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CR		58.9	27M0G7W		30	P	
AUS	AUS0040B	152.00	105.69	-10.45	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CR		58.9	27M0G7W		30	P	
AUS	AUS0040C	152.00	110.52	-66.28	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CR		58.9	27M0G7W		30	P	
AUS	AUS00500	152.00	133.90	-18.40	2.82	1.74	105.00	R13TSS		37.53		MODRES	35.50	CL		59.4	27M0G7W			P	
AUS	AUS00600	152.00	136.60	-30.90	2.41	1.52	161.00	R13TSS		38.80		MODRES	35.50	CL		58.4	27M0G7W			P	
AUS	AUS00700	164.00	145.20	-38.10	2.12	1.02	147.00	R13TSS		41.09		MODRES	35.50	CR		58.5	27M0G7W		31	P	
AUS	AUS0070A	164.00	158.94	-54.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CR		58.9	27M0G7W		31	P	
AUS	AUS00800	164.00	145.90	-21.70	3.62	1.63	136.00	R13TSS		36.73		MODRES	35.50	CL		58.8	27M0G7W			P	
AUS	AUS00900	164.00	147.50	-32.10	2.31	1.43	187.00	R13TSS		39.25		MODRES	35.50	CR		59.3	27M0G7W		32	P	
AUS	AUS0090A	164.00	159.06	-31.52	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CR		58.9	27M0G7W		32	P	
AUS	AUS0090B	164.00	167.93	-29.02	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CR		58.9	27M0G7W		32	P	
AUS	AUSA_100	152.00	132.38	-38.37				CB_TSS_AUSA		48.88		MODRES	35.50	CR		58.9	27M0G7W			P	
AUS	AUSB_100	164.00	132.38	-38.37				CB_TSS_AUSB		48.88		MODRES	35.50	CL		58.9	27M0G7W			P	
AUT	AUT01600	-18.80	10.31	49.47	1.82	0.92	151.78	MOD13FRTSS		42.19		MODRES	35.50	CR		59.1	27M0G7W			P	
AZE	AZE06400	23.20	47.47	40.14	0.93	0.60	158.14	R13TSS		46.98		MODRES	35.50	CL		58.9	27M0G7W			P	
BDI	BDI27000	11.00	29.90	-3.10	0.71	0.60	80.00	R13TSS		48.15		MODRES	35.50	CL		58.4	27M0G7W			P	
BEL	BEL01800	38.20	5.12	51.96	1.00	1.00	24.53	MOD13FRTSS		44.45		MODRES	35.50	CL		55.5	27M0G7W			P	
BEN	BEN23300	-19.20	2.20	9.50	1.44	0.68	97.00	R13TSS		44.54		MODRES	35.50	CL		58.3	27M0G7W			P	
BFA	BFA10700	-30.00	-1.50	12.20	1.45	1.14	29.00	R13TSS		42.26		MODRES	35.50	CL		57.0	27M0G7W			P	
BGD	BGD22000	74.00	90.30	23.60	1.46	0.84	135.00	R13TSS		43.56		MODRES	35.50	CR		58.7	27M0G7W			P	
BHR	BHR25500	34.00	50.50	26.10	0.60	0.60	0.00	MOD13FRTSS		48.88		MODRES	35.50	CR		54.5	27M0G7W			P	
BIH	BIH14800	56.00	18.22	43.97	0.60	0.60	90.00	R13TSS		48.88		MODRES	35.50	CL		58.9	27M0G7W			P	
BLR	BLR06200	37.80	27.91	53.06	1.21	0.60	11.47	R13TSS		45.83		MODRES	35.50	CL		58.9	27M0G7W			P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16
Admin. symbol	Beam identification	Orbital Position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle						
BOT	BOT29700	-0.80	23.30	-22.20	2.13	1.50	36.00	R13TSS		39.40		MODRES	35.50	CL		58.7	27M0G7W			P	
BRM	BRM29800	104.00	96.97	18.67	3.33	1.66	91.58	R13TSS		37.04		MODRES	35.50	CL		58.9	27M0G7W			P	
BRU	BRU33000	74.00	114.70	4.40	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CR		57.5	27M0G7W			P	
BTN	BTN03100	86.00	90.44	27.05	0.72	0.60	175.47	R13TSS		48.11		MODRES	35.50	CR		58.9	27M0G7W			P	
BUL	BUL02000	-1.20	25.00	43.00	1.04	0.60	165.00	R13TSS		46.50		MODRES	35.50	CL		58.6	27M0G7W			P	
CAF	CAF25800	-13.20	21.00	6.30	2.25	1.68	31.00	R13TSS		38.67		MODRES	35.50	CL		59.3	27M0G7W			P	
CBG	CBG29900	86.00	104.82	12.34	1.04	0.86	9.45	R13TSS		44.91		MODRES	35.50	CR		59.3	27M0G7W			P	
CHN	CHN15500	62.00	88.18	31.20	3.03	1.24	163.23	R13TSS		38.69		MODRES	35.50	CL		57.9	27M0G7W			P	
CHN	CHN15800	134.00	113.29	39.70	2.80	1.55	35.44	R13TSS		38.07		MODRES	35.50	CR		57.0	27M0G7W			P	
CHN	CHN19000	122.00	114.17	23.32	0.91	0.60	2.88	MOD13FRTSS		47.08		MODRES	35.50	CR		58.9	27M0G7W			P	
CHN	CHNA_100	62.00	90.56	39.22				CB_TSS_CHNA		40.01		MODRES	35.50	CR		58.5	27M0G7W			P	
CHN	CHNC_100	134.00	105.77	27.56				CB_TSS_CHNC		39.51		MODRES	35.50	CL		57.1	27M0G7W			P	
CHN	CHNE_100	92.20	114.96	20.16				CB_TSS_CHNE		44.74		MODRES	35.50	CL		59.4	27M0G7W			P	
CHN	CHNF_100	92.20	123.54	45.78				CB_TSS_CHNF		43.71		MODRES	35.50	CR		60.4	27M0G7W			P	
CHN	CHN20000	122.00	113.55	22.20	0.60	0.60	0.00	MOD13FRTSS		48.88		MODRES	35.50	CL		57.0	27M0G7W			P	
CLN	CLN21900	50.00	80.60	7.70	1.18	0.60	106.00	R13TSS		45.95		MODRES	35.50	CL		56.7	27M0G7W			P	
CME	CME30000	-13.00	12.70	6.20	2.54	1.68	87.00	R13TSS		38.15		MODRES	35.50	CR		58.5	27M0G7W			P	
COD	COD__100	-19.20	21.85	-3.40				CB_TSS_CODA		38.36		MODRES	35.50	CR		59.7	27M0G7W			P	
COG	COG23500	-13.20	14.60	-0.70	2.02	1.18	59.00	R13TSS		40.67		MODRES	35.50	CL		58.8	27M0G7W			P	
COM	COM20700	29.00	44.10	-12.10	0.76	0.60	149.00	R13TSS		47.86		MODRES	35.50	CR		58.1	27M0G7W			P	
CPV	CPV30100	-33.50	-24.12	16.09	0.77	0.63	94.46	R13TSS		47.56		MODRES	35.50	CL		57.2	27M0G7W			P	
CTI	CTI23700	-24.80	-5.78	7.19	1.50	1.26	111.74	R13TSS		41.67		MODRES	35.50	CL		58.8	27M0G7W			P	
CVA	CVA08300	-1.20	13.02	42.09	0.75	0.66	20.53	R13TSS		47.50		MODRES	35.50	CR		60.2	27M0G7W			P	
CVA	CVA08500	-1.20	12.59	41.09	1.72	1.31	144.13	MOD13FRTSS		40.92		MODRES	35.50	CR		56.5	27M0G7W			P	
CYP	CYP08600	-1.20	33.45	35.12	0.60	0.60	0.00	MOD13FRTSS		48.88		MODRES	35.50	CR		56.1	27M0G7W			P	
CZE	CZE14401	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CL		58.8	27M0G7W			P	
CZE	CZE14402	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CR		58.8	27M0G7W			P	
CZE	CZE14403	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CR		58.8	27M0G7W		37	P	
D	D 08700	-18.80	10.31	49.47	1.82	0.92	151.78	MOD13FRTSS		42.19		MODRES	35.50	CR		59.1	27M0G7W			P	
DJI	DJI09900	16.80	42.68	11.68	0.60	0.60	90.00	R13TSS		48.88		MODRES	35.50	CL		57.5	27M0G7W			P	
DNK	DNK__100	-25.20	2.92	59.62				CB_TSS_DNKA		48.88		MODRES	35.50	CL		58.3	27M0G7W			P	
DNK	DNK090XR	-33.50	13.27	60.86	1.99	0.63	151.38	MOD13FRTSS		43.48		MODRES	35.50	CR		54.5	27M0G7W			P	
DNK	DNK091XR	-33.50	-15.16	63.67	1.56	0.60	170.63	MOD13FRTSS		44.73		MODRES	35.50	CR		58.6	27M0G7W			P	
E	E____100	-30.00	-9.40	34.15				CB_TSS_E__A		44.79		MODRES	35.50	CL		58.9	27M0G7W		1	P	
E	HISP33D1	-30.00	-4.00	39.00					COP	39.80	5.50	MODRES	35.50	CL		57.6	33M0G7W--	HISPASAT-1	1	PE	
E	HISP33D2	-30.00	-4.00	39.00					COP	39.80	5.50	MODRES	32.50	CL		57.6	33M0G7W--	HISPASAT-1	1	PE	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16
Admin. symbol	Beam identification	Orbital Position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle						
E	HISPA27D	-30.00	-4.00	39.00					COP	39.80	5.50	MODRES	38.43	CL		57.6	27M0G7W--	HISPASAT-1	1	PE	
E	HISPASA4	-30.00	-4.00	39.00					COP	39.80	5.50	MODRES	38.43	CL		57.6	27M0F8W	HISPASAT-1	1	PE	
EGY	EGY02600	-7.00	29.70	26.80	2.33	1.72	136.00	R13TSS		38.42		MODRES	35.50	CL		58.1	27M0G7W		12	P	
ERI	ERI09200	22.80	39.41	14.98	1.67	0.95	145.48	R13TSS		42.44		MODRES	35.50	CR		58.9	27M0G7W			P	
EST	EST06100	44.50	25.06	58.60	0.77	0.60	12.27	R13TSS		47.81		MODRES	35.50	CR		58.7	27M0G7W			P	
ETH	ETH09200	36.00	40.29	8.95	2.87	2.16	174.06	R13TSS		36.52		MODRES	35.50	CL		58.7	27M0G7W			P	
F	F 09300	-7.00	3.52	45.41	2.22	1.15	159.34	R13TSS		40.39		MODRES	35.50	CL		58.8	27M0G7W		21	P	
F	F____100	-7.00	50.00	-15.65				CB_TSS_F__A		48.88		MODRES	35.50	CR		58.9	27M0G7W			P	
F	NCL10000	140.00	166.00	-21.00	1.14	0.72	146.00	R13TSS		45.30		MODRES	35.50	CR		58.7	27M0G7W			P	
F	OCE10100	-160.00	-145.00	-16.30	4.34	3.54	4.00	R13TSS		32.58		MODRES	35.50	CL		58.5	27M0G7W			P	
F	WAL10200	140.00	-176.80	-14.00	0.74	0.60	29.00	R13TSS		47.97		MODRES	35.50	CR		59.4	27M0G7W			P	
FIN	FIN10300	22.80	22.50	64.50	1.38	0.76	171.00	MOD13FRTSS		44.24		MODRES	35.50	CL		54.5	27M0G7W		52	P	
FIN	FIN10400	22.80	15.87	61.15	2.24	0.91	16.70	MOD13FRTSS		41.37		MODRES	35.50	CL		54.5	27M0G7W		52	P	
FJI	FJI19300	-178.00	179.62	-17.87	1.16	0.92	155.22	R13TSS		44.16		MODRES	35.50	CR		58.7	27M0G7W			P	
FSM	FSM00000	158.00	151.90	5.48	5.15	1.57	167.00	R13TSS		35.38		MODRES	35.50	CR		58.9	27M0G7W			P	
G	G 02700	-33.50	-3.50	53.80	1.84	0.72	142.00	R13TSS		43.23		MODRES	35.50	CR		58.0	27M0G7W			P	
GAB	GAB26000	-13.20	11.80	-0.60	1.43	1.12	64.00	R13TSS		42.40		MODRES	35.50	CR		58.3	27M0G7W			P	
GEO	GEO06400	23.20	43.35	42.27	1.11	0.60	161.21	R13TSS		46.23		MODRES	35.50	CR		58.9	27M0G7W			P	
GHA	GHA10800	-25.00	-1.20	7.90	1.48	1.06	102.00	R13TSS		42.49		MODRES	35.50	CR		58.6	27M0G7W			P	
GMB	GMB30200	-37.00	-15.10	13.40	0.79	0.60	4.00	R13TSS		47.69		MODRES	35.50	CL		58.3	27M0G7W			P	
GNB	GNB30400	-30.00	-15.00	12.00	0.90	0.60	172.00	R13TSS		47.12		MODRES	35.50	CL		58.1	27M0G7W			P	
GNE	GNE30300	-18.80	10.30	1.50	0.68	0.60	10.00	R13TSS		48.34		MODRES	35.50	CL		58.8	27M0G7W			P	
GRC	GRC10500	-1.20	24.51	38.08	1.70	0.95	152.97	MOD13FRTSS		42.40		MODRES	35.50	CL		56.3	27M0G7W			P	
GUI	GUI19200	-37.00	-11.00	10.20	1.58	1.04	147.00	R13TSS		42.29		MODRES	35.50	CR		58.4	27M0G7W			P	
HNG	HNG10601	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CL		59.3	27M0G7W			P	
HNG	HNG10602	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CR		59.3	27M0G7W			P	
HNG	HNG10603	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CR		59.3	27M0G7W		37	P	
HOL	HOL21300	38.20	5.12	51.96	1.00	1.00	24.53	MOD13FRTSS		44.45		MODRES	35.50	CL		58.5	27M0G7W			P	
HRV	HRV14801	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CL		58.8	27M0G7W			P	
HRV	HRV14802	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CR		58.8	27M0G7W			P	
HRV	HRV14803	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CR		58.8	27M0G7W		37	P	
I	I 08200	9.00	12.67	40.74	1.99	1.35	144.20	R13TSS		40.14		MODRES	35.50	CR		54.5	27M0G7W			P	
IND	IND03700	68.00	93.00	25.50	1.46	1.13	40.00	R13TSS		42.27		MODRES	35.50	CL		58.9	27M0G7W			P	
IND	IND04700	68.00	93.30	11.10	1.92	0.60	96.00	R13TSS		43.83		MODRES	35.50	CR		58.4	27M0G7W			P	
IND	INDA_100	56.00	76.16	14.72				CB_TSS_INDA		45.66		MODRES	35.50	CR		58.8	27M0G7W			P	
IND	INDB_100	56.00	83.43	24.22				CB_TSS_INDB		43.15		MODRES	35.50	CL		58.9	27M0G7W			P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16
Admin. symbol	Beam identification	Orbital Position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle						
IND	INDD_100	68.00	74.37	29.16				CB_TSS_INDD		41.80		MODRES	35.50	CR		59.3	27M0G7W			P	
INS	INSA_100	80.20	108.82	-0.73				CB_TSS_INSA		38.88		MODRES	35.50	CR		59.2	27M0G7W			P	
INS	INSB_100	104.00	129.75	-3.50				CB_TSS_INSB		37.53		MODRES	35.50	CL		58.8	27M0G7W			P	
IRL	IRL21100	-37.20	-8.25	53.22	0.72	0.60	157.56	R13TSS		48.08		MODRES	35.50	CL		59.2	27M0G7W			P	
IRN	IRN10900	34.00	54.20	32.40	3.82	1.82	149.00	R13TSS		36.03		MODRES	35.50	CL		57.8	27M0G7W			P	
IRQ	IRQ25600	50.00	43.78	33.28	1.74	1.23	156.76	R13TSS		41.14		MODRES	35.50	CL		58.3	27M0G7W			P	
ISL	ISL04900	-33.50	-19.00	64.90	1.00	0.60	177.00	R13TSS		46.67		MODRES	35.50	CL		60.8	27M0G7W			P	
ISL	ISL05000	-33.50	-15.35	63.25	1.58	0.60	169.00	R13TSS		44.67		MODRES	35.50	CR		57.3	27M0G7W			P	
ISR	ISR11000	-4.00	34.95	31.32	0.73	0.60	110.02	R13TSS		48.01		MODRES	35.50	CR		58.8	27M0G7W			P	
J	000BS-3N	109.85	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		MODRES	35.50	CR		*	27M0F8W	BS-3N	2	PE	
J	J 10985	109.85	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		MODRES	35.50	CR		*	34M5G7W		2	P	
J	J 11100	110.00	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		MODRES	35.50	CR		*	34M5G7W		2	P	
J	J 1110E	110.00	134.50	31.50	3.52	3.30	68.00	R13TSS		33.80		MODRES	35.50	CR		*	27M0F8W	BS-3M	2	PE	
JOR	JOR22400	11.00	37.55	34.02	1.47	0.91	73.16	MOD13FRTSS		43.19		MODRES	35.50	CL		55.5	27M0G7W			P	
KAZ	KAZ06600	56.40	65.73	46.40	4.58	1.76	177.45	R13TSS		35.38		MODRES	35.50	CR		58.9	27M0G7W			P	
KEN	KEN24900	-0.80	37.95	0.92	2.13	1.34	98.35	R13TSS		39.90		MODRES	35.50	CL		58.7	27M0G7W			P	
KGZ	KGZ07000	50.00	73.91	41.32	1.47	0.64	5.05	R13TSS		44.75		MODRES	35.50	CR		59.0	27M0G7W			P	
KIR	KIR__100	176.00	-170.31	-0.56				CB_TSS_KIRA		42.58		MODRES	35.50	CL		58.9	27M0G7W			P	
KOR	KO11201D	116.00	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		MODRES	38.43	CL		**	27M0G7W	KOREASAT-1	3	PE	
KOR	KOR11200	116.00	127.50	36.00	1.24	1.02	168.00	R13TSS		43.80		MODRES	35.50	CL		***	27M0G7W		3	P	
KOR	KOR11201	116.00	127.50	36.00	1.24	1.02	168.00	R13TSS		43.40		MODRES	38.43	CL		**	27M0F8W	KOREASAT-1	3	PE	
KRE	KRE28600	140.00	128.45	40.32	1.63	0.68	18.89	R13TSS		44.00		MODRES	35.50	CL		59.0	27M0G7W			P	
KWT	KWT11300	11.00	47.48	29.12	0.60	0.60	90.00	R13TSS		48.88		MODRES	35.50	CR		58.2	27M0G7W			P	
LAO	LAO28400	122.20	103.71	18.17	1.87	1.03	123.99	MOD13FRTSS		41.60		MODRES	35.50	CR		58.8	33M0G7W			P	
LBN	LBN27900	11.00	37.55	34.02	1.47	0.91	73.16	MOD13FRTSS		43.19		MODRES	35.50	CR		55.5	27M0G7W			P	
LBR	LBR24400	-33.50	-9.30	6.60	1.22	0.70	133.00	R13TSS		45.13		MODRES	35.50	CR		58.2	27M0G7W			P	
LBY	LBY__100	-24.80	17.62	26.55				CB_TSS_LBYA		40.30		MODRES	35.50	CL		58.0	27M0G7W			P	
LIE	LIE25300	-18.80	10.31	49.47	1.82	0.92	151.78	MOD13FRTSS		42.19		MODRES	35.50	CL		59.1	27M0G7W			P	
LSO	LSO30500	4.80	27.80	-29.80	0.66	0.60	36.00	R13TSS		48.47		MODRES	35.50	CR		59.2	27M0G7W			P	
LTU	LTU06100	23.20	24.51	56.09				CB_TSS_LTUA		48.21		MODRES	35.50	CL		56.9	27M0G7W			P	

* Channel 1: 58.2 dBW, channels 3, 5, 7: 59.2 dBW, channels 9, 11, 13: 59.3 dBW, other channels: 59.4 dBW

** Channels 2, 4, 6: 63.6 dBW, channels 8, 10, 12: 63.7 dBW

*** Channels 2, 4, 6: 59.0 dBW, other channels: 59.1 dBW

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16
Admin. symbol	Beam identification	Orbital Position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle						
LUX	LUX11400	28.20	5.21	49.20	0.60	0.60	90.00	R13TSS		48.88		MODRES	35.50	CL		57.9	27M0G7W		9	P	
LVA	LVA06100	23.20	24.51	56.09				CB_TSS_LVAA		48.21		MODRES	35.50	CR		56.9	27M0G7W			P	
MAU	MAU__100	29.00	58.61	-15.88				CB_TSS_MAUA		41.42		MODRES	35.50	CL		59.0	27M0G7W			P	
MCO	MCO11600	34.20	7.93	43.59	1.28	0.60	21.73	MOD13FRTSS		45.58		MODRES	35.50	CL		58.6	27M0G7W			P	
MDA	MDA06300	50.00	28.45	46.99	0.60	0.60	90.00	R13TSS		48.88		MODRES	35.50	CR		58.9	27M0G7W			P	
MDG	MDG23600	29.00	46.60	-18.80	2.72	1.14	65.00	R13TSS		39.53		MODRES	35.50	CL		58.3	27M0G7W			P	
MHL	MHL00000	146.00	167.64	9.83	2.07	0.90	157.42	R13TSS		41.75		MODRES	35.50	CR		59.0	27M0G7W			P	
MKD	MKD14800	22.80	21.61	41.56	0.60	0.60	90.00	R13TSS		48.88		MODRES	35.50	CR		58.9	27M0G7W			P	
MLA	MLA__100	91.50	108.05	4.00				CB_TSS_MLAA		43.00		MODRES	35.50	CR		58.4	27M0G7W			P	
MLD	MLD30600	50.00	72.95	5.78	1.19	0.91	104.53	R13TSS		44.09		MODRES	35.50	CR		58.7	27M0G7W			P	
MLI	MLI__100	-19.20	-5.35	17.11				CB_TSS_MLIB		41.21		MODRES	35.50	CR		58.7	27M0G7W			P	
MLT	MLT14700	22.80	14.40	35.90	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CR		56.0	27M0G7W			P	
MNG	MNG24800	74.00	102.20	46.60	3.60	1.13	169.00	R13TSS		38.35		MODRES	35.50	CR		59.0	27M0G7W			P	
MOZ	MOZ30700	-1.00	34.00	-18.00	3.57	1.38	55.00	R13TSS		37.52		MODRES	35.50	CL		59.2	27M0G7W			P	
MRC	MRC20900	-25.20	-8.95	28.98	3.56	1.23	49.23	R13TSS		38.02		MODRES	35.50	CR		54.9	27M0G7W			P	
MTN	MTN__100	-36.80	-10.52	19.66				CB_TSS_MTNA		41.91		MODRES	35.50	CR		55.5	27M0G7W			P	
MWI	MWI30800	4.80	33.79	-13.25	1.56	0.70	92.69	R13TSS		44.10		MODRES	35.50	CR		59.2	27M0G7W			P	
NGR	NGR11500	-37.20	7.63	17.01	2.20	1.80	102.40	R13TSS		38.48		MODRES	35.50	CL		59.5	27M0G7W			P	
NIG	NIG11900	-19.20	7.80	9.40	2.16	2.02	45.00	R13TSS		38.05		MODRES	35.50	CR		58.9	27M0G7W			P	
NMB	NMB02500	-18.80	17.50	-21.60	2.66	1.90	48.00	R13TSS		37.41		MODRES	35.50	CL		59.7	27M0G7W			P	
NOR	NOR12000	-0.80	13.42	62.76	1.43	0.60	19.61	MOD13FRTSS		45.10		MODRES	35.50	CL		56.2	27M0G7W		6	P	
NOR	NOR12100	-0.80	18.00	60.23	1.67	0.83	23.85	R13TSS		43.02		MODRES	35.50	CL		57.8	27M0G7W		6	P	
NPL	NPL12200	50.00	83.70	28.30	1.72	0.60	163.00	R13TSS		44.31		MODRES	35.50	CR		59.6	27M0G7W			P	
NRU	NRU30900	134.00	167.00	-0.50	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CL		57.5	27M0G7W			P	
NZL	NZL__100	158.00	-170.68	-19.72				CB_TSS_NZLA		48.88		MODRES	35.50	CL		59.6	27M0G7W			P	
OMA	OMA12300	17.20	55.60	21.00	1.88	1.02	100.00	R13TSS		41.62		MODRES	35.50	CR		58.3	27M0G7W			P	
PAK	PAK12700	38.20	69.60	29.50	2.30	2.16	14.00	R13TSS		37.49		MODRES	35.50	CR		58.9	27M0G7W			P	
PHL	PHL28500	98.00	121.30	11.10	3.46	1.76	99.00	R13TSS		36.60		MODRES	35.50	CL		58.7	27M0G7W			P	
PLW	PLW00000	140.00	132.98	5.51	1.30	0.60	55.41	R13TSS		45.53		MODRES	35.50	CR		58.8	27M0G7W			P	
PNG	PNG13100	134.00	148.07	-6.65	3.13	2.30	168.32	MOD13FRTSS		35.87		MODRES	35.50	CR		54.5	27M0G7W			P	
POL	POL13200	50.00	20.07	51.86	1.20	0.69	17.76	R13TSS		45.26		MODRES	35.50	CL		59.2	27M0G7W			P	
POR	POR__100	-37.00	-15.92	37.65				CB_TSS_PORA		47.17		MODRES	35.50	CR		58.4	27M0G7W			P	
PSE	YYY00000	-13.20	34.99	31.86	0.60	0.60	90.00	R13TSS		48.88		MODRES	35.50	CL		58.9	27M0G7W			P	3
QAT	QAT24700	20.00	51.38	25.26	0.60	0.60	90.00	R13TSS		48.88		MODRES	35.50	CL		54.5	27M0G7W			P	
ROU	ROU13600	50.00	25.12	45.75	1.17	0.73	9.52	R13TSS		45.15		MODRES	35.50	CR		58.9	27M0G7W			P	
RRW	RRW31000	11.00	30.00	-2.10	0.66	0.60	42.00	R13TSS		48.47		MODRES	35.50	CL		59.8	27M0G7W			P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16
Admin. symbol	Beam identification	Orbital Position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle						
RUS	RSTREA11	36.00	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CL		53.0	27M0F8W	RST-1	5	PE	
RUS	RSTREA12	36.00	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CR		53.0	27M0F8W	RST-1	5	PE	
RUS	RSTRED11	36.00	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CL		53.0	27M0G7W	RST-1	5	PE	
RUS	RSTRED12	36.00	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CR		53.0	27M0G7W	RST-1	5	PE	
RUS	RSTRSD11	36.00	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CL		53.0	27M0G7W	RST-1	5	P	
RUS	RSTRSD12	36.00	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CR		53.0	27M0G7W	RST-1	5	P	
RUS	RSTRSD13	36.00	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	39.02	CL		53.0	27M0G7W	RST-1	5	P	
RUS	RSTRSD14	36.00	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	39.02	CR		53.0	27M0G7W	RST-1	5	P	
RUS	RSTRSD21	56.00	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	35.50	CL		55.0	27M0G7W	RST-2	14	P	
RUS	RSTRSD22	56.00	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	35.50	CR		55.0	27M0G7W	RST-2	14	P	
RUS	RSTRSD31	86.00	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CL		55.0	27M0G7W	RST-3	33	P	
RUS	RSTRSD32	86.00	97.00	62.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CR		55.0	27M0G7W	RST-3	33	P	
RUS	RSTRSD51	140.00	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CL		55.0	27M0G7W	RST-5	35	P	
RUS	RSTRSD52	140.00	158.00	56.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CR		55.0	27M0G7W	RST-5	35	P	
RUS	RUS00401	110.00	128.73	54.30	4.25	2.02	156.81	R13TSS		35.11		MODRES	35.50	CL		58.9	27M0G7W		34	P	
RUS	RUS00402	110.00	128.73	54.30	4.25	2.02	156.81	R13TSS		35.11		MODRES	35.50	CR		58.9	27M0G7W		34	P	
S	S 13800	5.00	16.20	61.00	1.04	0.98	14.00	R13TSS		44.36		MODRES	35.50	CL		55.6	27M0G7W		4	P	
S	S 13900	5.00	17.00	61.50	2.00	1.00	10.00	R13TSS		41.44		MODRES	35.50	CL		61.1	27M0G7W		4	P	
SDN	SDN__100	-7.00	30.24	13.53				CB_TSS_SDNA		40.26		MODRES	35.50	CR		59.4	27M0G7W			P	
SEN	SEN22200	-37.00	-14.40	13.80	1.46	1.04	139.00	R13TSS		42.63		MODRES	35.50	CL		58.6	27M0G7W			P	
SEY	SEY00000	42.50	51.86	-7.23	2.43	1.04	27.51	R13TSS		40.44		MODRES	35.50	CR		58.9	27M0G7W			P	
SLM	SLM00000	128.00	159.27	-8.40	1.35	1.08	118.59	R13TSS		42.81		MODRES	35.50	CL		58.9	27M0G7W			P	
SMO	SMO05700	-178.00	-171.70	-13.87	0.60	0.60	90.00	R13TSS		48.88		MODRES	35.50	CR		58.6	27M0G7W			P	
SMR	SMR31100	-36.80	12.60	43.70	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CR		57.4	27M0G7W			P	
SNG	SNG15100	88.00	103.86	1.42	0.92	0.72	175.12	R13TSS		46.25		MODRES	35.50	CL		58.5	27M0G7W			P	
SOM	SOM31200	37.80	45.16	7.11	3.31	1.51	65.48	R13TSS		37.46		MODRES	35.50	CR		57.4	27M0G7W			P	
SRL	SRL25900	-33.50	-11.80	8.60	0.78	0.68	114.00	R13TSS		47.20		MODRES	35.50	CR		58.4	27M0G7W			P	
STP	STP24100	-7.00	6.17	1.45	0.65	0.60	153.51	R13TSS		48.56		MODRES	35.50	CR		56.4	27M0G7W			P	
SUI	SUI14000	-18.80	10.31	49.47	1.82	0.92	151.78	MOD13FRTSS		42.19		MODRES	35.50	CL		59.1	27M0G7W			P	
SVK	SVK14401	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CL		59.3	27M0G7W			P	
SVK	SVK14402	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CR		59.3	27M0G7W			P	
SVK	SVK14403	-12.80	16.77	46.78	1.71	0.89	149.15	MOD13FRTSS		42.64		MODRES	35.50	CR		59.3	27M0G7W		37	P	
SVN	SVN14800	33.80	15.01	46.18	0.60	0.60	90.00	R13TSS		48.88		MODRES	35.50	CR		58.9	27M0G7W			P	
SWZ	SWZ31300	4.80	31.39	-26.44	0.60	0.60	90.00	R13TSS		48.88		MODRES	35.50	CL		57.9	27M0G7W			P	
SYR	SYR22900	11.00	37.55	34.02	1.47	0.91	73.16	MOD13FRTSS		43.19		MODRES	35.50	CL		55.5	27M0G7W		53	P	
SYR	SYR33900	11.00	37.60	34.20	1.32	0.88	74.00	MOD13FRTSS		43.80		MODRES	35.50	CL		56.4	27M0G7W		53	P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16
Admin. symbol	Beam identification	Orbital Position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle						
TCD	TCD14300	17.00	18.36	15.47	3.23	2.05	82.89	R13TSS		36.23		MODRES	35.50	CR		58.9	27M0G7W			P	
TGO	TGO22600	-30.00	0.72	8.61	1.12	0.60	109.54	R13TSS		46.19		MODRES	35.50	CR		58.5	27M0G7W			P	
THA	THA14200	98.00	100.75	12.88	2.80	1.82	93.77	R13TSS		37.37		MODRES	35.50	CL		58.6	27M0G7W			P	
TJK	TJK06900	38.00	71.14	38.41	1.21	0.73	155.31	R13TSS		45.00		MODRES	35.50	CL		58.8	27M0G7W			P	
TKM	TKM06800	50.00	59.24	38.83	2.26	1.02	166.64	R13TSS		40.81		MODRES	35.50	CR		58.9	27M0G7W			P	
TMP	TMP00000	128.00	126.03	-8.72	0.66	0.60	13.92	R13TSS		48.50		MODRES	35.50	CR		58.9	27M0G7W			P	9
TON	TON21500	170.75	-175.23	-18.19	1.59	0.60	71.33	R13TSS		44.64		MODRES	35.50	CR		58.3	27M0G7W			P	
TUN	TUN15000	-25.20	9.50	33.50	1.88	0.72	135.00	MOD13FRTSS		43.13		MODRES	35.50	CR		57.3	27M0G7W		55	P	
TUN	TUN27200	-25.20	2.10	31.75	3.41	1.81	179.18	MOD13FRTSS		36.54		MODRES	35.50	CR		55.5	27M0G7W		55	P	4
TUR	TUR14500	42.00	34.95	39.09	3.18	0.99	0.79	R13TSS		39.47		MODRES	35.50	CL		58.8	27M0G7W		36	P	
TUV	TUV00000	176.00	177.61	-7.11	0.94	0.60	137.58	R13TSS		46.93		MODRES	35.50	CR		58.9	27M0G7W			P	
TZA	TZA22500	11.00	34.60	-6.20	2.41	1.72	129.00	R13TSS		38.27		MODRES	35.50	CR		58.7	27M0G7W			P	
UAE	UAE27400	52.50	53.85	24.34	1.19	0.85	3.72	R13TSS		44.39		MODRES	35.50	CR		58.2	27M0G7W			P	
UGA	UGA05100	17.00	32.20	1.04	1.50	1.02	68.73	R13TSS		42.62		MODRES	35.50	CL		58.2	27M0G7W			P	
UKR	UKR06300	38.20	31.74	48.22	2.29	0.96	177.78	R13TSS		41.01		MODRES	35.50	CR		58.9	27M0G7W			P	
USA	GUM33100	122.00	144.50	13.10	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CL		58.3	27M0G7W			P	
USA	MRA33200	121.80	145.90	16.90	1.20	0.60	76.00	R13TSS		45.87		MODRES	35.50	CR		58.5	27M0G7W			P	
USA	PLM33200	170.00	-161.40	7.00	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CL		57.4	27M0G7W			P	
USA	USAA_100	170.00	-170.51	-12.72				CB_TSS_USAA		48.88		MODRES	35.50	CL		56.1	27M0G7W			P	
USA	WAK33400	140.00	166.50	19.20	0.60	0.60	0.00	R13TSS		48.88		MODRES	35.50	CR		58.6	27M0G7W			P	
UZB	UZB07100	33.80	63.80	41.21	2.56	0.89	159.91	R13TSS		40.84		MODRES	35.50	CR		58.8	27M0G7W			P	
VTN	VTN32500	107.00	106.84	14.21	3.43	1.76	109.43	R13TSS		36.65		MODRES	35.50	CR		58.4	27M0G7W			P	
VUT	VUT12800	140.00	168.00	-16.40	1.52	0.68	87.00	R13TSS		44.30		MODRES	35.50	CL		57.8	27M0G7W			P	
YEM	YEM__100	11.00	48.05	14.64				CB_TSS_YEMA		47.63		MODRES	35.50	CL		54.9	27M0G7W			P	
YUG	YUG14800	-7.00	20.50	43.98	0.91	0.60	145.16	R13TSS		47.07		MODRES	35.50	CR		58.9	27M0G7W			P	
ZMB	ZMB31400	-0.80	27.50	-13.10	2.38	1.48	39.00	R13TSS		38.98		MODRES	35.50	CR		58.7	27M0G7W			P	
ZWE	ZWE13500	-0.80	29.60	-18.80	1.46	1.36	37.00	R13TSS		41.47		MODRES	35.50	CR		59.2	27M0G7W			P	

COLUMN HEADINGS OF THE PLAN

Col. 1 *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. 2 *Notifying administration symbol*.

Col. 3 *Beam identification* (Column 2, normally, contains the symbol designating the administration 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. 4 *Polarization* (CL – circular left, CR – circular right).

Col. 5 *Channel number/Indication of minimum equivalent protection margin (EPM) for a given assignment derived from the set of values for all test points belonging to the given beam* (dB).

Minimum equivalent protection margin of assignments in the Regions 1 and 3 Plan (sorted by orbital position)

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identifica-tion	Polariza-tion type	Channel number																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum EPM																																							
-178.00	FJI	FJI19300	CR	6.1		6.1		6.1		6.1		6.1		6.1		6.1		6.1		6.1		6.1		6.1		6.1																	
-178.00	SMO	SMO05700	CR	1.6		1.6		1.6		1.6		1.6		1.6		1.6		1.6		1.6		1.6		1.6		1.6																	
-160.00	F	OCE10100	CL		99.9		99.9		99.9		99.9		99.9		99.9		99.9		99.9		99.9		99.9		99.9		99.9																
-37.20	IRL	IRL21100	CL	2.6		0.6		0.6		0.6		0.6		0.6		0.6		0.6		0.6		0.6																					
-37.20	NGR	NGR11500	CL		6.8		6.8		6.8		6.8		6.8		6.8		6.8		6.8		6.8		6.9																				
-37.00	AND	AND34100	CL		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.8																				
-37.00	GMB	GMB30200	CL	4.6		1.9		1.9		1.9		1.9		1.9		1.9		1.9		1.9		1.9																					
-37.00	GUI	GUI19200	CR		0.9		0.9		0.9		0.9		0.9		0.9		0.9		0.9		0.9		1.5																				
-37.00	POR	POR__100	CR	2.4		1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.1																					
-37.00	SEN	SEN22200	CL																					-0.3		4.7		4.7		4.7		4.7		4.7		4.7		4.7		4.7		4.7	
-36.80	MTN	MTN__100	CR																						1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.1		3.9
-36.80	SMR	SMR31100	CR	4.4		3.2		3.2		3.1		3.1		3.1		3.2		3.2		3.2		3.2																					
-33.50	CPV	CPV30100	CL		9.5		9.5		9.5		9.5		9.5		9.5		9.5		9.5		9.5		8.8																				
-33.50	DNK	DNK090XR	CR																													0.9				0.9							
-33.50	DNK	DNK091XR	CR																															-0.9				-0.9					
-33.50	G	G 02700	CR		-0.1		0.1		-0.1		-0.1		-0.1		-0.1		0.2		-0.1		0.1		0.3																				
-33.50	ISL	ISL04900	CL																					8.8		7.2		7.2		10.1		14.8		3.6		14.8		3.6		21.7		21.7	
-33.50	ISL	ISL05000	CR																						0.1		0.1		0.1														
-33.50	LBR	LBR24400	CR	3.3		0.4		0.4		0.4		0.4		0.4		0.4		0.4		0.4		0.4																					
-33.50	SRL	SRL25900	CR																					-0.4		1.0		1.0		1.0		1.0		0.9		1.0		0.9		1.0		1.0	
-30.00	BFA	BFA10700	CL																						1.5		1.5		1.5		1.5		1.5		1.5		1.5		1.5		1.5		2.4
-30.00	E	E____100	CL																					8.3		5.9		5.9		5.9		5.9		5.9		5.6		5.9		5.6		5.9	
-30.00	E	HISP33D1	CL																							-0.4				-0.4				-0.4				-0.4				-0.4	
-30.00	E	HISP33D2	CL																							-1.0				-1.0				-1.0				-1.0				-1.0	
-30.00	E	HISPA27D	CL																							1.3				1.3				1.3				1.3				1.3	
-30.00	E	HISPASA4	CL																							1.3				1.3				1.3				1.3				1.3	
-30.00	GNB	GNB30400	CL																						0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.7
-30.00	TGO	TGO22600	CR	7.9		7.5		7.5		7.5		7.5		7.5		7.5		7.5		7.5		7.5																					
-25.20	DNK	DNK__100	CL	-0.9		-1.5		-1.5		-1.5		-1.5		-1.5		-1.5		-1.5		-1.5		-1.5																					
-25.20	MRC	MRC20900	CR	0.1		-0.4		-0.4		-0.4		-0.4		-0.4		-0.3		-0.3		-0.4		-0.4																					
-25.20	TUN	TUN15000	CR																					-1.0		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8	
-25.20	TUN	TUN27200	CR																																	-0.9				-0.9			
-25.00	GHA	GHA10800	CR																					7.1		5.2		5.2		5.2		5.2		5.2		4.7		5.2		4.7		5.2	
-24.80	AGL	AGL29500	CL	4.6		3.6		3.6		3.6		3.6		3.6		3.6		3.6		3.6		3.6																					
-24.80	ALG	ALG__100	CL																						-0.7		-0.7		-0.7		-0.7		-0.7		-0.8		-0.8		-0.8		-0.8		2.2

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identification	Polarization type	Channel number																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum EPM																																							
-24.80	CTI	CTI23700	CL	3.4		2.9		2.9		2.9		2.9		2.9		2.9		2.9		2.9		2.9																					
-24.80	LBY	LBY__100	CL		2.4		2.4		2.4		2.4		2.4		2.4		2.4		2.4		2.4		2.7																				
-19.20	BEN	BEN23300	CL	3.1		2.6		2.6		2.6		2.6		2.6		2.6		2.6		2.6		2.6																					
-19.20	COD	COD__100	CR		4.7		4.7		4.7		4.7		4.7		4.7		4.7		4.7		4.7		5.9																				
-19.20	MLI	MLI__100	CR	5.6		4.6		4.6		4.6		4.6		4.6		4.6		4.6		4.6		4.6																					
-19.20	NIG	NIG11900	CR																						3.5		3.5		3.5		3.5		3.5		3.5		3.5		3.5		3.5		4.1
-18.80	AUT	AUT01600	CR																					0.9		-0.1		0.0		0.0		0.1		0.0		0.1		0.0		0.0		0.0	
-18.80	D	D 08700	CR	1.1		-0.2		-0.1		-0.2		-0.1		-0.1		-0.1		-0.1		-0.1		-0.2																					
-18.80	GNE	GNE30300	CL																					2.0		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4	
-18.80	LIE	LIE25300	CL																						0.4		0.4		0.4		0.4		0.4		0.4		0.4		0.4		0.4		2.8
-18.80	NMB	NMB02500	CL																					8.6		9.6		9.6		9.6		9.6		9.6		9.6		9.6		9.6		9.6	
-18.80	SUI	SUI14000	CL		0.2		0.7		0.2		0.7		0.3		0.7		0.3		0.7		0.2		0.8																				
-13.20	CAF	CAF25800	CL																						1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.5
-13.20	COG	COG23500	CL	0.8		0.7		0.7		0.7		0.7		0.7		0.7		0.7		0.7		0.7																					
-13.20	GAB	GAB26000	CR	0.5		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0																					
-13.20	PSE	YYY00000	CL																					5.3		4.8		5.1		4.9		5.1		4.9		5.1		4.9		5.1		4.9	
-13.00	CME	CME30000	CR																						0.4		0.4		0.4		0.5		0.4		0.5		0.4		0.5		0.4		0.5
-12.80	CZE	CZE14401	CL	1.9								0.8								0.6								-0.9								-0.8							
-12.80	CZE	CZE14402	CR														0.1														-0.9								-0.9				
-12.80	CZE	CZE14403	CR		0.1*																				-0.9*		-0.9*																
-12.80	HNG	HNG10601	CL			1.1								1.2								1.1								-0.3								-0.3					
-12.80	HNG	HNG10602	CR						0.6																								-0.4								-0.4		
-12.80	HNG	HNG10603	CR		0.6*																				-0.4*		-0.4*																
-12.80	HRV	HRV14801	CL					0.6								0.8								0.3								-0.8								-0.8			
-12.80	HRV	HRV14802	CR										0.1																						-0.9								-0.2
-12.80	HRV	HRV14803	CR		0.1*																				-0.9*		-0.9*																
-12.80	SVK	SVK14401	CL							1.1								1.2								-0.4								-0.3								-0.3	
-12.80	SVK	SVK14402	CR																		0.6								-0.4								-0.4						
-12.80	SVK	SVK14403	CR		0.6*																				-0.4*		-0.4*																
-7.00	EGY	EGY02600	CL		10.9		10.9		10.9		10.9		10.9		10.9		10.9		10.9		10.9		5.9																				
-7.00	F	F 09300	CL																						5.4		4.3		5.6		4.3		5.6		4.8		5.6		4.8		5.6		5.5
-7.00	F	F___100	CR																					5.0		5.1		5.1		5.1		5.1		5.1		5.1		5.1		5.1		5.1	
-7.00	SDN	SDN__100	CR																					5.4		8.0		8.0		8.0		8.0		8.0		8.0		8.0		8.0		8.0	

* This assignment shall only be used by the Administrations of Coatia, Czech Republic, Hungary and Slovakia on the basis of equal access subject to mutual agreement between them.

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identification	Polarization type	Channel number																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum EPM																																							
-7.00	STP	STP24100	CR		6.1		5.6		5.6		5.6		5.6		5.6		5.6		5.6		5.6		4.9																				
-7.00	YUG	YUG14800	CR																						-1.2		-1.1		-0.6		-0.9		-0.6		-0.9		-0.6		-0.9		-0.6		-0.5
-4.00	ISR	ISR11000	CR																						3.1		3.0		3.1		3.0		3.1		3.0		3.1		3.0		3.1		5.7
-1.20	BUL	BUL02000	CL																						1.0		-0.4		1.6		-0.4		1.6		-0.4		1.6		-0.4		1.6		-0.3
-1.20	CVA	CVA08300	CR	2.2		0.5		0.9		0.9		0.9		0.9																													
-1.20	CVA	CVA08500	CR																						-0.8																		
-1.20	CYP	CYP08600	CR	1.4		0.0		0.5		0.5		0.5		0.5		2.2		2.2		2.2		1.5																					
-1.20	GRC	GRC10500	CL		-0.4		0.6		-0.1		0.8		-0.1		0.9		-0.1		0.9		-0.3		1.0																				
-1.00	MOZ	MOZ30700	CL		2.8		3.8		2.8		3.8		2.8		3.8		2.8		3.8		2.8		3.6																				
-0.80	BOT	BOT29700	CL																						1.5		0.9		1.5		0.9		1.5		0.9		1.5		0.9		1.5		2.2
-0.80	KEN	KEN24900	CL																						3.8		2.8		3.9		2.8		3.9		2.8		3.9		2.8		3.9		3.3
-0.80	NOR	NOR12000	CL	4.4		2.0		-0.7		-0.7		-0.7		-0.7		-0.6		-0.6		-0.6		1.1																					
-0.80	NOR	NOR12100	CL																								-0.6				-0.6												
-0.80	ZMB	ZMB31400	CR																					2.8		3.2		4.3		3.2		4.3		3.2		4.3		3.2		4.3		3.2	
-0.80	ZWE	ZWE13500	CR	5.5		2.6		2.6		2.6		2.6		2.6		2.6		2.6		2.6		2.6																					
4.80	AFS	AFS02100	CL																					4.5		5.6		5.6		5.6		5.2		5.2		5.2		5.2		5.2		5.2	
4.80	LSO	LSO30500	CR	3.9		2.9		2.9		2.9		2.9		2.9		3.1		3.1		3.1		2.9																					
4.80	MWI	MWI30800	CR		3.2		3.8		3.3		3.9		3.3		3.9		3.9		3.9		3.8		3.4																				
4.80	SWZ	SWZ31300	CL	4.5		3.2		3.2		3.2		3.2		3.2		3.4		3.4		3.4		3.2																					
5.00	S	S 13800	CL																					4.7		-0.4		2.3		-0.4		2.3		0.6		4.5		0.6		4.5		0.6	
5.00	S	S 13900	CL																														8.7										
9.00	I	I 08200	CR																						-3.6		-3.8		-3.6		-3.8		-3.8		-3.8		-3.8		-3.8		-3.8		-2.6
11.00	BDI	BDI27000	CL																						3.0		3.0		3.0		3.0		3.0		3.0		3.0		3.0		3.0		5.6
11.00	JOR	JOR22400	CL		-1.0		-0.8		-0.7		-0.7		-0.7		-0.7		-0.7		-0.7		-0.8		0.0																				
11.00	KWT	KWT11300	CR																						5.4		5.4		5.4		5.4		5.4		5.4		5.4		5.4		5.4		6.3
11.00	LBN	LBN27900	CR	0.9		-0.6		-0.1		-0.1		-0.1		-0.1		-0.1		-0.1		-0.1		-0.6																					
11.00	RRW	RRW31000	CL		10.2		10.2		10.2		10.2		10.2		10.2		10.2		10.2		10.2		5.7																				
11.00	SYR	SYR22900	CL																						-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-0.5
11.00	SYR	SYR33900	CL																																								1.4**
11.00	TZA	TZA22500	CR																					2.6		3.6		3.6		3.6		3.6		3.6		3.6		3.6		3.6		3.6	
11.00	YEM	YEM__100	CL	2.1		-0.3		-0.3		-0.3		-0.3		-0.3		-0.3		-0.3		-0.3		-0.3																					
16.80	DJI	DJI09900	CL		8.2		8.2		8.1		8.1		8.1		8.1		8.1		8.1		8.1		6.7																				
17.00	ARS	ARS__100	CL																						-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		0.0
17.00	ARS	ARS34000	CL																																								2.0

** See Note 1 of § 11.2 of Article 11.

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identification	Polarization type	Channel number																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum EPM																																							
17.00	TCD	TCD14300	CR	9.8		8.8		8.8		8.8		8.8		8.8		8.8		8.8		8.8		8.8																					
17.00	UGA	UGA05100	CL																					3.6		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0	
17.20	OMA	OMA12300	CR																						1.7		1.7		1.7		1.7		1.7		1.7		1.7		1.7		1.7		0.9
20.00	QAT	QAT24700	CL		5.9		5.9		5.9		5.9		5.9		5.9		5.9		5.8		5.8		6.2**																				
22.80	ARM	ARM06400	CR																						0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.4		0.5		2.7
22.80	ERI	ERI09200	CR																					2.3		2.8		2.8		2.8		2.8		2.8		2.8		2.8		2.8		2.8	
22.80	FIN	FIN10300	CL																						-0.5		1.2		1.9		2.0		1.8		2.1		1.7		2.2		1.6		4.9
22.80	FIN	FIN10400	CL																																				-0.4				1.1
22.80	MKD	MKD14800	CR																					3.6		3.3		3.3		3.3		3.3		3.3		3.3		3.2		3.3		3.3	
22.80	MLT	MLT14700	CR																						1.7		1.8		1.7		1.8		1.7		1.8		1.7		1.7		1.8		3.4
23.20	AZE	AZE06400	CL																					0.6		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
23.20	GEO	GEO06400	CR	5.3		4.1		4.1		4.1		4.1		4.1		4.1		4.1		4.1		4.1																					
23.20	LTU	LTU06100	CL	1.4		0.1		0.0		0.0		-0.1		-0.1		-0.1		-0.2		-0.2		-0.2																					
23.20	LVA	LVA06100	CR		-0.8		-0.8		-0.8		-0.8		-0.9		-0.9		-0.9		-0.9		-0.9		-0.3																				
28.20	LUX	LUX11400	CL	3.1		2.9		2.8		2.8		2.8		2.8		2.8		2.8		2.8		2.8																					
29.00	COM	COM20700	CR																					11.2		9.5		9.5		9.5		9.5		9.5		9.5		9.5		9.5		9.6	
29.00	MAU	MAU__100	CL																						11.0		11.0		11.0		11.0		11.0		11.0		11.0		11.1		11.1		12.7
29.00	MDG	MDG23600	CL	14.0		13.6		13.5		13.4		13.4		13.3		13.3		13.2		13.2		13.2																					
33.80	SVN	SVN14800	CR		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.4		1.6																				
33.80	UZB	UZB07100	CR	3.3		1.9		1.9		1.9		1.9		1.9		1.9		1.9		1.9		1.9																					
34.00	BHR	BHR25500	CR																					0.9		0.9		8.7		8.8		9.2		8.8		9.2		8.8		9.2		8.8	
34.00	IRN	IRN10900	CL	1.2		0.9		0.9		0.9		0.9		0.9		0.9		0.9		0.9		0.9		8.8		8.5																	
34.20	MCO	MCO11600	CL	0.7		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0																					
36.00	ETH	ETH09200	CL		11.8		11.8		11.8		11.8		11.8		11.8		11.8		11.8		11.8		12.1																				
36.00	RUS	RSTREA11	CL																											-3.6				-3.6				-3.6				-3.6	
36.00	RUS	RSTREA12	CR																												-4.3				-4.3				-4.3				-4.2
36.00	RUS	RSTRED11	CL																											-3.6				-3.6				-3.6				-3.6	
36.00	RUS	RSTRED12	CR																												-4.3				-4.3				-4.3				-4.2
36.00	RUS	RSTRSD11	CL																									4.5		4.9		4.9		4.9		4.9		4.9		4.9		4.9	
36.00	RUS	RSTRSD12	CR																										3.4		3.4		3.4		3.4		3.4		3.4		3.4		3.4
36.00	RUS	RSTRSD13	CL																									4.9		5.0		5.0		5.0		5.0		5.0		5.0		5.0	
36.00	RUS	RSTRSD14	CR																										3.5		3.5		3.5		3.5		3.5		3.5		3.5		3.6
37.80	BLR	BLR06200	CL	3.8		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3																					
37.80	SOM	SOM31200	CR																						3.3		3.3		11.7		10.2		11.7		10.2		11.7		10.2		11.7		10.4
38.00	TJK	TJK06900	CL																						0.6		1.2		7.9		7.8		7.9		7.8		7.9		7.8		7.9		7.9
38.20	BEL	BEL01800	CL																						2.5		2.2		2.0		1.7		2.0		1.7		2.0		1.7		2.0		3.4
38.20	HOL	HOL21300	CL		1.6		1.6		1.6		1.6		1.6		1.6		1.6		1.6		1.6		2.5																				
38.20	PAK	PAK12700	CR		3.5		3.5		3.5		3.5		3.5		3.5		3.5		3.5		3.5		4.6		2.0		2.1																

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identification	Polarization type	Channel number																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum EPM																																							
38.20	UKR	UKR06300	CR		0.6		0.6		0.6		0.6		0.6		0.6		0.6		0.6		0.6		1.5																				
42.00	TUR	TUR14500	CL		1.7		1.7		1.7		1.7		1.7		1.7		1.7		1.7		1.7		1.7																				
42.50	SEY	SEY00000	CR																						12.3		13.0		13.1		13.1		13.1		13.1		13.1		13.1		13.1		14.4
44.50	EST	EST06100	CR	6.6		5.6		5.6		5.6		5.6		5.6		5.6		5.6		5.6		5.6																					
50.00	AFG	AFG__100	CL	-0.3		-0.5		-0.5		-0.5		-0.5		-0.5		-0.5		-0.5		-0.5		-0.5		3.0		2.2																	
50.00	CLN	CLN21900	CL	0.8		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		1.5		1.6																	
50.00	IRQ	IRQ25600	CL	4.2		3.6		3.6		3.6		3.6		3.6		3.6		3.6		3.6		3.6**																					
50.00	KGZ	KGZ07000	CR		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		1.0																				
50.00	MDA	MDA06300	CR																						0.7		0.7		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4
50.00	MLD	MLD30600	CR	6.4		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		4.8		4.4																	
50.00	NPL	NPL12200	CR		3.2		3.2		3.2		3.2		3.2		3.2		3.2		3.2		3.2		3.3		2.3		3.5																
50.00	POL	POL13200	CL																						2.4		2.7		3.1		3.1		3.1		3.1		3.1		3.1		3.1		3.2
50.00	ROU	ROU13600	CR	4.9		3.9		3.9		3.9		3.9		3.9		3.9		3.9		3.9		3.9																					
50.00	TKM	TKM06800	CR																						1.0		2.4		8.5		8.5		8.5		8.5		8.5		8.5		8.5		8.7
52.50	UAE	UAE27400	CR																					3.2		3.2		14.3		15.1		15.1		15.1		15.1		15.1		15.1		15.1**	
56.00	BIH	BIH14800	CL	5.9		5.9		5.9		5.9		5.9		5.9		5.9		5.9		5.9		5.9																					
56.00	IND	INDA_100	CR		2.5		2.6		2.5		2.6		2.6		2.5		2.6		2.6		2.5		3.2		3.9		6.4																
56.00	IND	INDB_100	CL	2.4		1.9		1.9		1.9		1.9		1.9		1.9		1.9		1.9		1.9		2.9		2.9																	
56.00	RUS	RSTRSD21	CL																									9.3		11.6		11.6		11.6		11.6		11.6		11.6		11.6	
56.00	RUS	RSTRSD22	CR																										3.5		3.5		3.5		3.5		3.5		3.5		3.5		3.6
56.40	KAZ	KAZ06600	CR	3.5		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3																					
62.00	ALB	ALB29600	CL																						8.6		10.9		33.5		33.5		33.5		33.5		33.5		33.5		33.5		34.4
62.00	CHN	CHN15500	CL	2.5		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4																	
62.00	CHN	CHNA_100	CR		1.9		1.9		1.9		1.9		1.9		1.9		1.9		1.9		1.9		2.1		2.3		5.3																
68.00	IND	IND03700	CL		4.5		4.5		4.5		4.5		4.5		4.5		4.5		4.5		4.5		4.5		4.5		7.2																
68.00	IND	IND04700	CR	5.4		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0																	
68.00	IND	INDD_100	CR	6.0		4.6		4.6		4.6		4.6		4.6		4.6		4.6		4.6		4.6		4.6		4.6																	
74.00	BGD	BGD22000	CR	12.1		11.0		11.0		11.0		11.0		11.0		11.0		11.0		11.0		11.0		4.1		4.1																	
74.00	BRU	BRU33000	CR		5.1		5.1		5.1		5.1		5.1		5.1		5.1		5.1		5.1		4.8		4.5		6.9																
74.00	MNG	MNG24800	CR																					6.6		6.6		26.4		99.9		99.9		99.9		99.9		99.9		99.9		99.9	
80.20	INS	INSA_100	CR	12.8		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7																	
86.00	BTN	BTN03100	CR	11.8		8.9		8.9		8.9		8.9		8.9		8.9		8.9		8.9		8.9		8.9		8.9																	
86.00	CBG	CBG29900	CR		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7		11.7																
86.00	RUS	RSTRSD31	CL																									5.5		99.9		99.9		99.9		99.9		99.9		99.9		99.9	

** See Note 1 of § 11.2 of Article 11.

1	2	3	4	5																																							
				Channel number																																							
Orbital Position	Admin. symbol	Beam Identifica-tion	Polariza-tion type	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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum EPM																																							
86.00	RUS	RSTRSD32	CR																										99.9		99.9		99.9		99.9		99.9		99.9		99.9		99.9
88.00	SNG	SNG15100	CL	2.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3																	
91.50	MLA	MLA__100	CR		0.8		0.8		0.8		0.8		0.8		0.8		0.8		0.8		0.8		0.8		0.8		3.5**																
92.20	CHN	CHNE_100	CL	4.4		1.5		1.5		1.5		1.5		1.5		1.5		1.5		1.5		1.5		1.5		1.5																	
92.20	CHN	CHNF_100	CR		4.4		4.4		4.4		4.4		4.4		4.4		4.4		4.4		4.4		4.4		4.4		6.6																
98.00	PHL	PHL28500	CL		2.3		2.3		2.3		2.3		2.3		2.3		2.3		2.3		2.3		2.3		2.3		4.7																
98.00	THA	THA14200	CL	1.8		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2																	
104.00	BRM	BRM29800	CL	2.1		-0.1		-0.1		-0.1		-0.1		-0.1		-0.1		-0.1		-0.1		-0.1		-0.1		-0.1																	
104.00	INS	INSB_100	CL		4.1		4.1		4.1		4.1		4.1		4.1		4.1		4.1		4.1		4.1		4.1		4.9**																
107.00	VTN	VTN32500	CR		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		3.1																
109.85	J	000BS-3N	CR	6.3		4.3		4.3		4.3		4.2		4.1		6.5		12.6																									
109.85	J	J 10985	CR	6.2		4.2		4.2		4.2		4.2		4.0		6.6		13.9		13.9		13.9		13.9		13.9																	
110.00	J	J 11100	CR	5.5		3.5		3.5		3.4		3.4		3.3		5.9		13.8		13.8		13.8		13.8		13.8																	
110.00	J	J 1110E	CR	5.4		3.4		3.4		3.4		3.3		3.1		5.6		12.4																									
110.00	RUS	RUS00401	CL																									13.2		99.9		99.9		99.9		99.9		99.9		99.9		99.9	
110.00	RUS	RUS00402	CR																										99.9		99.9												
116.00	KOR	KO11201D	CL		5.6		5.7		5.6		5.2		5.0		5.3																												
116.00	KOR	KOR11200	CL		-0.8		-0.8		-0.8		-0.8		-1.2		-1.2		4.3		3.9		3.9		3.9		3.9		4.9																
116.00	KOR	KOR11201	CL		5.6		5.7		5.6		5.2		5.0		5.3																												
121.80	USA	MRA33200	CR	5.3		3.5		3.5		3.5		3.5		3.5		3.5		3.5		3.5		3.5		3.5		3.5																	
122.00	CHN	CHN19000	CR	2.9		0.4		0.4		0.4		0.3		0.3		0.3		0.0		0.0		0.0		0.0		0.0																	
122.00	CHN	CHN20000	CL		1.4		1.4		1.4		1.3		1.3		1.4		0.9		0.7		0.7		0.7		0.7		2.4																
122.00	USA	GUM33100	CL		6.0		6.0		6.0		6.0		6.0		6.0		6.0		6.0		6.0		6.0		6.0		8.6																
122.20	LAO	LAO28400	CR		-1.8		-1.8		-1.8		-1.8		-1.8		-1.8		-1.8		-1.8		-1.8		-1.8		-1.8		-0.5																
128.00	SLM	SLM00000	CL	13.3		11.9		11.9		11.9		11.9		11.9		11.9		11.7		11.7		11.7		11.7		11.7																	
128.00	TMP	TMP00000	CR		9.4		9.3		9.3		9.3		9.3		9.3		9.3		9.2		9.2		9.2		9.2		10.4																
134.00	CHN	CHN15800	CR		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		1.3																
134.00	CHN	CHNC_100	CL	2.1		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4																	
134.00	NRU	NRU30900	CL	8.6		7.3		7.3		7.3		7.3		7.3		7.3		7.3		7.3		7.3		7.3		7.3																	
134.00	PNG	PNG13100	CR		6.4		6.4		6.4		6.4		6.4		6.4		6.4		6.4		6.4		6.4		6.4		7.5																
140.00	F	NCL10000	CR		4.2		4.2		4.2		4.2		4.2		4.2		4.2		4.2		4.2		4.2		4.2		5.3																
140.00	F	WAL10200	CR		7.8		7.8		7.8		7.8		7.8		7.8		7.8		7.8		7.8		7.8		7.8		7.9																
140.00	KRE	KRE28600	CL	15.5		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0																	
140.00	PLW	PLW00000	CR		11.2		11.2		11.2		11.2		11.2		11.2		11.2		11.2		11.2		11.2		11.2		11.4																

** See Note 1 of § 11.2 of Article 11.

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identification	Polarization type	Channel number / Minimum EPM																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
140.00	RUS	RSTRSD51	CL																									15.8		99.9		99.9		99.9		99.9		99.9		99.9		99.9	
140.00	RUS	RSTRSD52	CR																										99.9		99.9		99.9		99.9		99.9		99.9		99.9		99.9
140.00	USA	WAK33400	CR	16.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0																	
140.00	VUT	VUT12800	CL	7.1		4.3		4.3		4.3		4.3		4.3		4.3		4.3		4.3		4.3		4.3		4.3																	
146.00	MHL	MHL00000	CR		25.2		25.1		25.2		25.1		25.2		25.4		25.5		25.4		25.5		25.4		25.5		26.3																
152.00	AUS	AUS00400	CR			5.7				5.7				5.7				5.7				5.7				5.7																	
152.00	AUS	AUS0040A	CR			16.9				16.9				16.9				16.9				16.9				16.9																	
152.00	AUS	AUS0040B	CR			16.3				16.3				16.3				16.3				16.3				16.3																	
152.00	AUS	AUS0040C	CR			17.4				17.4				17.4				17.4				17.4				17.4																	
152.00	AUS	AUS00500	CL				5.1				5.1				9.1				9.1				9.1				9.1																
152.00	AUS	AUS00600	CL		4.3				4.3				4.3				8.7				8.7				8.7																		
152.00	AUS	AUSA_100	CR	9.2				7.5				7.5																															
158.00	FSM	FSM00000	CR	14.9		23.5		14.6		23.5		14.6		23.5		23.8		24.9		25.3		24.9		25.3		24.9																	
158.00	NZL	NZL__100	CL		12.1		8.5		12.1		8.5		12.1		8.6		12.1		12.1		12.1		12.1		12.1		15.1																
164.00	AUS	AUS00700	CR			4.8				4.8				4.8				9.4				9.4				9.4																	
164.00	AUS	AUS0070A	CR			7.7				7.7				7.7				15.8				15.8				15.8																	
164.00	AUS	AUS00800	CL		5.4				5.4				5.4				5.4				5.4				5.4																		
164.00	AUS	AUS00900	CR	7.8				3.6				3.6				3.6				7.2				7.2																			
164.00	AUS	AUS0090A	CR	13.0				7.1				7.1				7.1				13.0				13.0																			
164.00	AUS	AUS0090B	CR	16.2				7.7				7.7				7.7				15.7				15.7																			
164.00	AUS	AUSB_100	CL				4.6				4.6				4.6																												
170.00	USA	PLM33200	CL		6.5		6.5		6.5		6.5		6.5		6.5		6.5		6.5		6.5		6.5		6.5		9.2																
170.00	USA	USAA_100	CL	9.9		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.4																	
170.75	TON	TON21500	CR		9.6		9.6		9.6		9.6		9.6		9.6		9.6		9.7		9.7		9.7		9.7		11.6																
176.00	KIR	KIR__100	CL	13.4		10.5		10.5		10.5		10.5		10.5		10.5		10.5		10.5		10.5		10.5		10.5																	
176.00	TUV	TUV00000	CR		6.2		6.2		6.2		6.2		6.2		6.2		6.2		6.2		6.2		6.2		6.2		9.1																

MOD

ANNEX 1

Limits for determining whether a service of an administration is affected by a proposed modification to the Region 2 Plan or by a proposed new or modified assignment in the Regions 1 and 3 List or when it is necessary under this Appendix to seek the agreement of any other administration[13]

(See Article 4)

1 Limits for the interference into frequency assignments in conformity with the Regions 1 and 3 Plan or with the Regions 1 and 3 List or into new or modified assignments in the Regions 1 and 3 List

ADD

Under assumed free-space propagation conditions, the power flux-density of a proposed new or modified assignment in the List shall not exceed the value of –103.6 dB(W/(m^2 · 27 MHz)).

With respect to § 4.1.1 *a)* or *b)* of Article 4, an administration in Region 1 or 3 shall be considered by the Bureau as being affected if the minimum orbital spacing between the wanted and interfering space stations, under worst-case station-keeping conditions, is less than 9°.

However, an administration shall not be considered as affected if either of the following two conditions are met:

a) under assumed free-space propagation conditions, the power flux-density at any test point within the service area associated with any of its frequency assignments in the Plan or in the List or for which the procedure of Article 4 has been initiated, does not exceed the following values:[14]

–147 dB(W/(m^2 · 27 MHz)) for $0° \le \theta < 0.245°$

–134.8 + 20 log θ dB(W/(m^2 · 27 MHz)) for $0.245° \le \theta < 1.7°$

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[13] With respect to this Annex, except for Section 2, the limits relate to the power flux-density which would be obtained assuming free-space propagation conditions.

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] For the protection of analogue assignments brought in service before 17 October 1997, the following values shall be used until 1 January 2015:

–147 dB(W/(m^2 · 27 MHz)) for $0° \le \theta < 0.44°$

–138 + 25 log θ dB(W/(m^2 · 27 MHz)) for $0.44° \le \theta < 9°$.

$-135 + 1.66\,\theta^2$ dB(W/(m^2 · 27 MHz)) for $1.7° \leq \theta < 3.6°$

$-127.5 + 25 \log \theta$ dB(W/(m^2 · 27 MHz)) for $3.6° \leq \theta < 9°$

where θ corresponds to the minimum geocentric angular separation taking into account the pertinent station-keeping accuracy of the interfering broadcasting-satellite service and the interfered-with broadcasting-satellite service space stations;

b) the effect of the proposed new or modified assignments in the List is that the equivalent downlink protection margin[15] corresponding to a test point of its assignment in the Regions 1 and 3 Plan or List, or for which the procedure of Article 4 has been initiated, including cumulative effect of any previous modification to the List or any previous agreement, does not fall more than 0.45 dB below 0 dB or, if already negative, more than 0.45 dB below the value resulting from:

– the Regions 1 and 3 Plan and List as established by WRC-2000; *or*

– a proposed new or modified assignment to the List in accordance with this Appendix; *or*

– a new entry in the Regions 1 and 3 List as a result of successful application of Article 4 procedures.

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 for frequency assignments in conformity with the Region 2 Plan

With respect to § 4.2.3 *c)* of Article 4, an administration in Region 2 shall be considered as being affected if the overall equivalent protection margin[16] 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*

– a new entry in the Region 2 Plan under Article 4; *or*

– any agreement reached in accordance with this Appendix.

[15] For the definition of the equivalent protection margin, see § 3.4 of Annex 5.

[16] For the definition of the overall equivalent protection margin, see § 1.11 of Annex 5.

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 § 4.1.1 *c)* of Article 4, an administration in Region 2 shall be considered as being affected if the proposed new or modified assignment in the Regions 1 and 3 List would result in exceeding the power flux-densities given below, at any test point in the service area affected.

With respect to § 4.2.3 *a)*, 4.2.3 *b)* or 4.2.3 *f)* 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 test point in the service area affected.

-147 dB(W/(m$^2 \cdot$ 27 MHz))	for $0° \leq \theta < 0.44°$
$-138 + 25 \log \theta$ dB(W/(m$^2 \cdot$ 27 MHz))	for $0.44° \leq \theta < 19.1°$
-106 dB(W/(m$^2 \cdot$ 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 power flux-density to protect the terrestrial services of other administrations[17, 18, 19]

With respect to § 4.1.1 *d)* of Article 4, an administration in Region 1, 2 or 3 shall be considered as being affected if the consequence of the proposed modified assignment in the Regions 1 and 3 List 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 Plan or List for Regions 1 and 3 as established by WRC-2000. 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 below.

With respect to § 4.2.3 *d)* of Article 4, an administration in Region 1, 2 or 3 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

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[17] See § 3.18 of Annex 5.

[18] 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**.

[19] See Resolution **34**.

the Region 2 Plan at the time of entry into force of the Final Acts of the 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 limits expressed below.

With respect to § 4.1.1 *d)* or § 4.2.3 *d)* of Article 4, an administration in Region 1, 2 or 3 shall be considered as being affected if the proposed new assignment in the Regions 1 and 3 List, or if the proposed new frequency assignment in the Region 2 Plan, would result in exceeding a power flux-density, for any angle of arrival, at any point on its territory, of:

$-148 \quad dB(W/(m^2 \cdot 4\ kHz))$ for $\theta \leq 5°$

$-148 + 0.5\,(\theta - 5) \quad dB(W/(m^2 \cdot 4\ kHz))$ for $5° < \theta \leq 25°$

$-138 \quad dB(W/(m^2 \cdot 4\ kHz))$ for $25° < \theta \leq 90°$

where θ represents the angle of arrival.

5 (Not used.)

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 or in the band 12.2-12.5 GHz in Region 3, 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 § 4.1.1 *e)* of Article 4, an administration in Region 2 or Region 3 shall be considered as being affected if the proposed new or modified assignment in the Regions 1 and 3 List 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 Plan or List for Regions 1 and 3 as established by WRC-2000.

With respect to § 4.2.3 *e)*, 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 of the 1985 Conference.

With respect to § 4.1.1 *e)* of Article 4, where a proposed new or modified assignment in the Regions 1 and 3 List gives a power flux-density of less than –138 dB(W/(m^2 · 27 MHz))[20] anywhere in the territory of an administration of Region 2 or Region 3, that administration shall be considered as not being affected. With respect to § 4.2.3 *e)* of Article 4, where a proposed modification to the Region 2 Plan gives a power flux-density of less than –160 dB (W/(m^2 · 4 kHz))[20] 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 § 4.2.3 *e)* 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 value of $\Delta T/T$ resulting from the proposed modification is greater than the value of $\Delta T/T$ resulting from the assignment in the Region 2 Plan as of the date of entry into force of the Final Acts of the 1985 Conference; *and*

– the value of $\Delta T/T$ resulting from the proposed modification exceeds 4%,

using the method of Appendix **S8** (Case II).

MOD

ANNEX 2

Basic characteristics to be furnished in notices relating to space stations in the broadcasting-satellite service

The data elements contained in this Annex are included in Appendix **S4**.

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[20] In place of these values, the values given in the Annex to Resolution **540 (WRC-2000)** shall be applied by administrations and the Bureau until this section is revised by a subsequent conference.

MOD

ANNEX 4

Need for coordination of a transmitting space station in the fixed-satellite service or in the broadcasting-satellite service where this service is not subject to a Plan: 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 § 7.1 and 7.2 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 § 7.1 and 7.2 of Article 7, coordination of a space station in the fixed-satellite service (space-to-Earth) in Region 1 or 3 or broadcasting-satellite service not subject to a Plan in Region 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 service space station in Region 2 and the longitude of the affected broadcasting-satellite service space station in Regions 1 and 3, *or*

– the difference in degrees between the longitude of the interfering fixed-satellite service space station in Region 1 or 3 or the interfering broadcasting-satellite service space station in Region 3 and the longitude of the affected broadcasting-satellite service space station in Region 2.

ANNEX 5

MOD

Technical data used in establishing the provisions and associated Plans and the Regions 1 and 3 List, which should be used for their application[21]

MOD

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 § 1.6 to 1.11 are applicable to Region 2.

MOD

1.11 Overall equivalent protection margin[22]

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);

M_2, M_3: overall adjacent channel protection margins for the upper and lower adjacent channels, respectively (dB) (as defined in § 1.9);

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)[23].

MOD

[21] In revising this Annex at WRC-97 and at WRC-2000, 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 Region 2 Plan and the Regions 1 and 3 List may differ from the technical data presented herein.

[22] 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**.

[23] M_4 and M_5 are applicable only for Region 2.

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.

MOD

3.1.1 At WARC-77 and during revision of the Regions 1 and 3 Plan at WRC-97, planning of the broadcasting-satellite service was 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). The WRC-2000 Regions 1 and 3 Plan and the List are generally based on digital modulation of sound and television signals.

MOD

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[24, 25]

– 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[25, 26, 27]:

– 24 dB for co-channel signals;

– 16 dB for adjacent channel signals.

---

[24] These protection ratio values were 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.

[25] 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.

ADD

[26] These protection ratio values were 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 between 27 October 1997 and 12 May 2000.

ADD

[27] These protection ratio values were used for protection of digital and analogue assignments from analogue emissions.

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:

– 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[28].

WRC-2000 adopted, for the protection of digital assignments from digital emissions, the following protection ratio values to be applied for calculation of downlink equivalent protection margins of the WRC-2000 Regions 1 and 3 Plan:

– 21 dB for co-channel signals;

– 16 dB for adjacent channel signals.

During planning at WRC-2000, these values were used for all assignments of the Regions 1 and 3 Plan and List except those for which WRC-2000 adopted different values used in the planning process[29].

Revision of the Regions 1 and 3 Plan at WRC-97 and planning at WRC-2000 were 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*. The Regions 1 and 3 Plan as established by WRC-2000 is generally based on the use of digital modulation.

Protection masks and associated calculation methods for interference into broadcast satellite systems involving digital emissions are given in Recommendation ITU-R BO.1293-1.

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[28] The overall protection margin calculation method used is based on the first formula in § 1.12 of Annex 3 to Appendix **S30A**.

ADD

[29] For analogue assignments, the protection ratios adopted by WRC-97 were used (24 dB co-channel and 16 dB adjacent channel).

MOD

3.8 Necessary bandwidth

WARC-77 Regions 1 and 3 Plan and the WRC-97 revision of the Regions 1 and 3 Plan used the following:

– 625-line systems in Regions 1 and 3: 27 MHz;

– 525-line systems in Region 3: 27 MHz.

The planning at WRC-2000 was generally based on a necessary bandwidth of 27 MHz.

In Region 2, the Plan is based on a channel bandwidth of 24 MHz[30], 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.

If different bandwidths and/or channel spacing 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.

MOD

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

For Regions 1 and 3 at WARC-77, the guardbands were derived on the assumption of analogue emissions and 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.

[30] 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.

MOD

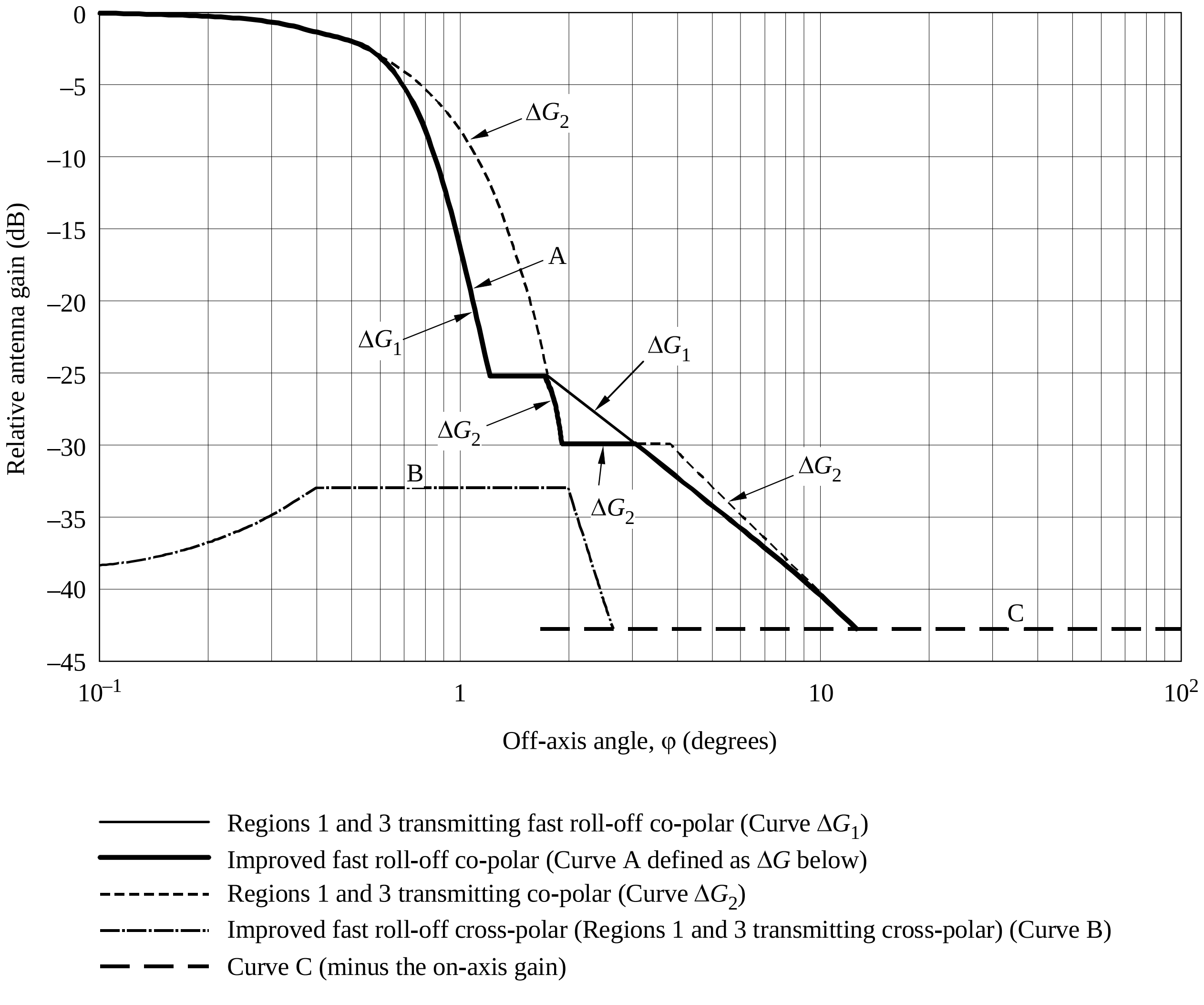
3.13.3 Transmitting antenna reference patterns

(Add to the end of § 3.13.3)

The improved fast roll-off satellite transmitting antenna pattern described in Recommendation ITU-R BO.1445 (see Fig. 13) has been used in the planning at WRC-2000.

FIGURE 13

Improved fast roll-off satellite transmitting antenna pattern for Regions 1 and 3



Note 1 – The diagram gives the example curves in the case of a satellite antenna beamwidth of φ_0 = 1.2° (circular).

APS30-13

Curve A: co-polar relative gain:

$$\Delta G = \min(\Delta G_1, \Delta G_2) \quad \text{dB}$$

where:

$\Delta G_1 = -12(\varphi / \varphi_0)^2$ for $0 \le (\varphi/\varphi_0) \le 0.5$

$\Delta G_1 = -12\left(\dfrac{\dfrac{\varphi}{\varphi_0} - x}{\dfrac{B_{min}}{\varphi_0}}\right)^2$ for $0.5 < (\varphi/\varphi_0) \le \left(\dfrac{1.45}{\varphi_0} B_{min} + x\right)$

$\Delta G_1 = -25.3$ for $\left(\dfrac{1.45}{\varphi_0} B_{min} + x\right) < (\varphi/\varphi_0) \le 1.45$

$\Delta G_1 = -(22 + 20 \log(\varphi / \varphi_0))$ for $(\varphi/\varphi_0) > 1.45$

$\Delta G_1 = -(G_{on-axis})$ after intersection with Curve C

$\Delta G_2 = -12(\varphi / \varphi_0)^2$ for $0 \le \varphi \le 1.58\ \varphi_0$

$\Delta G_2 = -30$ for $1.58\ \varphi_0 < \varphi \le 3.16\ \varphi_0$

$\Delta G_2 = -(17.5 + 25 \log(\varphi / \varphi_0))$ for $\varphi > 3.16\ \varphi_0$

$\Delta G_2 = -(G_{on-axis})$ after intersection with Curve C

Curve B: cross-polar relative gain (dB):

$-\left(40 + 40 \log\left|\dfrac{\varphi}{\varphi_0} - 1\right|\right)$ for $0 \le \varphi \le 0.33\ \varphi_0$

-33 for $0.33\ \varphi_0 < \varphi \le 1.67\ \varphi_0$

$-\left(40 + 40 \log\left|\dfrac{\varphi}{\varphi_0} - 1\right|\right)$ for $\varphi > 1.67\ \varphi_0$

$-(G_{on-axis})$ after intersection with 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 42.8 dBi)

where:

φ: off-axis angle (degrees)

φ_0: cross-sectional half-power beamwidth in the direction of interest (degrees)

B_{min}: 0.6° for Regions 1 and 3

$$x = 0.5\left(1 - \frac{B_{min}}{\varphi_0}\right)$$

ADD

3.13.4 Composite beam

A composite beam represents a single beam (i.e. “simulated shaped beam”) and is formed by combining two or more elliptical beams at a given orbital position. In general, composite beams were used at WRC-2000 for administrations which had more than one beam at a given orbital position in the WRC-97 Regions 1 and 3 Plan.

ADD

3.19 Orbital separation limit for interference calculation

WRC-2000 has adopted the use of an orbital separation limit for interference calculation in Regions 1 and 3. Beyond this limit no interference was taken into account.

Initially, the values used for the orbital separation limit were 15º for co-polar and 9º for cross-polar emissions. At a later stage, the unique value of the orbital separation limit of 9º was adopted by WRC-2000.

MOD

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 37.2° 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) The purpose of the following orbital position and e.i.r.p. limitations is to preserve access to the geostationary-satellite orbit by the Region 2 fixed-satellite service in the band 11.7-12.2 GHz. Within the orbital arc of the geostationary-satellite orbit between 37.2° W and 10° E, the orbital position associated with any new or modified assignment in the Regions 1 and 3 Plan or the List of additional uses shall lie within one of the portions of the orbital arc listed in Table 1. The e.i.r.p. of such assignments shall not exceed 56 dBW, except at the positions listed in Table 2.

TABLE 1

Allowable portions of the orbital arc between 37.2° W and 10° E for new or modified assignments in the Regions 1 and 3 Plan and List

Orbital position	37.2° W to 36° W	33.5° W to 32.5° W	30° W to 29° W	26° W to 24° W	20° W to 18° W	14° W to 12° W	8° W to 6° W	4° W[1]	2° W to 0°	4° E to 6° E	9° E[1]

TABLE 2

Nominal positions in the orbital arc between 37.2° W and 10° E at which the e.i.r.p. may exceed the limit of 56 dBW

Orbital position	37° W ±0.2°	33.5° W	30° W	25° W ±0.2°	19° W ±0.2°	13° W ±0.2°	7° W ±0.2°	4° W[1]	1° W ±0.2°	5° E ±0.2°	9° E[1]

[1] Modifications to the List which involve this orbital position shall not exceed the pfd limit –138 dB(W/(m^2 · 27 MHz)) at any point in Region 2.

B The Region 2 Plan is based on the grouping of the space stations in nominal orbital positions of ±0.2º 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

MOD

Provisions and associated Plans and Lists[1] 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[2] and 17.3-18.1 GHz in Regions 1 and 3, and 17.3-17.8 GHz in Region 2

MOD

ARTICLE 1

General definitions

1 For the purposes of this Appendix, the following terms shall have the meanings defined below:

1.1 *Regions 1 and 3 feeder-link Plan:* The Plan for 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.

1.2 *Region 2 feeder-link Plan:* The Plan for 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.

1.3 *Frequency assignment in conformity with the Plan:*

– any frequency assignment for a receiving space station or transmitting earth station which appears in the Regions 1 and 3 feeder-link Plan; *or*

– any frequency assignment for a receiving space station or transmitting earth station which appears in the Region 2 feeder-link 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 (Geneva, 1983) (RARC Sat-R2).

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[1] *Note by the Secretariat:* The Regions 1 and 3 feeder-link Lists of additional uses are annexed to the Master International Frequency Register (see Resolution **542 (WRC-2000)**).

[2] This use of the band 14.5-14.8 GHz is reserved for countries outside Europe.

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.

1.7 *1997 Conference:* World Radiocommunication Conference (Geneva, 1997), called in short WRC-97.

1.8 *2000 Conference:* World Radiocommunication Conference (Istanbul, 2000), called in short WRC-2000.

1.9 *Additional use in Regions 1 and 3*: For the application of the provisions of this Appendix, additional uses in Regions 1 and 3 are:

a) use of assignments with characteristics different from those appearing in the Regions 1 and 3 feeder-link Plan and which are capable of causing more interference than the corresponding entries in that Plan;

b) use of assignments in addition to those appearing in the Regions 1 and 3 feeder-link Plan.

1.10 *Regions 1 and 3 feeder-link Lists of additional uses (hereafter called in short the "feeder-link Lists")*: The lists of assignments for additional uses in Regions 1 and 3 as established by WRC-2000, as updated following the successful application of the procedure of § 4.1 of Article 4.

ARTICLE 2

Frequency bands

ADD

2.2 The use of the guardbands of the Plans in this Appendix, as defined in § 3.1 and 4.1 of Annex 3, to provide space operations functions in accordance with No. **S1.23** in support of the operation of geostationary-satellite networks broadcasting-satellite service, shall be coordinated with the assignments subject to these Plans using the provisions of Article 7. Coordination among assignments intended to provide these functions and services not subject to a Plan shall be effected using the provisions of No. **S9.7** and the associated provisions of Articles **S9** and **S11**. Coordination of modifications to the Region 2 feeder-link Plan or assignments to be included in the Regions 1 and 3 feeder-link Lists, with assignments intended to provide these functions shall be effected using § 4.1.1 *d)* of Article 4.

MOD

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 3 feeder-link Plan or in the Region 2 feeder-link 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)**.

3.4 The Regions 1 and 3 feeder-link Plan is based on national coverage from the geostationary-satellite orbit. The associated procedures contained in this Appendix are intended to promote long-term flexibility of the Plan and to avoid monopolization of the planned bands and orbit by a country or a group of countries.

MOD

ARTICLE 4

Procedures for modifications to the Region 2 feeder-link Plan or for additional uses in Regions 1 and 3

4.1 Provisions applicable to Regions 1 and 3

4.1.1 An administration proposing to include a new or modified assignment in the feeder-link Lists shall seek the agreement of those administrations whose services are considered to be affected, i.e. administrations[3]:

a) of Regions 1 and 3 having a feeder-link frequency assignment in the fixed-satellite service (Earth-to-space) to a space station in the broadcasting-satellite service which is included in the

[3] Agreement with administrations having a frequency assignment in the bands 14.5-14.8 GHz or 17.7-18.1 GHz to a terrestrial station, or having a frequency assignment in the band 17.7-18.1 GHz to an earth station in the fixed-satellite service (space-to-Earth), or having a frequency assignment in the band 17.3-17.8 GHz in the broadcasting-satellite service shall be sought under No. **S9.17**, No. **S9.17A** or No. **S9.19**, respectively.

Regions 1 and 3 feeder-link Plan with a necessary bandwith, any portion of which falls within the necessary bandwith of the proposed assignment; *or*

b) of Regions 1 and 3 having a feeder-link frequency assignment included in the feeder-link Lists or for which complete Appendix **S4** information has been received by the Bureau in accordance with the provisions of § 4.1.3, and any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

c) of Region 2 having a feeder-link frequency assignment in the fixed-satellite service (Earth-to-space) to a space station in the broadcasting-satellite service which is in conformity with the Region 2 feeder-link Plan, or in respect of which proposed modifications to that Plan have already been received by the Bureau in accordance with the provisions of § 4.2.6 with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

d) of Region 2 having a feeder-link frequency assignment in the band 17.8-18.1 GHz in the fixed-satellite service (Earth-to-space) to a space station in the broadcasting-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 under § 7.1 of Article 7, with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment.

4.1.2 The services of an administration are considered to be affected when the limits shown in Annex 1 are exceeded.

4.1.3 An administration intending to include a new or modified assignment in the feeder-link Lists shall send to the Bureau, not earlier than eight years but preferably not later than two years before the date on which the assignment is to be brought into use, the relevant information listed in Appendix **S4**. An assignment in the feeder-link Lists shall lapse if it is not brought into use by that date.[4]

4.1.4 If the information received by the Bureau under § 4.1.3 is found to be incomplete, the Bureau shall immediately seek from the administration concerned any clarification required and information not provided.

4.1.5 The Bureau shall determine, on the basis of Annex 1, the administrations whose frequency assignments are considered to be affected. The Bureau shall publish[5], in a Special Section of its International Frequency Information Circular (BR IFIC), the complete information received under § 4.1.3, together with the names of the affected administrations, the corresponding fixed-

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[4] The provisions of Resolution **533 (Rev.WRC-2000)** apply.

[5] If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication, after informing the administration concerned. The Bureau shall inform all administrations of such action and that the network specified in the publication in question no longer has to be taken into consideration by the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration, not later than 60 days prior to due date of the payment if payment has not been received by that date. This provision was identified in reply to Resolution 88 (Minneapolis, 1998) of the Plenipotentiary Conference and shall enter into force at a date to be determined by the forthcoming Plenipotentiary Conference.

satellite service networks and the corresponding feeder-links to broadcasting-satellite service assignments, as appropriate. The Bureau shall immediately send the results of its calculations to the administration proposing the assignment.

4.1.6 The Bureau shall send a telegram/fax to the administrations listed in the Special Section of its BR IFIC drawing their attention to the information it contains, and shall send them the results of its calculations.

4.1.7 An administration which considers that it should have been identified in the publication referred to under § 4.1.5 above shall, within four months of the date of publication of its relevant BR IFIC, and giving the technical reasons for so doing, request the Bureau to include its name in the publication. The Bureau shall study this information on the basis of Annex 1 and shall inform both administrations of its conclusions. Should the Bureau agree to the administration's request, it shall publish an addendum to the publication under § 4.1.5.

4.1.8 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.

4.1.9 Comments from administrations on the information published pursuant to § 4.1.5 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.

4.1.10 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 its BR IFIC referred to in § 4.1.5 shall be deemed to have agreed to the proposed assignment. This time-limit may be extended:

– for an administration that has requested additional information under § 4.1.8, by up to three months, *or*

– for an administration that has requested the assistance of the Bureau under § 4.1.21, by up to three months following the date at which the Bureau communicated the result of its action.

4.1.11 If, in seeking agreement, an administration modifies its initial proposal, it shall again apply the provisions of § 4.1 and the consequent procedure with respect to any other administration whose services might be affected as a result of modifications to the initial proposal.

4.1.12 If no comments have been received on the expiry of the periods specified in § 4.1.10, or if agreement has been reached with the administrations which have made comments and with which agreement is necessary, the administration proposing the new or modified assignment 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.

4.1.13 The agreement of the administrations affected may also be obtained in accordance with this Article, for a specified period.

4.1.14 Where the proposed assignment involves developing countries, administrations shall seek all practicable solutions conducive to the economical development of the broadcasting-satellite systems of these countries.

4.1.15 The Bureau shall publish in a Special Section of its BR IFIC the information received under § 4.1.12, together with the names of any administrations with which the provisions of this Article have been successfully applied. The frequency assignment concerned shall be included in the feeder-link Lists.

4.1.16 In case of disagreement on the part of an administration whose agreement has been sought, the requesting administration 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.

4.1.17 If no agreement is reached between the administrations concerned, the Bureau shall carry out any study that may be requested by either one of 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.

4.1.18 If, in spite of the application of § 4.1.16 and 4.1.17, there is still continuing disagreement and the notifying administration insists that the proposed assignment be included in the feeder-link Lists, the Bureau shall enter the assignment provisionally in the feeder-link Lists with an indication of those administrations whose assignments were the basis of the disagreement; however, the entry shall be changed from provisional to definitive recording in the feeder-link Lists only if the Bureau is informed that the new assignment in the feeder-link Lists has been in use, together with the assignment which was the basis for the disagreement, for at least four months without any complaint of harmful interference being made. When the assignment which was the basis of the disagreement is an assignment in the Regions 1 and 3 feeder-link Plan, the second period of 15 years referred to in § 4.1.24 is subject to the written agreement of the administration concerned. Any action undertaken by WRC-03 to modify § 4.1.18 shall apply to all assignments entered provisionally in application of this provision between 3 June 2000 and the date of entry into force of the provisions of Appendices **S30** and **S30A**, as modified, if appropriate, by WRC-03. Without prejudice to any decision of WRC-03, the applications of § 4.1.18 in respect to a given assignment in this Plan shall be limited to three in the above period. The relevant studies requested by Resolution **540 (WRC-2000)** shall be carried out.

4.1.18*bis* When an assignment is entered in the feeder-link Lists provisionally, the responsible administration is deemed to have undertaken to eliminate any harmful interference immediately after notification of that interference.

4.1.19 Should the assignments that were the basis of the disagreement not be brought into use within the period specified in No. **S11.44** (for non-planned services), or in § 4.1 (for assignments in the feeder-link Lists or having initiated the procedure under § 4.1), as appropriate, then the status of the assignment in the feeder-link Lists shall be reviewed accordingly.

4.1.20 Should harmful interference be caused by an assignment included in the feeder-link Lists under § 4.1.18 to any recorded assignment in the Master Register which was the basis of the disagreement, the administration using the frequency assignment included in the feeder-link Lists under § 4.1.18 shall, upon receipt of advice thereof, immediately eliminate this harmful interference.

4.1.21 An administration may, at any stage in the procedure described, or before applying it, request the assistance of the Bureau.

4.1.22 The relevant provisions of Article 5 shall be applied when frequency assignments are notified to the Bureau.

4.1.23 When a frequency assignment included in the feeder-link Lists is no longer required, the administration concerned shall immediately so inform the Bureau. The Bureau shall publish this information in a Special Section of its BR IFIC and delete the assignment from the feeder-link Lists.

4.1.24 No assignment in the feeder-link Lists shall have a period of operation exceeding 15 years, counted from the date of bringing into use, or 2 June 2000, whichever is later. Upon request by the responsible administration received by the Bureau at the latest three years before the expiry of this period, this period may be extended by up to 15 years, on condition that all the characteristics of the assignment remain unchanged.

4.1.25 Where an administration already having included in the feeder-link Lists two assignments (not including those systems notified on behalf of a group of named administrations and included in the feeder-link Lists by WRC-2000) in the same channel and covering the same service area, proposes to include in the feeder-link Lists a new assignment in the same channel over this same service area, it shall apply the following in respect of another administration which has no assignment in the feeder-link Lists in the same channel and which proposes to include in the feeder-link Lists a new assignment:

a) if the agreement of the former administration is required following the application of § 4.1 by the latter administration, in order to protect the new assignment proposed by the former administration from interference caused by the assignment proposed by the latter administration, both administrations shall make every possible effort to resolve the difficulties by means of mutually acceptable adjustments to their networks;

b) in case of continuing disagreement, and if the former administration has not communicated to the Bureau the information specified in Annex 2 to Resolution **49 (Rev.WRC-2000)**, this administration shall be deemed to have given its agreement to inclusion in the feeder-link Lists of the assignment of the latter administration.

4.1.26 This procedure may be applied by the administration of a new ITU Member State in order to include new assignments in the feeder-link Lists. Upon completion of the procedure, the next world radiocommunication conference may be requested to consider, among the assignments included in the feeder-link Lists after the successful completion of this procedure, the inclusion in the Regions 1 and 3 feeder-link Plan of up to 10 channels (for Region 1) and up to 12 channels (for Region 3), over the national territory of the new Member State.

4.1.27 When an administration has successfully applied this procedure and received all the agreements[6] required to include in the feeder-link Lists assignments over its national territory, at an orbital location and/or in channels different from those appearing in the Regions 1 and 3 feeder-link Plan for its country, it may request the next world radiocommunication conference to consider the inclusion in this Plan of up to 10 (for Region 1) and up to 12 (for Region 3) of these assignments, in replacement of its assignments appearing in this Plan.

4.1.28 The feeder-link Lists, as updated, shall be published periodically by the Bureau.

4.1.29 New or modified assignments in the feeder-link Lists shall be limited to digital modulation.

4.2 Provisions applicable to Region 2

4.2.1 When an administration intends to make a modification to the Region 2 feeder-link Plan, i.e.:

a) to modify the characteristics of any of its frequency assignments in the fixed-satellite service which are shown in the Region 2 feeder-link 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 Region 2 feeder-link 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 Bureau (see Article 5 and Resolution **42 (Rev.Orb-88)**).

4.2.2 An administration proposing a modification to the characteristics of a frequency assignment in conformity with the Region 2 feeder-link Plan, or the inclusion of a new frequency assignment in that Plan, shall seek the agreement of those administrations[7, 8]:

a) having an assignment for feeder-links in the fixed-satellite service (Earth-to-space) which is in conformity with the Regions 1 and 3 feeder-link Plan with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

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6 In such a case, § 4.1.18 does not apply.

7 Agreement with administrations having a frequency assignment in the bands 17.7-17.8 GHz to a terrestrial station or to an earth station in the fixed-satellite service (space-to-Earth) shall be sought under No. **S9.17** or No. **S9.17A**, respectively.

8 Agreement with administrations having a frequency assignment in the band 17.3-17.8 GHz to an earth station in the broadcasting-satellite service shall be sought under No. **S9.19**.

b) of Regions 1 and 3 having a feeder-link frequency assignment included in the feeder-link Lists or for which complete Appendix **S4** information has been received by the Bureau in accordance with the provisions of § 4.1.3, and any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

c) 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 Region 2 feeder-link Plan or in respect of which proposed modifications to this Plan have been received by the Bureau in accordance with the provisions of § 4.2.6;

d) which are considered affected.

4.2.3 (Not used.)

4.2.4 The services of an administration are considered to be affected when the limits shown in Annex 1 are exceeded.

4.2.5 The agreement referred to in § 4.2.2 is not required when an administration proposes to bring into use, with characteristics appearing in the Region 2 feeder-link 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 this Plan.

4.2.6 An administration intending to make a modification to the Region 2 feeder-link Plan shall send to the Bureau, not earlier than eight years but preferably not later than two years before the date on which the assignment is to be brought into use, the relevant information listed in Appendix **S4**. Modifications to that Plan involving additions under § 4.2.1 *b)* shall lapse if the assignment is not brought into use by that date.

4.2.7 If the information received by the Bureau under § 4.2.6 is found to be incomplete, the Bureau shall immediately seek from the administration concerned any clarification required and information not provided.

4.2.8 The Bureau shall determine, on the basis of Annex 1, the administrations whose frequency assignments are considered to be affected within the meaning of § 4.2.2. The Bureau shall publish[9], in a Special Section of its BR IFIC, the complete information received under § 4.2.6, together with the names of the affected administrations, the corresponding fixed-satellite service networks and the corresponding feeder links to broadcasting-satellite service assignments, as appropriate. The Bureau shall immediately send the results of its calculations to the administration proposing the modification to the Region 2 feeder-link Plan.

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[9] If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication, after informing the administration concerned. The Bureau shall inform all administrations of such action and that the network specified in the publication in question no longer has to be taken into consideration by the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration, not later than 60 days prior to due date of the payment if payment has not been received by that date. This provision was identified in reply to Resolution 88 (Minneapolis, 1998) of the Plenipotentiary Conference and shall enter into force at a date to be determined by the forthcoming Plenipotentiary Conference.

4.2.9 The Bureau shall send a telegram/fax to the administrations listed in the Special Section of its BR IFIC drawing their attention to the information it contains and shall send them the results of its calculations.

4.2.10 An administration which considers 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 in the list. 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 Region 2 feeder-link Plan.

4.2.11 Any modification to a frequency assignment which is in conformity with the Region 2 feeder-link 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 affected administrations.

4.2.12 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.

4.2.13 Comments from administrations on the information published pursuant to § 4.2.8 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.

4.2.14 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 BR IFIC referred to in § 4.2.8 shall be deemed 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 § 4.2.12 or for an administration which has requested the assistance of the Bureau under § 4.2.22. In the latter case, the Bureau shall inform the administrations concerned of this request.

4.2.15 If, in seeking agreement, an administration modifies its initial proposal, it shall again apply the provisions of § 4.2 and the consequent procedure with respect to any other administration whose services might be affected as a result of modifications to the initial proposal.

4.2.16 If no comments have been received on the expiry of the periods specified in § 4.2.14, 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 so inform the Bureau, indicating the final characteristics of the frequency assignment together with the names of the administrations with which agreement has been reached.

4.2.17 The agreement of the administrations affected may also be obtained in accordance with this Article, for a specified period.

4.2.18 When the proposed modification to the Region 2 feeder-link Plan involves developing countries, administrations shall seek all practicable solutions conducive to the economical development of the broadcasting-satellite systems of these countries.

4.2.19 The Bureau shall publish in a special section of its BR IFIC the information received under § 4.2.16 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 Region 2 feeder-link Plan and will be considered as a frequency assignment in conformity with that Plan.

4.2.20 When an administration proposing to modify the characteristics of a frequency assignment or to make a new frequency assignment receives notice of disagreement on the part of 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.

4.2.21 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.

4.2.22 An administration may at any stage in the procedure described, or before applying it, request the assistance of the Bureau.

4.2.23 The relevant provisions of Article 5 shall be applied when frequency assignments are notified to the Bureau.

4.2.24 Cancellation of frequency assignments

When a frequency assignment in conformity with the Region 2 feeder-link Plan 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 BR IFIC and delete the assignment from the Region 2 feeder-link Plan.

4.2.25 Master copy of the Region 2 feeder-link Plan

4.2.25.1 The Bureau shall maintain an up-to-date master copy of the Region 2 feeder-link Plan, including the overall equivalent protection margins of each assignment, taking account of the application of the procedure set out in this Article. This master copy shall contain the overall equivalent protection margins derived from that Plan as established by the 1983 Conference and those derived from all modifications to that Plan as a result of the successful completion of the modification procedure set out in this Article.

4.2.25.2 An up-to-date version of the Region 2 feeder-link Plan shall be published by the Secretary-General when justified by the circumstances.

MOD

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[10]

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 12 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.

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 11 and 12 of the Regions 1 and 3 feeder-link 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 3 June 2000 for recording in the International Master Frequency Register (Master Register).

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[10] Notification of assignments to transmitting feeder-link earth stations included in the Region 2 feeder-link Plan, or included in the feeder-link Lists, following successful application of Article 4, shall be effected applying the provisions of Article **S11**.

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 Appendix **S4**, 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 Appendix **S4** 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 BR IFIC 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), e)* and *f)* below); *and*

b) with respect to its conformity with the appropriate Regional feeder-link Plan or the Regions 1 and 3 feeder-link Lists, as appropriate; *or*

c) with respect to the coordination requirements specified in the Remarks column of Article 9 or Article 9A; *or* *d)* with respect to its conformity with the appropriate Regional feeder-link Plan or the Regions 1 and 3 feeder-link Lists, however, having characteristics differing from those in this Plan or in the Regions 1 and 3 feeder-link Lists 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 or in the Regions 1 and 3 feeder-link Lists,

– 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 § 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[11],

e) for Region 2, with respect to its conformity with the provisions of Resolution **42 (Rev.Orb-88)**;

f) 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)*, 5.2.1 *c)* and 5.2.1 *f)*, 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 feeder-link 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 When the Bureau reaches a favourable finding with respect to § 5.2.1 *a)*, 5.2.1 *c)*, 5.2.1 *d)* and 5.2.1 *f)*, 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 feeder-link 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 that 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)* and 5.2.1 *c)* but an unfavourable finding with respect to § 5.2.1 *b)* and 5.2.1 *d)*, 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

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[11] The Bureau shall also apply this provision to § 5.2.1 *d)* of Appendix **S30** for Regions 1 and 3.

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 *e)*, where applicable, 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)* and 5.2.1 *c)* but an unfavourable finding with respect to § 5.2.1 *b)* and 5.2.1 *d)*, 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)*, 5.2.1 *c)* and 5.2.1 *d)* but an unfavourable finding with respect to § 5.2.1 *f)*, 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 *f)* 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 11 and 12 of the Regions 1 and 3 feeder-link Plan.

5.2.2.5 When an assignment is recorded as a result of a favourable finding with respect to § 5.2.1 *f)*, 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), or*

– § 5.2.1 *c), or*

– § 5.2.1 *b)* and 5.2.1 *d)* and, where appropriate, § 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.

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.

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.

MOD

ARTICLE 6

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 feeder-link Plan or the Region 2 feeder-link 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 band 17.7-17.8 GHz should evaluate the level of interference assessed on the basis of coordination contours calculated in accordance with Appendix **S7**[12], which might be caused by a feeder-link earth station located on the territory of another administration and included in the service area of an assignment to a

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[12] 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 11 and 12 of the feeder-link Plan.

broadcasting-satellite service feeder-link space station which is in conformity with the appropriate regional feeder-link Plan. 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 horizon elevation angle around its existing and planned feeder-link earth stations.

6.2 In the case of Region 2, when the entry in the feeder-link Plan contains information on specific earth stations, this shall be used in the interference calculations referred to in § 6.1 above. Where such information is not contained in the Region 2 feeder-link 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 this 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 four 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 four 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 four 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.

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.

MOD

ARTICLE 7

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, 2 and 3 in the band 17.7-18.1 GHz, to stations in the fixed-satellite service (Earth-to-space) in Region 2 in the band 17.8-18.1 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 in the 17.3-18.1 GHz band in Regions 1 and 3 or in the band 17.3-17.8 GHz in Region 2 are involved

Section I – Coordination of transmitting space or earth stations in the fixed-satellite service or transmitting space stations in the broadcasting-satellite service with assignments to broadcasting-satellite service feeder links

7.1 The provisions of No. **S9.7**[13] and the associated provisions under Articles **S9** and **S11** are applicable to transmitting space stations in the fixed-satellite service in the band 17.7-18.1 GHz, to transmitting earth stations in the fixed-satellite service in Region 2 in the band 17.8-18.1 GHz and to transmitting space stations in the broadcasting-satellite service in Region 2 in the band 17.3-17.8 GHz.

7.2 In applying the procedures referred to in § 7.1, the provisions of Appendix **S5** are replaced by the following:

7.2.1 The frequency assignments to be taken into account are:

a) the assignments in conformity with the appropriate Regional feeder-link Plan in Appendix **S30A**;

b) the assignments included in the Regions 1 and 3 feeder-link Lists;

c) the assignments for which the procedure of Article 4 has been initiated as from the date of receipt of the complete Appendix **S4** information under § 4.1 or 4.2.

7.2.2 The criteria to be applied are those given in Annex 4.

Section II – Coordination with assignments in conformity with the appropriate Regional feeder-link Plan in Appendix S30A

7.3 Administrations planning to implement assignments for receiving earth stations in all Regions in the band 17.7-18.1 GHz in the fixed-satellite service (space-to-Earth) or in the band 17.3-17.8 GHz in the broadcasting-satellite service should evaluate the level of interference,

[13] The provisions of Resolution **33 (Rev.WRC-97)** are applicable to space stations in the broadcasting-satellite service for which the advance publication information or the request for coordination has been received by the Bureau prior to 1 January 1999.

assessed on the basis of coordination contours calculated in accordance with Appendix **S7**, which might be caused by a feeder-link earth station located on the territory of another administration and included in the service area of an assignment to a broadcasting-satellite service feeder-link space station which is in conformity with the appropriate Regional feeder-link Plan. 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 station to indicate the geographical coordinates, the antenna characteristics and the elevation angle of the horizon around its existing and planned feeder-link earth stations.

7.4 In the case of Region 2, when the entry in the feeder-link Plan contains information on specific earth stations this shall be used in the interference calculations mentioned in § 7.2 above. Where such information is not contained in this Plan an administration which receives a request under § 7.2 shall, within a period of four 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 this Plan.

7.5 In the case of Regions 1 and 3, an administration which receives a request under § 7.2 shall, within a period of four months, communicate the details of the feeder-link earth stations to the administration planning the receiving earth station, and to the Bureau for information.

7.6 If, at the end of the period of four months, the administration responsible for the fixed-satellite or broadcasting-satellite receiving earth station(s) does not receive a reply, it may request the assistance of the Bureau.

7.7 If the administration responsible for the feeder-link earth stations does not communicate to the Bureau, within a period of four 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 or broadcasting-satellite earth station(s) under consideration.

7.8 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 where 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.

Section III – Coordination with assignments in the Regions 1 and 3 feeder-link Lists, or for which the procedure of Article 4 has been initiated

7.9 The provisions of No. **S9.17A** and the associated provisions under Articles **S9** and **S11** and Appendix **S5** are applicable to fixed-satellite service and broadcasting-satellite service receiving earth stations, in respect of frequency assignments to transmitting broadcasting-satellite service feeder-link earth stations, in the fixed-satellite service in the bands 17.3-18.1 GHz in Regions 1 and 3 and 17.3-17.8 GHz in Region 2 which correspond to assignments to receiving broadcasting-satellite service feeder-link space stations already included in the Regions 1 and 3 feeder-link Lists, or for which the procedure of Article 4 has been initiated, as from the date of receipt of the complete Appendix **S4** information.

SUP

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

ADD

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 administration 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 *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. 5 *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.

Col. 6 *Space station receiving antenna pattern code*.

The codes used for the antenna pattern of the receiving space station (feeder link) antenna are defined as follows:

R13RSS	Figure B (curves A, B and C) and § 3.7.3 in Annex 3
R123FR	Figure C and § 3.7.3 in Annex 3
MODRSS	Figure B (curves A', B' and C) and § 3.7.3 in Annex 3 (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 7. A particular shaped beam is identified by the combination of Column 1, Column 7 and Column 14. In such cases the maximum cross-polar gain is given in Column 8, Cross-polar gain field.

In cases where the "Space station receiving antenna pattern code" field contains a code which starts with "CB_" characters, it is a composite beam. Any composite beam consists of two or more elliptical beams. Each composite beam is described in the special composite beam file having the same name plus a GXT extension (e.g. the description of the CB_COMP_BM1 composite beam is stored in the CB_COMP_BM1.GXT file).

Col. 7 *Space station receiving antenna shaped (non-elliptical, non-composite) beam identification.*

Col. 8 *Maximum space station receiving antenna co-polar and cross-polar (in the case of shaped beam) isotropic gain* (dBi).

Col. 9 *Earth station transmitting antenna pattern code and maximum gain* (dBi).

The codes used for transmitting earth station (feeder-link) antenna patterns are defined as follows:

R13TES	Figure A (curves A and B) and § 3.5.3 in Annex 3
MODTES	Figure A (curves A' and B') and § 3.5.3 in Annex 3 (Recommendation ITU-R BO.1295)

Col. 10 *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. 11 *e.i.r.p.* in the direction of maximum radiation (dBW).

Col. 12 *Permitted increase in earth station e.i.r.p.* (dB) for the purpose of power control (see § 3.11 of Annex 3)[14].

[14] The power control values will be calculated after WRC-2000.

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 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 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. 16 *Assignment status*.

The assignment status codes used for beams are defined as follows:

P	Assignment in the Regions 1 and 3 feeder-link Plan which has not been brought into use and/or the date of bringing into use has not been confirmed to the Bureau. For this category of assignments, WRC-2000 protection ratios are applied (27 dB co-channel and 22 dB adjacent channel).
PE	Assignment in the Regions 1 and 3 feeder-link Plan, which is in conformity with Appendix **S30**, has been notified, brought into use and the date of bringing into use has been confirmed to the Bureau before 12 May 2000. For this category of assignments, WRC-97 protection ratios are applied (30 dB co-channel and 22 dB adjacent channel).

Col. 17 *Remarks*.

9A.2 TEXT FOR NOTES IN THE REMARKS COLUMN OF THE REGIONS 1 AND 3 FEEDER-LINK PLAN

1 (Not used.)

2 (Not used.)

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 Appendix **S7**, in respect of a specific earth station in the fixed-satellite service (space-to-Earth) in the band 17.7-18.1 GHz (see also Note to § 9A.2):

a) either recorded in the Master Register prior to 3 June 2000 with a favourable finding; or

b) for which a notice is received by the Bureau prior to 3 June 2000 for recording in the Master Register, but has not yet been processed, and which subsequently receives a favourable finding based on the Plan as it existed on 3 June 2000.

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 or 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 (see also Note to § 9A.2):

a) either recorded in the Master Register prior to 3 June 2000 with a favourable finding; or

b) for which a notice is received by the Bureau prior to 3 June 2000 for recording in the Master Register, but has not yet been processed, and which subsequently receives a favourable finding based on the WRC-2000 Regions 1 and 3 feeder-link Plan as it existed on 3 June 2000.

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 with respect to assignments which are in conformity with the Region 2 feeder-link Plan on 12 May 2000 (see also Note to § 9A.2).

6 This assignment shall not claim protection from the assignments of the administrations which are in conformity with the Region 2 feeder-link Plan on 12 May 2000 (see also Note to § 9A.2).

7 This assignment shall not claim protection from the assignments of the administrations which are recorded in the Master Register with a favourable finding prior to 12 May 2000 (see also Note to § 9A.2).

The methodology and criteria for this analysis shall be those contained in § 1 of Annex 4, modified to take into consideration the system noise temperature of the received space station to be 600 K and to apply a $\Delta T/T$ criterion of 6%.

8 Provisional beam. These assignments have been included in the Regions 1 and 3 feeder-link Plan by WRC-97. These assignments are for exclusive use by Palestine, subject to the Israeli-Palestinian Interim Agreement of 28 September 1995, Resolution 741 of the Council notwithstanding and Resolution 99 (Minneapolis, 1998) of the Plenipotentiary Conference.

9 (Not used.)

10 Provisional beam. These assignments have been included in the Regions 1 and 3 feeder-link Plan by WRC-2000. These assignments are for exclusive use by East Timor.

NOTE – In cases where assignments from the WRC-97 Plans without Remarks were included in the WRC-2000 Regions 1 and 3 feeder-link Plan without change, or with conversion of modulation from analogue to digital, or a change from normal roll-off to fast roll-off antenna characteristics, the coordination status afforded by the WRC-97 Plans shall be preserved.

In cases where assignments from the WRC-97 Plans with Remarks were included in the WRC-2000 Regions 1 and 3 feeder-link Plan without change, or with conversion of modulation from analogue to digital, or a change from normal roll-off to fast roll-off antenna pattern, the compatibility will be reassessed using the revised criteria and methodology of WRC-2000 and the Remarks of the WRC-97 Plans assignment will either be maintained or reduced on the basis of the results of this analysis.

In other cases, the methodology described in Notes 3 to 7 shall be applied.

TABLE 2A

Table showing correspondence between channel numbers and assigned frequencies[1] 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

[1] Assigned frequency = 14 506.12 + 19.18*n*, where *n* is the channel number.

TABLE 2B

Table showing correspondence between channel numbers and assigned frequencies[1] for the feeder links in the frequency band 17.3-18.1 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] Assigned frequency = 17 308.3 + 19.18n, where n is the channel number.

FIGURE 1

Allocation of orbital positions in the Regions 1 and 3 feeder-link Plan in the frequency band 14.5-14.8 GHz (position in degrees/administration symbols)

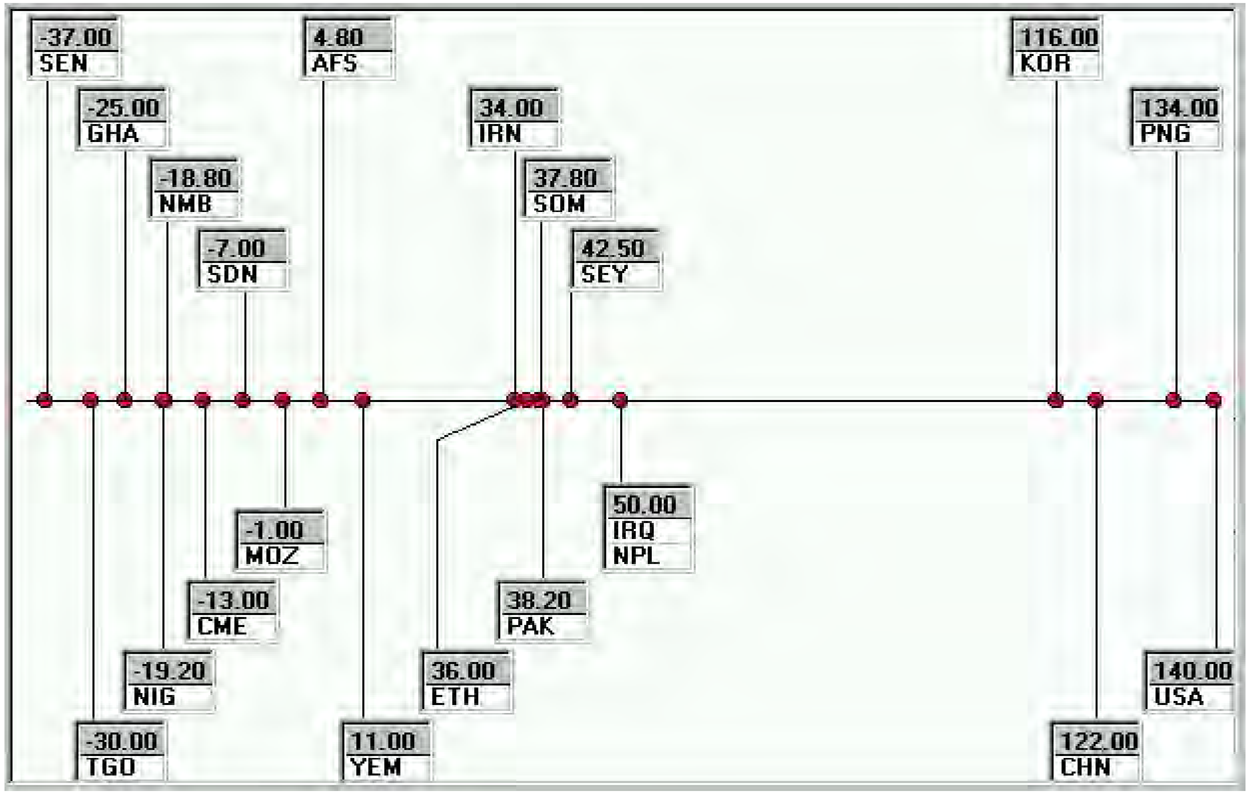

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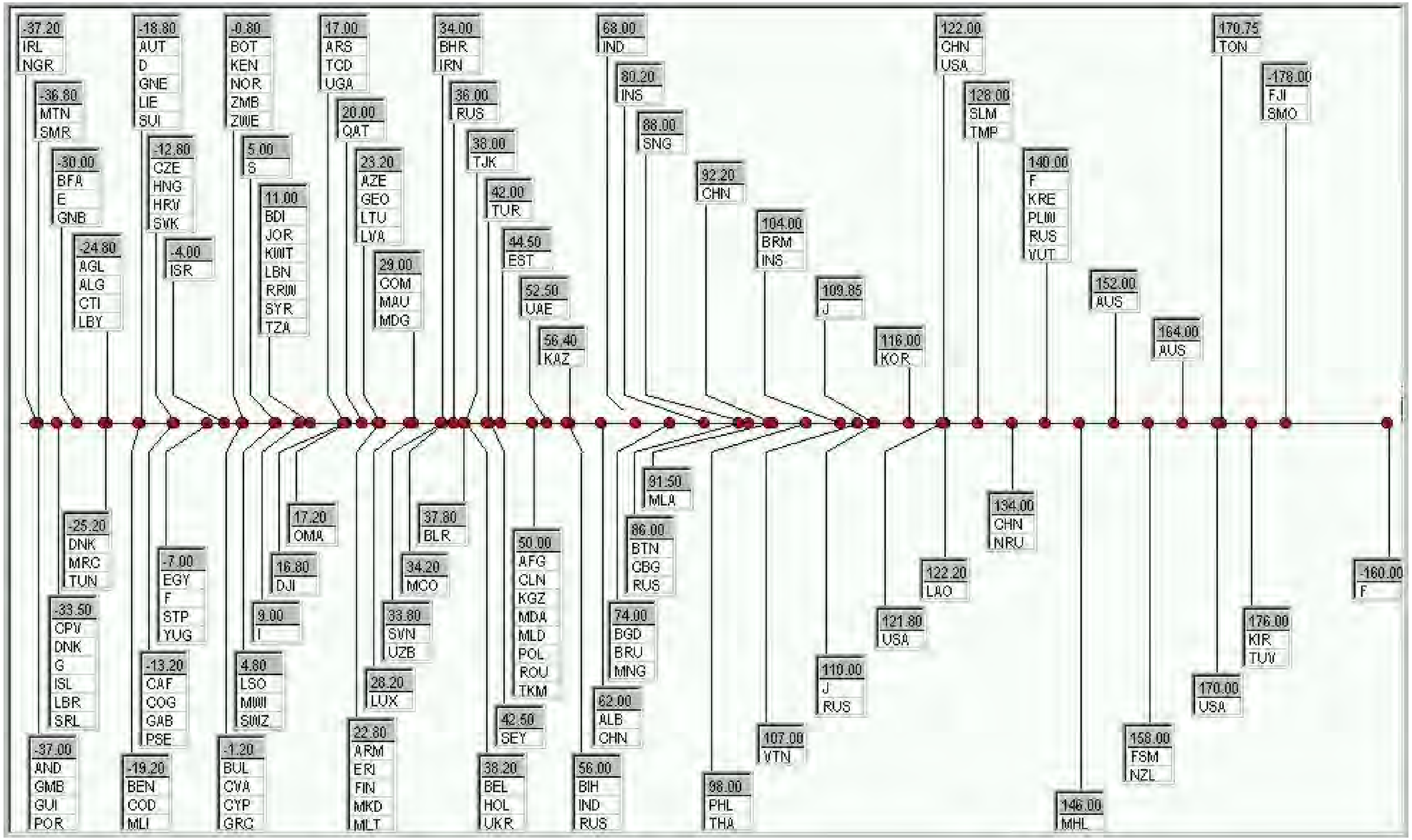
FIGURE 2

Allocation of orbital positions in the Regions 1 and 3 feeder-link Plan in the frequency band 17.3-18.1 GHz
(position in degrees/administration symbols)



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Basic characteristics of the Regions 1 and 3 feeder-link Plan in the frequency band 14.5-14.8 GHz (sorted by administration)

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16	17
Admin. symbol	Beam identifi-cation	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Power control	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle							
AFS	AFS02101	4.80	24.50	-28.00	3.13	1.68	27.00	MODRSS		37.24		MODTES	57.00	CL		82.0		27M0G7W		4L	P	
AFS	AFS02102	4.80	24.50	-28.00	3.13	1.68	27.00	MODRSS		37.24		MODTES	57.00	CR		82.0		27M0G7W		4L	P	
CHN	CHN19001	122.00	114.17	23.32	0.91	0.60	2.88	MODRSS		47.08		MODTES	57.00	CL		84.0		27M0G7W		4C	P	
CHN	CHN19002	122.00	114.17	23.32	0.91	0.60	2.88	MODRSS		47.08		MODTES	57.00	CR		84.0		27M0G7W		4C	P	
CME	CME30001	-13.00	12.70	6.20	2.54	1.68	87.00	MODRSS		38.15		MODTES	57.00	CL		84.0		27M0G7W		4I	P	
CME	CME30002	-13.00	12.70	6.20	2.54	1.68	87.00	MODRSS		38.15		MODTES	57.00	CR		84.0		27M0G7W		4I	P	
ETH	ETH09201	36.00	40.49	9.20	2.83	2.26	174.44	MODRSS		36.40		MODTES	57.00	CL		82.0		27M0G7W		4P	P	
ETH	ETH09202	36.00	40.49	9.20	2.83	2.26	174.44	MODRSS		36.40		MODTES	57.00	CR		82.0		27M0G7W		4P	P	
GHA	GHA10801	-25.00	-1.20	7.90	1.48	1.06	102.00	MODRSS		42.49		MODTES	57.00	CR		83.0		27M0G7W		4F	P	
GHA	GHA10802	-25.00	-1.20	7.90	1.48	1.06	102.00	MODRSS		42.49		MODTES	57.00	CL		83.0		27M0G7W		4F	P	
IRN	IRN10901	34.00	54.20	32.40	3.82	1.82	149.00	MODRSS		36.03		MODTES	57.00	CR		82.0		27M0G7W		4S	P	
IRN	IRN10902	34.00	54.20	32.40	3.82	1.82	149.00	MODRSS		36.03		MODTES	57.00	CL		82.0		27M0G7W		4S	P	
IRQ	IRQ25601	50.00	43.86	32.86	1.82	1.34	162.65	MODRSS		40.58		MODTES	57.00	CL		82.0		27M0G7W		4M	P	
IRQ	IRQ25602	50.00	43.86	32.86	1.82	1.34	162.65	MODRSS		40.58		MODTES	57.00	CR		82.0		27M0G7W		4M	P	
KOR	KO11201D	116.00	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	57.30	CL		82.0		27M0G7W	KOREASAT-1	3	PE	
KOR	KOR11201	116.00	127.50	36.00	1.24	1.02	168.00	R13RSS		43.40		R13TES	57.30	CL		82.0		27M0F8W	KOREASAT-1	3	PE	
MOZ	MOZ30701	-1.00	34.00	-18.00	3.57	1.38	55.00	MODRSS		37.52		MODTES	57.00	CL		82.0		27M0G7W		4K	P	
MOZ	MOZ30702	-1.00	34.00	-18.00	3.57	1.38	55.00	MODRSS		37.52		MODTES	57.00	CR		82.0		27M0G7W		4K	P	
NIG	NIG11901	-19.20	7.80	9.40	2.16	2.02	45.00	MODRSS		38.05		MODTES	57.00	CR		82.0		27M0G7W		4G	P	
NIG	NIG11902	-19.20	7.80	9.40	2.16	2.02	45.00	MODRSS		38.05		MODTES	57.00	CL		82.0		27M0G7W		4G	P	
NMB	NMB02501	-18.80	17.50	-21.60	2.66	1.90	48.00	MODRSS		37.41		MODTES	57.00	CL		82.0		27M0G7W		4H	P	
NMB	NMB02502	-18.80	17.50	-21.60	2.66	1.90	48.00	MODRSS		37.41		MODTES	57.00	CR		82.0		27M0G7W		4H	P	
NPL	NPL12201	50.00	83.70	28.30	1.72	0.60	163.00	MODRSS		44.31		MODTES	57.00	CR		82.0		27M0G7W		4N	P	
NPL	NPL12202	50.00	83.70	28.30	1.72	0.60	163.00	MODRSS		44.31		MODTES	57.00	CL		82.0		27M0G7W		4N	P	
PAK	PAK12701	38.20	69.60	29.50	2.30	2.16	14.00	MODRSS		37.49		MODTES	57.00	CR		82.0		27M0G7W		4R	P	
PAK	PAK12702	38.20	69.60	29.50	2.30	2.16	14.00	MODRSS		37.49		MODTES	57.00	CL		82.0		27M0G7W		4R	P	
PNG	PNG13101	134.00	148.07	-6.65	3.13	2.30	168.32	MODRSS		38.87		MODTES	57.00	CR		89.0		27M0G7W		4B	P	
PNG	PNG13102	134.00	148.07	-6.65	3.13	2.30	168.32	MODRSS		38.87		MODTES	57.00	CL		89.0		27M0G7W		4B	P	
SDN	SDN__101	-7.00	30.13	13.52				CB_RSS_SDNA		37.20		MODTES	57.00	CL		86.0		27M0G7W		4J	P	
SDN	SDN__102	-7.00	30.13	13.52				CB_RSS_SDNA		37.20		MODTES	57.00	CR		86.0		27M0G7W		4J	P	
SEN	SEN22201	-37.00	-14.40	13.80	1.46	1.04	139.00	MODRSS		42.63		MODTES	57.00	CL		82.0		27M0G7W		4D	P	
SEN	SEN22202	-37.00	-14.40	13.80	1.46	1.04	139.00	MODRSS		42.63		MODTES	57.00	CR		82.0		27M0G7W		4D	P	
SEY	SEY00001	42.50	51.86	-7.23	2.43	1.04	27.51	MODRSS		40.44		MODTES	57.00	CL		84.0		27M0G7W		4T	P	
SEY	SEY00002	42.50	51.86	-7.23	2.43	1.04	27.51	MODRSS		40.44		MODTES	57.00	CR		84.0		27M0G7W		4T	P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Power control	Designation of emission	Identity of the space station	Group code	Status	Remarks
			Long.	Lat.	Major axis	Minor axis	Orientation			Co-polar	Cross-polar	Code	Gain	Type	Angle							
SOM	SOM31201	37.80	45.17	6.61	3.37	1.68	62.04	MODRSS		36.92		MODTES	57.00	CL		83.0		27M0G7W		4Q	P	
SOM	SOM31202	37.80	45.17	6.61	3.37	1.68	62.04	MODRSS		36.92		MODTES	57.00	CR		83.0		27M0G7W		4Q	P	
TGO	TGO22601	-30.00	0.68	8.57	1.13	0.60	108.43	MODRSS		46.14		MODTES	57.00	CL		82.0		27M0G7W		4E	P	
TGO	TGO22602	-30.00	0.68	8.57	1.13	0.60	108.43	MODRSS		46.14		MODTES	57.00	CR		82.0		27M0G7W		4E	P	
USA	USAC_101	140.00	177.50	16.35				CB_RSS_USAC		44.06		MODTES	57.00	CL		87.0		27M0G7W		4A	P	
USA	USAC_102	140.00	177.50	16.35				CB_RSS_USAC		44.06		MODTES	57.00	CR		87.0		27M0G7W		4A	P	
YEM	YEM__101	11.00	48.29	14.53				CB_RSS_YEMA		47.78		MODTES	57.00	CR		82.0		27M0G7W		4O	P	
YEM	YEM__102	11.00	48.29	14.53				CB_RSS_YEMA		47.78		MODTES	57.00	CL		82.0		27M0G7W		4O	P	

Basic characteristics of the Regions 1 and 3 feeder-link Plan in the frequency band 17.3-18.1 GHz (sorted by administration)

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16	17
Admin. symbol	Beam identifi-cation	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Power control	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle							
AFG	AFG24501	50.00	67.00	34.30	1.89	1.19	18.00	MODRSS		40.93		MODTES	57.00	CL		84.0		27M0G7W		7E	P	
AFG	AFG24502	50.00	67.00	34.30	1.89	1.19	18.00	MODRSS		40.93		MODTES	57.00	CR		84.0		27M0G7W		7E	P	
AGL	AGL29500	-24.80	16.43	-12.37	2.66	1.75	77.43	MODRSS		37.77		MODTES	57.00	CR		84.0		27M0G7W			P	
ALB	ALB29600	62.00	19.50	41.37	0.60	0.60	69.35	MODRSS		48.88		MODTES	57.00	CL		82.6		27M0G7W			P	
ALG	ALG25152	-24.80	1.50	27.60	3.65	2.94	135.00	MODRSS		34.14		MODTES	57.00	CL		84.0		27M0G7W			P	
AND	AND34100	-37.00	1.60	42.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		83.0		27M0G7W			P	
ARM	ARM06400	22.80	44.99	39.95	0.73	0.60	148.17	MODRSS		48.02		MODTES	57.00	CR		84.0		27M0G7W			P	
ARS	ARS00375	17.00	44.60	23.40	4.21	2.48	145.00	MODRSS		34.26		MODTES	57.00	CL		84.0		27M0G7W		54	P	
ARS	ARS34000	17.00	44.60	23.40	4.21	2.48	145.00	MODRSS		34.28		MODTES	57.00	CL		84.0		27M0G7W		54	P	
AUS	AUS00400	152.00	135.00	-24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	57.00	CL		87.0		27M0G7W		30	P	
AUS	AUS00401	152.00	96.83	-12.19	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		30	P	
AUS	AUS00402	152.00	105.69	-10.45	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		30	P	
AUS	AUS00403	152.00	110.52	-66.28	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		30	P	
AUS	AUS00404	152.00	158.94	-54.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		30	P	
AUS	AUS00405	152.00	159.06	-31.52	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		30	P	
AUS	AUS00406	152.00	167.93	-29.02	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		30	P	
AUS	AUS0040A	152.00	135.36	-23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	57.00	CL		87.0		27M0G7W		30	P	
AUS	AUS00500	152.00	135.00	-24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	57.00	CR		87.0		27M0G7W		41	P	
AUS	AUS00501	152.00	96.83	-12.19	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		41	P	
AUS	AUS00502	152.00	105.69	-10.45	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		41	P	
AUS	AUS00503	152.00	110.52	-66.28	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		41	P	
AUS	AUS00504	152.00	158.94	-54.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		41	P	
AUS	AUS00505	152.00	159.06	-31.52	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		41	P	
AUS	AUS00506	152.00	167.93	-29.02	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		41	P	
AUS	AUS00600	152.00	135.50	-24.20	7.19	5.20	140.00	MODRSS		28.71		MODTES	57.00	CR		87.0		27M0G7W		42	P	
AUS	AUS00601	152.00	96.83	-12.19	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		42	P	
AUS	AUS00602	152.00	105.69	-10.45	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		42	P	
AUS	AUS00603	152.00	110.52	-66.28	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		42	P	
AUS	AUS00604	152.00	158.94	-54.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		42	P	
AUS	AUS00605	152.00	159.06	-31.52	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		42	P	
AUS	AUS00606	152.00	167.93	-29.02	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		42	P	
AUS	AUS00700	164.00	136.00	-23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	57.00	CR		87.0		27M0G7W		31	P	
AUS	AUS00701	164.00	96.83	-12.19	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		31	P	
AUS	AUS00702	164.00	105.69	-10.45	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		31	P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16	17
Admin. symbol	Beam identifi-cation	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Power control	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle							
AUS	AUS00703	164.00	110.52	-66.28	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		31	P	
AUS	AUS00704	164.00	158.94	-54.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		31	P	
AUS	AUS00705	164.00	159.06	-31.52	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		31	P	
AUS	AUS00706	164.00	167.93	-29.02	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		31	P	
AUS	AUS0070A	164.00	136.62	-24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	57.00	CR		87.0		27M0G7W		31	P	
AUS	AUS00800	164.00	136.00	-23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	57.00	CL		87.0		27M0G7W		44	P	
AUS	AUS00801	164.00	96.83	-12.19	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		44	P	
AUS	AUS00802	164.00	105.69	-10.45	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		44	P	
AUS	AUS00803	164.00	110.52	-66.28	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		44	P	
AUS	AUS00804	164.00	158.94	-54.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		44	P	
AUS	AUS00805	164.00	159.06	-31.52	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		44	P	
AUS	AUS00806	164.00	167.93	-29.02	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		44	P	
AUS	AUS00900	164.00	136.00	-23.90	7.26	4.48	132.00	MODRSS		29.32		MODTES	57.00	CR		87.0		27M0G7W		32	P	
AUS	AUS00901	164.00	96.83	-12.19	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		32	P	
AUS	AUS00902	164.00	105.69	-10.45	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		32	P	
AUS	AUS00903	164.00	110.52	-66.28	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		32	P	
AUS	AUS00904	164.00	158.94	-54.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		32	P	
AUS	AUS00905	164.00	159.06	-31.52	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		32	P	
AUS	AUS00906	164.00	167.93	-29.02	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		87.0		27M0G7W		32	P	
AUS	AUS0090A	164.00	136.62	-24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	57.00	CR		87.0		27M0G7W		32	P	
AUS	AUSA0000	152.00	135.36	-23.95	6.89	4.83	141.15	R123FR		29.23		MODTES	57.00	CL		87.0		27M0G7W		40	P	
AUS	AUSA0001	152.00	96.83	-12.19	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		40	P	
AUS	AUSA0002	152.00	105.69	-10.45	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		40	P	
AUS	AUSA0003	152.00	110.52	-66.28	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		40	P	
AUS	AUSA0004	152.00	158.94	-54.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		40	P	
AUS	AUSA0005	152.00	159.06	-31.52	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		40	P	
AUS	AUSA0006	152.00	167.93	-29.02	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		40	P	
AUS	AUSB0000	164.00	136.62	-24.16	6.82	4.20	134.19	R123FR		29.87		MODTES	57.00	CL		87.0		27M0G7W		43	P	
AUS	AUSB0001	164.00	96.83	-12.19	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		43	P	
AUS	AUSB0002	164.00	105.69	-10.45	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		43	P	
AUS	AUSB0003	164.00	110.52	-66.28	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		43	P	
AUS	AUSB0004	164.00	158.94	-54.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		43	P	
AUS	AUSB0005	164.00	159.06	-31.52	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		43	P	
AUS	AUSB0006	164.00	167.93	-29.02	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		87.0		27M0G7W		43	P	
AUT	AUT01600	-18.80	10.31	49.47	1.82	0.92	151.78	MODRSS		42.19		MODTES	57.00	CR		84.0		27M0G7W			P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16	17
Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Power control	Designation of emission	Identity of the space station	Group code	Status	Remarks
			Long.	Lat.	Major axis	Minor axis	Orientation			Co-polar	Cross-polar	Code	Gain	Type	Angle							
AZE	AZE06400	23.20	47.47	40.14	0.93	0.60	158.14	MODRSS		46.98		MODTES	57.00	CL		84.0		27M0G7W			P	
BDI	BDI27000	11.00	29.90	-3.10	0.71	0.60	80.00	MODRSS		48.15		MODTES	57.00	CL		81.0		27M0G7W			P	
BEL	BEL01800	38.20	5.12	51.96	1.00	1.00	0.00	MODRSS		44.44		MODTES	57.00	CR		85.5		27M0G7W			P	
BEN	BEN23300	-19.20	2.20	9.50	1.44	0.68	97.00	MODRSS		44.54		MODTES	57.00	CL		84.0		27M0G7W			P	
BFA	BFA10700	-30.00	-1.50	12.20	1.45	1.14	29.00	MODRSS		42.26		MODTES	57.00	CL		84.0		27M0G7W			P	
BGD	BGD22000	74.00	90.30	23.60	1.46	0.84	135.00	MODRSS		43.56		MODTES	57.00	CR		84.0		27M0G7W			P	
BHR	BHR25500	34.00	50.50	26.10	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		83.0		27M0G7W			P	
BIH	BIH14800	56.00	18.22	43.97	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CR		84.0		27M0G7W			P	
BLR	BLR06200	37.80	28.04	53.18	1.17	0.60	9.68	MODRSS		45.96		MODTES	57.00	CL		84.0		27M0G7W			P	
BOT	BOT29700	-0.80	23.30	-22.20	2.13	1.50	36.00	MODRSS		39.40		MODTES	57.00	CL		84.0		27M0G7W			P	
BRM	BRM29800	104.00	96.97	18.68	3.33	1.66	91.63	MODRSS		37.02		MODTES	57.00	CR		84.0		27M0G7W			P	
BRU	BRU3300A	74.00	114.70	4.40	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		84.0		27M0G7W			P	
BTN	BTN03100	86.00	90.44	27.05	0.72	0.60	175.47	MODRSS		48.11		MODTES	57.00	CR		84.0		27M0G7W			P	
BUL	BUL02000	-1.20	25.00	43.00	1.04	0.60	165.00	MODRSS		46.50		MODTES	57.00	CL		83.0		27M0G7W			P	
CAF	CAF25800	-13.20	21.00	6.30	2.25	1.68	31.00	MODRSS		38.67		MODTES	57.00	CR		84.0		27M0G7W			P	
CBG	CBG29900	86.00	104.89	12.79	1.12	0.94	32.89	MODRSS		44.22		MODTES	57.00	CR		84.0		27M0G7W			P	
CHN	CHN15400	62.00	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	57.00	CR		84.0		27M0G7W		45	P	
CHN	CHN15500	62.00	101.90	33.50	5.10	2.80	143.00	MODRSS		32.90		MODTES	57.00	CL		84.0		27M0G7W		45	P	
CHN	CHN15800	134.00	113.21	34.27	6.40	3.16	10.74	MODRSS		31.39		MODTES	57.00	CL		84.0		27M0G7W		46	P	
CHN	CHN15900	134.00	113.21	34.27	6.40	3.16	10.74	MODRSS		31.39		MODTES	57.00	CR		84.0		27M0G7W		46	P	
CHN	CHN16000	92.20	108.10	33.70	5.00	4.00	148.00	MODRSS		31.44		MODTES	57.00	CR		84.0		27M0G7W		47	P	
CHN	CHN16100	92.20	108.10	33.70	5.00	4.00	148.00	MODRSS		31.44		MODTES	57.00	CL		84.0		27M0G7W		47	P	
CHN	CHN20000	122.00	113.55	22.20	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		84.0		27M0G7W			P	
CLN	CLN21900	50.00	80.60	7.70	1.18	0.60	106.00	MODRSS		45.95		MODTES	57.00	CL		84.0		27M0G7W			P	
COD	COD__100	-19.20	21.85	-3.40				CB_RSS_CODA		38.36		MODTES	57.00	CL		84.0		27M0G7W			P	
COG	COG23500	-13.20	14.60	-0.70	2.02	1.18	59.00	MODRSS		40.67		MODTES	57.00	CR		84.0		27M0G7W			P	
COM	COM20700	29.00	44.10	-12.10	0.76	0.60	149.00	MODRSS		47.86		MODTES	57.00	CR		84.0		27M0G7W			P	
CPV	CPV30100	-33.50	-24.12	16.09	0.77	0.63	94.46	MODRSS		47.56		MODTES	57.00	CL		84.0		27M0G7W			P	
CTI	CTI23700	-24.80	-5.66	7.39	1.45	1.29	126.59	MODRSS		41.73		MODTES	57.00	CR		84.0		27M0G7W			P	
CVA	CVA08300	-1.20	13.02	42.09	0.75	0.66	20.53	MODRSS		47.48		MODTES	57.00	CR		84.0		27M0G7W			P	
CVA	CVA08500	-1.20	13.02	42.09	0.75	0.66	20.53	MODRSS		47.48		MODTES	57.00	CR		84.0		27M0G7W			P	
CYP	CYP08600	-1.20	33.45	35.12	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CL		84.0		27M0G7W			P	
CZE	CZE14401	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CR		84.0		27M0G7W			P	
CZE	CZE14402	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CL		84.0		27M0G7W			P	
CZE	CZE14403	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CL		84.0		27M0G7W		37	P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16	17
Admin. symbol	Beam identifi-cation	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Power control	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle							
D	D 08700	-18.80	10.31	49.47	1.82	0.92	151.78	MODRSS		42.19		MODTES	57.00	CR		84.0		27M0G7W			P	
DJI	DJI09900	16.80	42.68	11.68	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CL		84.0		27M0G7W			P	
DNK	DNK__100	-25.20	5.28	61.83				CB_RSS_DNKA		48.88		MODTES	57.00	CL		79.5		27M0G7W			P	
DNK	DNK09000	-33.50	14.34	61.72	1.83	0.60	151.50	MODRSS		44.05		MODTES	57.00	CR		84.0		27M0G7W			P	
DNK	DNK09100	-33.50	-14.94	63.79	1.52	0.60	168.57	MODRSS		44.86		MODTES	57.00	CR		84.0		27M0G7W			P	
E	E___100	-30.00	-9.40	34.15				CB_RSS_E__A		44.79		MODTES	57.00	CR		84.0		27M0G7W		1	P	
E	HISP27D4	-30.00	-3.10	39.90					ECO	43.00	18.70	R13TES	55.00	CR		82.5		27M0G7W--	HISPASAT-1	1	PE	
E	HISP27D6	-30.00	-3.10	39.90					ECO	43.00	18.70	R13TES	58.50	CR		83.5		27M0G7W--	HISPASAT-1	1	PE	
E	HISP33D4	-30.00	-3.10	39.90					ECO	43.00	18.70	MODTES	55.00	CR		82.5		33M0G7W--	HISPASAT-1	1	PE	
E	HISP33D6	-30.00	-3.10	39.90					ECO	43.00	18.70	MODTES	58.50	CR		83.5		33M0G7W--	HISPASAT-1	1	PE	
E	HISPASA4	-30.00	-3.10	39.90					ECO	43.00	18.70	R13TES	55.00	CR		82.5		27M0F8W	HISPASAT-1	1	PE	
E	HISPASA6	-30.00	-3.10	39.90					ECO	43.00	18.70	R13TES	58.50	CR		83.5		27M0F8W	HISPASAT-1	1	PE	
EGY	EGY02600	-7.00	29.70	26.80	2.33	1.72	136.00	MODRSS		38.42		MODTES	57.00	CR		84.0		27M0G7W		12	P	
ERI	ERI09200	22.80	39.41	14.98	1.67	0.95	145.49	MODRSS		42.44		MODTES	57.00	CL		84.0		27M0G7W			P	
EST	EST06100	44.50	25.40	59.18	0.67	0.60	5.99	MODRSS		48.42		MODTES	57.00	CR		84.0		27M0G7W			P	
F	F 09300	-7.00	3.30	45.37	2.18	1.20	156.36	MODRSS		40.27		MODTES	57.00	CR		84.0		27M0G7W		21	P	
F	F___100	-7.00	29.16	13.43				CB_RSS_F__A		48.88		MODTES	57.00	CL		84.0		27M0G7W		12	P	
F	F___200	140.00	174.50	-17.30				CB_RSS_F__B		45.80		MODTES	57.00	CL		84.0		27M0G7W			P	
F	F___300	140.00	174.65	-17.65				CB_RSS_F__C		47.97		MODTES	57.00	CR		84.0		27M0G7W			P	
F	OCE10100	-160.00	-145.00	-16.30	4.34	3.54	4.00	MODRSS		32.58		MODTES	57.00	CL		84.0		27M0G7W			P	
FIN	FIN10300	22.80	17.61	61.54	2.18	0.90	11.59	MODRSS		41.53		MODTES	57.00	CL		84.0		27M0G7W		52	P	
FIN	FIN10400	22.80	17.61	61.54	2.18	0.90	11.59	MODRSS		41.53		MODTES	57.00	CL		84.0		27M0G7W		52	P	
FJI	FJI19300	-178.00	179.62	-17.87	1.16	0.92	155.22	MODRSS		44.16		MODTES	57.00	CR		84.0		27M0G7W			P	
FSM	FSM00000	158.00	151.90	5.48	5.15	1.57	167.00	MODRSS		35.38		MODTES	57.00	CR		84.0		27M0G7W			P	
G	G 02700	-33.50	-3.50	53.80	1.84	0.72	142.00	MODRSS		43.23		MODTES	57.00	CR		84.0		27M0G7W			P	
GAB	GAB26000	-13.20	11.80	-0.60	1.43	1.12	64.00	MODRSS		42.40		MODTES	57.00	CL		84.0		27M0G7W			P	
GEO	GEO06400	23.20	43.35	42.27	1.11	0.60	161.21	MODRSS		46.23		MODTES	57.00	CL		84.0		27M0G7W			P	
GMB	GMB30200	-37.00	-15.10	13.40	0.79	0.60	4.00	MODRSS		47.69		MODTES	57.00	CL		83.0		27M0G7W			P	
GNB	GNB30400	-30.00	-15.00	12.00	0.90	0.60	172.00	MODRSS		47.12		MODTES	57.00	CL		84.0		27M0G7W			P	
GNE	GNE30300	-18.80	10.30	1.50	0.68	0.60	10.00	MODRSS		48.34		MODTES	57.00	CR		84.0		27M0G7W			P	
GRC	GRC10500	-1.20	24.52	38.11	1.70	0.95	152.55	MODRSS		42.37		MODTES	57.00	CR		84.0		27M0G7W			P	
GUI	GUI19200	-37.00	-11.00	10.20	1.58	1.04	147.00	MODRSS		42.29		MODTES	57.00	CR		85.0		27M0G7W			P	
HNG	HNG10601	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CR		84.0		27M0G7W			P	
HNG	HNG10602	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CL		84.0		27M0G7W			P	
HNG	HNG10603	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CL		84.0		27M0G7W		37	P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16	17
Admin. symbol	Beam identifi-cation	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Power control	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle							
HOL	HOL21300	38.20	5.12	51.96	1.00	1.00	0.00	MODRSS		44.44		MODTES	57.00	CL		85.5		27M0G7W			P	
HRV	HRV14801	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CR		84.0		27M0G7W			P	
HRV	HRV14802	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CL		84.0		27M0G7W			P	
HRV	HRV14803	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CL		84.0		27M0G7W		37	P	
I	I 08200	9.00	12.67	40.74	1.99	1.35	144.20	MODRSS		40.14		MODTES	57.00	CR		84.0		27M0G7W			P	
IND	IND03700	68.00	93.00	25.50	1.46	1.13	40.00	MODRSS		42.27		MODTES	57.00	CL		84.0		27M0G7W			P	
IND	IND04701	68.00	93.30	11.10	1.92	0.60	96.00	MODRSS		43.83		MODTES	57.00	CR		84.0		27M0G7W		7E	P	
IND	IND04702	68.00	93.30	11.10	1.92	0.60	96.00	MODRSS		43.83		MODTES	57.00	CL		84.0		27M0G7W		7E	P	
IND	INDA_100	56.00	76.16	14.72				CB_RSS_INDA		45.66		MODTES	57.00	CL		84.0		27M0G7W			P	
IND	INDB_100	56.00	83.67	23.73				CB_RSS_INDB		43.13		MODTES	57.00	CR		84.0		27M0G7W			P	
IND	INDD_100	68.00	74.37	29.16				CB_RSS_INDD		41.79		MODTES	57.00	CR		84.0		27M0G7W			P	
INS	INS02800	80.20	113.60	-1.40	6.73	3.33	160.00	MODRSS		30.94		MODTES	57.00	CR		84.0		27M0G7W			P	
INS	INS03501	104.00	115.20	-1.70	9.14	3.43	170.00	MODRSS		29.48		MODTES	57.00	CL		84.0		27M0G7W		7D	P	
INS	INS03502	104.00	115.20	-1.70	9.14	3.43	170.00	MODRSS		29.48		MODTES	57.00	CR		84.0		27M0G7W		7D	P	
IRL	IRL21100	-37.20	-8.25	53.22	0.72	0.60	157.56	MODRSS		48.08		MODTES	57.00	CR		84.0		27M0G7W			P	
IRN	IRN10900	34.00	54.20	32.40	3.82	1.82	149.00	MODRSS		36.03		MODTES	57.00	CL		83.0		27M0G7W			P	
ISL	ISL04900	-33.50	-19.00	64.90	1.00	0.60	177.00	MODRSS		46.67		MODTES	57.00	CL		83.0		27M0G7W			P	
ISL	ISL05000	-33.50	-14.94	63.79	1.52	0.60	168.57	MODRSS		44.86		MODTES	57.00	CR		84.0		27M0G7W			P	
ISR	ISR11000	-4.00	34.95	31.32	0.73	0.60	110.02	MODRSS		48.03		MODTES	57.00	CR		84.0		27M0G7W			P	
J	000BS-3N	109.85	134.50	31.50	3.52	3.30	68.00	MODRSS		33.80		MODTES	57.00	CR		87.0		27M0F8W	BS-3N	2	PE	
J	J 10985	109.85	134.50	31.50	3.52	3.30	68.00	MODRSS		33.80		MODTES	57.00	CR		87.0		34M5G7W		2	P	
J	J 11100	110.00	134.50	31.50	3.52	3.30	68.00	MODRSS		33.80		MODTES	57.00	CR		87.0		34M5G7W		2	P	
J	J 1110E	110.00	134.50	31.50	3.52	3.30	68.00	MODRSS		33.80		MODTES	57.00	CR		87.0		27M0F8W	BS-3M	2	PE	
JOR	JOR22400	11.00	37.55	34.02	1.47	0.91	73.16	MODRSS		43.19		MODTES	57.00	CL		85.0		27M0G7W			P	
KAZ	KAZ06600	56.40	65.73	46.40	4.58	1.76	177.45	MODRSS		35.38		MODTES	57.00	CL		84.0		27M0G7W			P	
KEN	KEN24900	-0.80	37.99	0.88	2.06	1.30	99.68	MODRSS		40.17		MODTES	57.00	CR		84.0		27M0G7W			P	
KGZ	KGZ07000	50.00	73.91	41.32	1.47	0.64	5.05	MODRSS		44.75		MODTES	57.00	CR		84.0		27M0G7W			P	
KIR	KIR__100	176.00	-170.31	-0.56				CB_RSS_KIRA		42.60		MODTES	57.00	CL		84.0		27M0G7W			P	
KOR	KOR11201	116.00	127.50	36.00	1.24	1.02	168.00	MODRSS		43.43		MODTES	57.00	CL		89.0		27M0G7W		3	P	
KOR	KOR11202	116.00	127.50	36.00	1.24	1.02	168.00	MODRSS		43.43		MODTES	57.00	CR		89.0		27M0G7W		3	P	
KRE	KRE28600	140.00	128.45	40.32	1.63	0.68	18.89	MODRSS		44.00		MODTES	57.00	CL		87.0		27M0G7W			P	
KWT	KWT11300	11.00	47.48	29.12	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CR		83.0		27M0G7W			P	
LAO	LAO28400	122.20	103.71	18.17	1.87	1.03	123.99	MODRSS		42.18		MODTES	57.00	CR		84.0		33M0G7W			P	
LBN	LBN27900	11.00	37.55	34.02	1.47	0.91	73.16	MODRSS		43.19		MODTES	57.00	CR		84.0		27M0G7W			P	
LBR	LBR24400	-33.50	-9.30	6.60	1.22	0.70	133.00	MODRSS		45.13		MODTES	57.00	CR		84.0		27M0G7W			P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16	17
Admin. symbol	Beam identifi-cation	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Power control	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle							
LBY	LBY28021	-24.80	17.50	26.30	3.68	1.84	130.00	MODRSS		36.14		MODTES	57.00	CL		84.0		27M0G7W			P	
LIE	LIE25300	-18.80	10.31	49.47	1.82	0.92	151.78	MODRSS		42.19		MODTES	57.00	CL		84.0		27M0G7W			P	
LSO	LSO30500	4.80	27.80	-29.80	0.66	0.60	36.00	MODRSS		48.47		MODTES	57.00	CL		84.0		27M0G7W			P	
LTU	LTU06100	23.20	24.52	56.11				CB_RSS_LTUA		47.92		MODTES	57.00	CR		84.0		27M0G7W			P	
LUX	LUX11400	28.20	5.21	49.20	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CL		84.0		27M0G7W		9	P	
LVA	LVA06100	23.20	24.52	56.11				CB_RSS_LVAA		47.92		MODTES	57.00	CR		84.0		27M0G7W			P	
MAU	MAU__100	29.00	58.61	-15.88				CB_RSS_MAUA		41.42		MODTES	57.00	CL		84.0		27M0G7W			P	
MCO	MCO11600	34.20	7.40	43.70	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		81.0		27M0G7W			P	
MDA	MDA06300	50.00	28.45	46.99	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CR		84.0		27M0G7W			P	
MDG	MDG23600	29.00	46.20	-18.60	2.57	0.80	67.00	MODRSS		41.32		MODTES	57.00	CL		84.0		27M0G7W			P	
MHL	MHL00000	146.00	167.64	9.83	2.07	0.90	157.42	MODRSS		41.75		MODTES	57.00	CR		84.0		27M0G7W			P	
MKD	MKD14800	22.80	21.53	41.50	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CL		84.0		27M0G7W			P	
MLA	MLA__100	91.50	108.07	3.92				CB_RSS_MLAA		41.75		MODTES	57.00	CR		84.0		27M0G7W			P	
MLD	MLD30600	50.00	73.10	6.00	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		84.0		27M0G7W			P	
MLI	MLI__100	-19.20	-4.80	16.10				CB_RSS_MLIA		41.11		MODTES	57.00	CR		87.0		27M0G7W			P	
MLT	MLT14700	22.80	14.40	35.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CR		84.0		27M0G7W			P	
MNG	MNG24800	74.00	101.95	46.79	3.32	1.04	169.27	MODRSS		39.07		MODTES	59.92	CL		86.9		27M0G7W			P	
MRC	MRC20900	-25.20	-8.90	28.90	3.96	1.55	50.00	MODRSS		36.57		MODTES	57.00	CR		80.0		27M0G7W			P	
MTN	MTN__100	-36.80	-11.24	20.91				CB_RSS_MTNA		37.55		MODTES	57.00	CR		86.0		27M0G7W			P	
MWI	MWI30800	4.80	33.79	-13.25	1.56	0.70	92.69	MODRSS		44.10		MODTES	57.00	CR		84.0		27M0G7W			P	
NGR	NGR11500	-37.20	7.63	16.97	2.20	1.80	100.58	MODRSS		38.47		MODTES	57.00	CL		84.0		27M0G7W			P	
NOR	NOR12000	-0.80	16.70	61.58	1.84	0.95	177.31	MODRSS		42.02		MODTES	57.00	CR		84.0		27M0G7W		6	P	
NOR	NOR12100	-0.80	16.70	61.58	1.84	0.95	177.31	MODRSS		42.02		MODTES	57.00	CL		84.0		27M0G7W		6	P	
NRU	NRU30900	134.00	167.00	-0.50	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		84.0		27M0G7W			P	
NZL	NZL__100	158.00	-174.35	-24.30				CB_RSS_NZLA		48.88		MODTES	57.00	CL		84.0		27M0G7W			P	
OMA	OMA12300	17.20	55.60	21.00	1.88	1.02	100.00	MODRSS		41.62		MODTES	57.00	CL		85.0		27M0G7W			P	
PHL	PHL28500	98.00	121.30	11.10	3.46	1.76	99.00	MODRSS		36.60		MODTES	57.00	CL		84.0		27M0G7W			P	
PLW	PLW00000	140.00	132.98	5.51	1.30	0.60	55.41	MODRSS		45.53		MODTES	57.00	CR		84.0		27M0G7W			P	
POL	POL13200	50.00	19.71	52.18	1.22	0.63	16.12	MODRSS		45.59		MODTES	57.00	CR		84.0		27M0G7W			P	
POR	POR__100	-37.00	-15.92	37.65				CB_RSS_PORA		47.17		MODTES	57.00	CR		84.0		27M0G7W			P	
PSE	YYY00001	-13.20	34.99	31.86	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CL		80.5		27M0G7W			P	8
QAT	QAT24700	20.00	51.59	25.35	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CL		84.0		27M0G7W			P	
ROU	ROU13600	50.00	25.12	45.75	1.17	0.73	9.52	MODRSS		45.15		MODTES	57.00	CL		84.0		27M0G7W			P	
RRW	RRW31000	11.00	30.00	-2.10	0.66	0.60	42.00	MODRSS		48.47		MODTES	57.00	CR		81.0		27M0G7W			P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16	17
Admin. symbol	Beam identifi-cation	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Power control	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle							
RUS	RSTREA11	36.00	38.00	53.00					COP	38.40	8.40	MODTES	57.00	CR		84.0		27M0F8W	RST-1	5	PE	
RUS	RSTREA12	36.00	38.00	53.00					COP	38.40	8.40	MODTES	57.00	CL		84.0		27M0F8W	RST-1	5	PE	
RUS	RSTRED11	36.00	38.00	53.00					COP	38.40	8.40	MODTES	57.00	CR		84.0		27M0G7W	RST-1	5	PE	
RUS	RSTRED12	36.00	38.00	53.00					COP	38.40	8.40	MODTES	57.00	CL		84.0		27M0G7W	RST-1	5	PE	
RUS	RSTRSD11	36.00	38.00	53.00					COP	38.40	8.40	MODTES	57.00	CR		84.0		27M0G7W	RST-1	5	P	
RUS	RSTRSD12	36.00	38.00	53.00					COP	38.40	8.40	MODTES	57.00	CL		84.0		27M0G7W	RST-1	5	P	
RUS	RSTRSD21	56.00	65.00	63.00					COP	38.40	8.40	MODTES	57.00	CR		84.0		27M0G7W	RST-2	14	P	
RUS	RSTRSD22	56.00	65.00	63.00					COP	38.40	8.40	MODTES	57.00	CL		84.0		27M0G7W	RST-2	14	P	
RUS	RSTRSD31	86.00	97.00	62.00					COP	38.40	8.40	MODTES	57.00	CR		84.0		27M0G7W	RST-3	33	P	
RUS	RSTRSD32	86.00	97.00	62.00					COP	38.40	8.40	MODTES	57.00	CL		84.0		27M0G7W	RST-3	33	P	
RUS	RSTRSD51	140.00	158.00	56.00					COP	38.40	8.40	MODTES	57.00	CR		84.0		27M0G7W	RST-5	35	P	
RUS	RSTRSD52	140.00	158.00	56.00					COP	38.40	8.40	MODTES	57.00	CL		84.0		27M0G7W	RST-5	35	P	
RUS	RUS00401	110.00	118.22	51.52					COP	38.40	8.40	MODTES	57.00	CR		84.0		27M0G7W	RUS-4	34	P	
RUS	RUS00402	110.00	118.22	51.52					COP	38.40	8.40	MODTES	57.00	CL		84.0		27M0G7W	RUS-4	34	P	
S	S 13800	5.00	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	57.00	CL		84.0		27M0G7W		4	P	
S	S 13900	5.00	17.00	61.50	2.00	1.00	10.00	MODRSS		41.44		MODTES	57.00	CL		84.0		27M0G7W		4	P	
SEY	SEY00000	42.50	51.86	-7.23	2.43	1.04	27.51	MODRSS		40.44		MODTES	57.00	CR		84.0		27M0G7W			P	
SLM	SLM00000	128.00	159.27	-8.40	1.35	1.08	118.59	MODRSS		42.81		MODTES	57.00	CL		84.0		27M0G7W			P	
SMO	SMO05700	-178.00	-171.70	-13.87	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CL		84.0		27M0G7W			P	
SMR	SMR31100	-36.80	12.50	43.90	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		83.0		27M0G7W			P	
SNG	SNG15100	88.00	103.86	1.42	0.92	0.72	175.12	MODRSS		46.25		MODTES	57.00	CL		84.0		27M0G7W			P	
SRL	SRL25900	-33.50	-11.80	8.60	0.78	0.68	114.00	MODRSS		47.20		MODTES	57.00	CR		84.0		27M0G7W			P	
STP	STP24100	-7.00	7.00	0.80	0.60	0.60	0.00	MODRSS		48.88		MODTES	57.00	CL		84.0		27M0G7W			P	
SUI	SUI14000	-18.80	10.31	49.47	1.82	0.92	151.78	MODRSS		42.19		MODTES	57.00	CL		84.0		27M0G7W			P	
SVK	SVK14401	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CR		84.0		27M0G7W			P	
SVK	SVK14402	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CL		84.0		27M0G7W			P	
SVK	SVK14403	-12.80	16.77	46.78	1.71	0.89	149.15	MODRSS		42.64		MODTES	57.00	CL		84.0		27M0G7W		37	P	
SVN	SVN14800	33.80	15.01	46.18	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CR		82.0		27M0G7W			P	
SWZ	SWZ31300	4.80	31.39	-26.44	0.60	0.60	90.00	MODRSS		48.88		MODTES	57.00	CR		82.0		27M0G7W			P	
SYR	SYR22900	11.00	37.55	34.02	1.47	0.91	73.16	MODRSS		43.19		MODTES	57.00	CL		84.0		27M0G7W		53	P	
SYR	SYR33900	11.00	37.60	34.20	1.32	0.88	74.00	MODRSS		43.80		MODTES	57.00	CL		84.0		27M0G7W		53	P	
TCD	TCD14300	17.00	18.39	15.52	3.21	2.05	83.26	MODRSS		36.26		MODTES	57.00	CR		84.0		27M0G7W			P	
THA	THA14200	98.00	100.75	12.88	2.80	1.82	93.77	MODRSS		37.38		MODTES	57.00	CR		84.0		27M0G7W			P	
TJK	TJK06900	38.00	71.14	38.41	1.21	0.73	155.31	MODRSS		45.00		MODTES	57.00	CL		82.0		27M0G7W			P	
TKM	TKM06800	50.00	59.24	38.83	2.26	1.02	166.64	MODRSS		40.81		MODTES	57.00	CL		85.7		27M0G7W			P	

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15	16	17
Admin. symbol	Beam identifi-cation	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		e.i.r.p.	Power control	Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle							
TMP	TMP00000	128.00	126.03	-8.72	0.66	0.60	13.92	MODRSS		48.50		MODTES	57.00	CR		84.0		27M0G7W			P	10
TON	TON21500	170.75	-175.23	-18.19	1.59	0.60	71.33	MODRSS		44.64		MODTES	57.00	CR		84.0		27M0G7W			P	
TUN	TUN15000	-25.20	9.50	33.50	1.88	0.72	135.00	MODRSS		43.13		MODTES	57.00	CR		84.0		27M0G7W		55	P	
TUN	TUN27200	-25.20	2.50	32.00	3.59	1.75	175.00	MODRSS		36.47		MODTES	57.00	CR		84.0		27M0G7W		55	P	
TUR	TUR14500	42.00	35.14	38.99	3.19	1.10	0.03	MODRSS		39.00		MODTES	57.00	CL		84.0		27M0G7W		36	P	
TUV	TUV00000	176.00	177.61	-7.11	0.94	0.60	137.58	MODRSS		46.93		MODTES	57.00	CR		84.0		27M0G7W			P	
TZA	TZA22500	11.00	34.60	-6.20	2.41	1.72	129.00	MODRSS		38.27		MODTES	57.00	CR		84.0		27M0G7W			P	
UAE	UAE27400	52.50	53.98	24.37	1.23	0.84	6.62	MODRSS		44.31		MODTES	57.00	CR		84.0		27M0G7W			P	
UGA	UGA05100	17.00	32.20	1.04	1.50	1.02	68.73	MODRSS		42.62		MODTES	57.00	CR		84.0		27M0G7W			P	
UKR	UKR06300	38.20	31.82	48.19	2.32	0.95	177.32	MODRSS		41.01		MODTES	57.00	CR		84.0		27M0G7W			P	
USA	GUM33101	122.00	155.56	13.21				CB_RSS_GUMA		43.61		MODTES	57.00	CR		87.0		27M0G7W		7C	P	
USA	GUM33102	122.00	155.56	13.21				CB_RSS_GUMA		43.61		MODTES	57.00	CL		87.0		27M0G7W		7C	P	
USA	MRA33200	121.80	155.56	13.21				CB_RSS_MRAA		43.61		MODTES	57.00	CR		91.0		27M0G7W			P	
USA	PLM33200	170.00	-145.55	19.50				CB_RSS_PLMA		39.35		MODTES	57.00	CL		87.0		27M0G7W			P	
USA	USAA_101	170.00	-145.55	19.50				CB_RSS_USAA		39.35		MODTES	57.00	CR		87.0		27M0G7W		7A	P	
USA	USAA_102	170.00	-145.55	19.50				CB_RSS_USAA		39.35		MODTES	57.00	CL		87.0		27M0G7W		7A	P	
UZB	UZB07100	33.80	63.80	41.21	2.56	0.89	159.91	MODRSS		40.84		MODTES	57.00	CR		82.0		27M0G7W			P	
VTN	VTN32500	107.00	106.84	14.21	3.43	1.76	109.43	MODRSS		36.64		MODTES	57.00	CR		84.0		27M0G7W			P	
VUT	VUT12801	140.00	168.00	-16.40	1.52	0.68	87.00	MODRSS		44.30		MODTES	57.00	CL		84.0		27M0G7W		7B	P	
VUT	VUT12802	140.00	168.00	-16.40	1.52	0.68	87.00	MODRSS		44.30		MODTES	57.00	CR		84.0		27M0G7W		7B	P	
YUG	YUG14800	-7.00	20.50	43.98	0.91	0.60	145.16	MODRSS		47.07		MODTES	57.00	CL		84.0		27M0G7W			P	
ZMB	ZMB31400	-0.80	27.50	-13.10	2.38	1.48	39.00	MODRSS		38.98		MODTES	57.00	CR		84.0		27M0G7W			P	
ZWE	ZWE13500	-0.80	29.60	-18.80	1.46	1.36	37.00	MODRSS		41.47		MODTES	57.00	CL		85.0		27M0G7W			P	

COLUMN HEADINGS

Col. 1 *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. 2 *Notifying administration symbol*.

Col. 3 *Beam identification* (Column 2, normally, contains the symbol designating the administration 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. 4 Polarization (CL – circular left, CR – circular right).

Col. 5 *Channel number/indication of minimum equivalent protection margin (EPM) for a given assignment derived from the set of values for all test points belonging to the given beam.*

Minimum equivalent protection margin in the Regions 1 and 3 feeder-link Plan in the frequency band 14.5-14.8 GHz (sorted by orbital position)

1	2	3	4	5												
Orbital position	Admin. symbol	Beam Identification	Polari-zation type	Channel number												
				2	3	4	5	6	7	8	9	10	11	12	13	14
				Minimum equivalent protection margin												
-37.00	SEN	SEN22201	CL				40.8		39.6		39.6		39.6		39.6	
-37.00	SEN	SEN22202	CR					39.6		39.6		39.6		39.6		40.7
-30.00	TGO	TGO22601	CL				15.0		14.1		14.1		14.1		14.1	
-30.00	TGO	TGO22602	CR					14.1		14.1		14.1		14.1		15.0
-25.00	GHA	GHA10801	CR				14.9		14.1		14.1		14.1		14.1	
-25.00	GHA	GHA10802	CL					14.1		14.1		14.1		14.1		14.9
-19.20	NIG	NIG11901	CR				6.4		4.2		4.2		4.2		4.2	
-19.20	NIG	NIG11902	CL					4.2		4.2		4.2		4.2		6.4
-18.80	NMB	NMB02501	CL				6.9		4.5		4.5		4.5		4.5	
-18.80	NMB	NMB02502	CR					4.5		4.5		4.5		4.5		6.9
-13.00	CME	CME30001	CL				17.2		16.3		16.3		16.3		16.3	
-13.00	CME	CME30002	CR					16.3		16.3		16.3		16.3		17.2
-7.00	SDN	SDN__101	CL				27.1		26.2		26.2		26.2		26.2	
-7.00	SDN	SDN__102	CR					26.2		26.2		26.2		26.2		27.1
-1.00	MOZ	MOZ30701	CL				16.6		15.7		15.7		15.7		15.7	
-1.00	MOZ	MOZ30702	CR					15.7		15.7		15.7		15.7		16.6
4.80	AFS	AFS02101	CL				11.9		11.0		11.0		11.0		11.0	
4.80	AFS	AFS02102	CR					11.0		11.0		11.0		11.0		11.9
11.00	YEM	YEM__101	CR				47.8		47.3		47.3		47.3		47.3	
11.00	YEM	YEM__102	CL					47.3		47.3		47.3		47.3		47.8
34.00	IRN	IRN10901	CR		15.2		13.9		13.9		13.9		13.9		13.9	
34.00	IRN	IRN10902	CL			14.3		13.9		13.9		13.9		13.9		14.8
36.00	ETH	ETH09201	CL				2.3		1.4		1.4		1.4		1.4	
36.00	ETH	ETH09202	CR					1.4		1.4		1.4		1.4		2.3
37.80	SOM	SOM31201	CL				0.0		-0.3		-0.3		-0.3		-0.3	
37.80	SOM	SOM31202	CR					-0.3		-0.3		-0.3		-0.3		1.6
38.20	PAK	PAK12701	CR		14.2		3.2		0.9		0.9		0.9		0.9	
38.20	PAK	PAK12702	CL			4.2		0.9		0.9		0.9		0.9		3.3
42.50	SEY	SEY00001	CL				36.3		35.3		35.3		35.3		35.3	
42.50	SEY	SEY00002	CR					35.3		35.3		35.3		35.3		36.4
50.00	IRQ	IRQ25601	CL				-0.1		-0.1		-0.1		-0.1		-0.1	
50.00	IRQ	IRQ25602	CR					-0.1		-0.1		-0.1		-0.1		2.4
50.00	NPL	NPL12201	CR		999.9		3.9		1.2		1.2		1.2		1.2	
50.00	NPL	NPL12202	CL			4.6		1.2		1.2		1.2		1.2		3.9
116.00	KOR	KO11201D	CL	7.5		7.5		7.5		7.5		7.5		7.5		
116.00	KOR	KOR11201	CL	7.5		7.5		7.5		7.5		7.5		7.5		
122.00	CHN	CHN19001	CL		47.7		47.7		47.7		47.7		47.7		50.7	
122.00	CHN	CHN19002	CR			42.0		42.0		42.0		42.0		42.0		999.9
134.00	PNG	PNG13101	CR		26.1		25.2		25.2		25.2		25.2		25.2	
134.00	PNG	PNG13102	CL			25.2		25.2		25.2		25.2		25.2		26.1
140.00	USA	USAC_101	CL		19.4		18.6		18.6		18.6		18.6		18.6	
140.00	USA	USAC_102	CR			18.6		18.6		18.6		18.6		18.6		19.4

Minimum equivalent protection margin in the Regions 1 and 3 feeder-link Plan in the frequency band 17.3-18.1 GHz (sorted by orbital position)

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identification	Polarization type	Channel number																																			
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum equivalent protection margin																																			
-178.00	FJI	FJI19300	CR	3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3																	
-178.00	SMO	SMO05700	CL	12.2		12.2		12.2		12.2		12.2		12.2		12.2		12.2		12.2		12.2		12.2		12.2																	
-160.00	F	OCE10100	CL		999.9		999.9		999.9		999.9		999.9		999.9		999.9		999.9		999.9		999.9		999.9		999.9																
-37.20	IRL	IRL21100	CR																					9.2		10.2		10.2		10.2		10.2		10.3		10.2		10.2		10.3		10.3	
-37.20	NGR	NGR11500	CL	1.8		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4																					
-37.00	AND	AND34100	CL																						10.0		10.0		10.0		9.9		10.0		10.0		9.9		10.0		10.0		12.0
-37.00	GMB	GMB30200	CL																					-0.2		-0.3		-0.3		-0.3		-0.3		-0.3		-0.3		-0.3		-0.3		-0.3	
-37.00	GUI	GUI19200	CR		0.8		0.8		0.8		0.8		0.8		0.8		0.8		0.8		0.8		1.5																				
-37.00	POR	POR__100	CR	2.6		0.1		0.0		0.1		0.0		0.1		0.0		0.1		0.0		0.1																					
-36.80	MTN	MTN__100	CR																						-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		1.5
-36.80	SMR	SMR31100	CL		10.6		10.6		10.6		10.6		10.6		10.6		10.6		10.6		10.6		10.2																				
-33.50	CPV	CPV30100	CL		14.3		14.3		14.3		14.3		14.3		14.3		14.3		14.3		14.3		11.6																				
-33.50	DNK	DNK09000	CR																												5.1						5.1						
-33.50	DNK	DNK09100	CR																																1.1				1.1				
-33.50	G	G 02700	CR		6.4		6.4		6.4		6.4		6.4		6.4		6.4		6.4		6.4		4.2																				
-33.50	ISL	ISL04900	CL																					1.5		-0.1		-0.1		1.8		7.5		2.8		1.8		1.8		2.8		14.1	
-33.50	ISL	ISL05000	CR																						1.1		1.1		1.1														
-33.50	LBR	LBR24400	CR	10.6		7.7		7.7		7.7		7.7		7.7		7.7		7.7		7.7		7.7																					
-33.50	SRL	SRL25900	CR																					9.7		11.8		11.8		11.4		13.1		13.7		11.4		11.4		13.7		17.0	
-30.00	BFA	BFA10700	CL																						12.0		12.0		12.0		12.0		12.0		12.0		12.0		12.0		12.0		14.9
-30.00	E	E___100	CR	7.9		7.6		7.6		7.6		7.6		7.6		7.6		7.6		7.6		7.6																					
-30.00	E	HISP27D4	CR	10.2				10.1				10.1				10.1				10.1																							
-30.00	E	HISP27D6	CR	11.2				11.1				11.1				11.1				11.1																							
-30.00	E	HISP33D4	CR	10.1				10.1				10.1				10.1				10.1																							
-30.00	E	HISP33D6	CR	11.1				11.1				11.1				11.1				11.1																							
-30.00	E	HISPASA4	CR	10.2				10.1				10.1				10.1				10.1																							
-30.00	E	HISPASA6	CR	11.2				11.1				11.1				11.1				11.1																							
-30.00	GNB	GNB30400	CL	15.6		16.9		15.2		16.9		15.2		16.9		15.2		16.9		15.2		16.9																					
-25.20	DNK	DNK__100	CL	1.3		-0.5		-0.5		-0.5		-0.5		-0.5		-0.5		-0.5		-0.5		-0.9																					
-25.20	MRC	MRC20900	CR		1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.1		-1.1																				
-25.20	TUN	TUN15000	CR																						-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.2
-25.20	TUN	TUN27200	CR																																		-1.2				-1.2		
-24.80	AGL	AGL29500	CR	9.2		6.8		6.8		6.8		6.8		6.8		6.8		6.8		6.8		6.8																					
-24.80	ALG	ALG25152	CL																						-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.1		-1.0		-1.1		0.0
-24.80	CTI	CTI23700	CR																					6.5		5.5		5.5		5.5		5.5		5.5		5.3		5.2		5.3		5.2	
-24.80	LBY	LBY28021	CL		-0.9		-0.9		-0.9		-0.9		-0.9		-0.9		-0.9		-0.9		-0.9		0.6																				
-19.20	BEN	BEN23300	CL																					4.4		9.4		9.4		9.4		9.4		9.4		9.4		9.4		9.4		9.4	
-19.20	COD	COD__100	CL	4.5		2.1		2.1		2.1		2.1		2.1		2.1		2.1		2.1		2.1																					

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identifi-cation	Pola-riza-tion type	Channel number																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum equivalent protection margin																																							
-19.20	MLI	MLI__100	CR		5.9		5.9		5.9		5.9		5.9		5.9		5.9		5.9		5.9		5.1																				
-18.80	AUT	AUT01600	CR																					-0.3		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2	
-18.80	D	D 08700	CR	2.5		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4																					
-18.80	GNE	GNE30300	CR																						13.0		13.0		13.0		13.0		13.0		13.0		13.0		13.0		13.0		14.7
-18.80	LIE	LIE25300	CL																						0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		2.5
-18.80	SUI	SUI14000	CL		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3																				
-13.20	CAF	CAF25800	CR		1.1		-0.4		1.1		-0.4		1.1		-0.4		1.1		-0.4		1.1		1.0																				
-13.20	COG	COG23500	CR																						9.8		9.8		9.8		9.8		9.8		9.8		9.8		9.8		9.8		11.7
-13.20	GAB	GAB26000	CL	4.9		1.7		1.7		1.7		1.7		1.7		1.7		1.7		1.7		1.7																					
-13.20	PSE	YYY00001	CL																					8.6		10.1		10.1		10.1		10.1		10.1		10.1		10.1		10.1		10.1	
-12.80	CZE	CZE14401	CR	2.8								0.8								0.8								0.0								0.0							
-12.80	CZE	CZE14402	CL														0.1														-0.7								-0.7				
-12.80	CZE	CZE14403	CL		0.1*																				-0.7*		-0.7*																
-12.80	HNG	HNG10601	CR			0.8								0.8								0.8								0.0								0.0					
-12.80	HNG	HNG10602	CL						0.1																								-0.7								-0.7		
-12.80	HNG	HNG10603	CL		0.1*																				-0.7*		-0.7*																
-12.80	HRV	HRV14801	CR					0.8								0.8								0.8								0.0								0.0			
-12.80	HRV	HRV14802	CL										0.1																						-0.7								2.1
-12.80	HRV	HRV14803	CL		0.1*																				-0.7*		-0.7*																
-12.80	SVK	SVK14401	CR							0.8								0.8								0.0								0.0								0.0	
-12.80	SVK	SVK14402	CL																		0.1								-0.7								-0.7						
-12.80	SVK	SVK14403	CL		0.1*																				-0.7*		-0.7*																
-7.00	EGY	EGY02600	CR		27.4		28.1		27.4		28.1		27.4		28.1		27.4		28.7		27.8		9.2																				
-7.00	F	F 09300	CR																						-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4
-7.00	F	F___100	CL	17.5		16.6		16.6		16.6		16.6		16.6		16.6		17.2		18.0		18.0																					
-7.00	STP	STP24100	CL																						14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.1
-7.00	YUG	YUG14800	CL																						1.5		1.5		1.5		1.5		1.5		1.5		1.5		1.5		1.5		2.0
-4.00	ISR	ISR11000	CR																						18.2		18.2		18.2		18.2		18.2		18.2		18.2		18.2		18.2		20.9
-1.20	BUL	BUL02000	CL	3.5		1.6		1.6		1.6		1.6		1.6		1.6		3.2		5.6		5.5																					
-1.20	CVA	CVA08300	CR		1.7		2.3		1.7		2.3		1.7		2.3																												
-1.20	CVA	CVA08500	CR														1.7																										
-1.20	CYP	CYP08600	CL																					7.7		4.6		4.7		4.6		4.7		4.6		4.7		4.6		4.7		4.6	
-1.20	GRC	GRC10500	CR																						0.2		-0.6		0.2		-0.6		0.2		-0.6		0.2		-0.6		0.2		0.6
-0.80	BOT	BOT29700	CL																					3.2		-0.4		0.8		-0.4		0.8		-0.4		0.8		-0.4		0.8		-0.4	
-0.80	KEN	KEN24900	CR		1.4		2.4		1.4		2.5		1.4		2.5		1.4		3.3		1.9		5.3																				
-0.80	NOR	NOR12000	CR	1.7		-0.7		-0.7		-0.7		-0.7		-0.7		-0.9		0.9		4.2		4.6																					

* This assignment shall only be used by the administrations of Croatia, Hungary, Slovakia and the Czech Rep on the basis of equal access subject to mutual agreement between them.

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identifi-cation	Pola-riza-tion type	Channel number																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum equivalent protection margin																																							
-0.80	NOR	NOR12100	CL																								4.4				4.4												
-0.80	ZMB	ZMB31400	CR																						0.2		-1.0		0.2		-1.0		0.2		-1.0		0.2		-1.0		0.2		0.7
-0.80	ZWE	ZWE13500	CL	8.6		7.6		7.6		7.6		7.6		7.6		7.6		7.8		7.9		7.9																					
4.80	LSO	LSO30500	CL		6.3		6.2		6.3		6.2		6.3		6.2		6.1		6.1		5.8		8.0																				
4.80	MWI	MWI30800	CR																					10.6		11.1		11.1		11.1		6.9		6.9		6.9		6.9		6.9		5.4	
4.80	SWZ	SWZ31300	CR	6.9		3.9		3.9		3.9		3.9		3.9		3.8		3.8		3.8		3.4																					
5.00	S	S 13800	CL																					7.5		7.2		8.2		7.2		8.2		7.2		8.2		7.2		8.2		7.2	
5.00	S	S 13900	CL																														9.8										
9.00	I	I 08200	CR																						12.2		12.0		12.2		11.6		11.1		11.2		11.2		11.2		11.2		11.4
11.00	BDI	BDI27000	CL	3.2		0.4		0.4		0.4		0.4		0.4		0.4		0.4		0.4		0.4																					
11.00	JOR	JOR22400	CL																						5.8		5.8		5.8		5.8		5.8		5.8		5.8		5.8		5.8		7.6
11.00	KWT	KWT11300	CR																					8.0		7.1		7.1		7.1		7.1		7.1		7.1		7.1		7.1		7.1	
11.00	LBN	LBN27900	CR	2.0		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8																					
11.00	RRW	RRW31000	CR		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		2.6																				
11.00	SYR	SYR22900	CL		-0.7		-0.7		-0.7		-0.7		-0.7		-0.7		-0.7		-0.7		-0.7		1.4																				
11.00	SYR	SYR33900	CL		-0.7																																						
11.00	TZA	TZA22500	CR																						0.1		0.1		0.1		0.1		0.1		0.1		0.1		0.1		0.1		2.0
16.80	DJI	DJI09900	CL	8.7		6.0		6.0		6.0		6.0		6.0		6.0		6.0		6.0		6.0																					
17.00	ARS	ARS00375	CL																						4.3		4.3		4.3		4.3		4.3		4.3		4.3		4.3		4.3		6.8
17.00	ARS	ARS34000	CL																																								6.8
17.00	TCD	TCD14300	CR	4.3		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.1																					
17.00	UGA	UGA05100	CR																					11.5		10.7		10.7		10.7		10.7		10.7		10.7		10.7		10.7		10.7	
17.20	OMA	OMA12300	CL		2.0		2.0		2.0		2.0		2.0		2.0		2.0		2.0		2.0		4.4																				
20.00	QAT	QAT24700	CL		13.7		13.7		13.7		13.7		13.7		13.7		13.7		13.7		13.7		15.5																				
22.80	ARM	ARM06400	CR																						2.4		2.4		2.4		2.4		2.4		2.4		2.4		2.4		2.4		5.1
22.80	ERI	ERI09200	CL																						1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.7
22.80	FIN	FIN10300	CL																						0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		1.7
22.80	FIN	FIN10400	CL																																				0.2				1.7
22.80	MKD	MKD14800	CL		8.7		8.7		8.7		8.7		8.7		8.7		8.7		8.7		8.7		10.6																				
22.80	MLT	MLT14700	CR	9.1		7.7		7.7		7.7		7.7		7.7		7.7		7.7		7.7		7.8																					
23.20	AZE	AZE06400	CL																					4.7		2.5		2.5		2.5		2.5		2.5		2.5		2.5		2.5		2.5	
23.20	GEO	GEO06400	CL	8.1		6.0		6.0		6.0		6.0		6.0		6.0		6.0		6.0		6.0																					
23.20	LTU	LTU06100	CR																					8.1		5.6		5.6		5.6		5.6		5.6		5.6		5.6		5.6		5.6	
23.20	LVA	LVA06100	CR	6.5		6.4		6.4		6.4		6.4		6.4		6.4		6.4		6.3		6.6																					
28.20	LUX	LUX11400	CL	18.5		18.2		17.7		18.2		17.7		18.2		17.7		18.2		18.2		18.3																					
29.00	COM	COM20700	CR																					12.9		9.9		9.9		9.9		9.9		9.9		9.9		9.9		9.9		9.9	
29.00	MAU	MAU__100	CL																						9.8		9.8		9.8		9.8		9.8		9.8		9.8		9.8		9.8		12.8
29.00	MDG	MDG23600	CL	28.0		27.5		27.5		27.5		27.5		27.5		27.5		27.5		27.5		27.9																					
33.80	SVN	SVN14800	CR		5.9		5.9		5.9		5.9		5.9		5.9		5.9		6.0		6.0		6.1																				
33.80	UZB	UZB07100	CR																						0.3		2.5		5.8		4.7		5.8		4.7		5.8		4.7		5.8		5.0
34.00	BHR	BHR25500	CR		6.6		6.6		6.6		6.6		6.6		6.6		6.6		6.6		6.6		6.7																				
34.00	IRN	IRN10900	CL	2.4		-0.2		-0.2		-0.2		-0.3		-0.2		-0.3		-0.2		-0.2		-0.2		0.6		1.9																	

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identification	Polarization type	Channel number																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum equivalent protection margin																																							
34.20	MCO	MCO11600	CR																						2.3		8.7		17.2		17.2		17.2		17.2		17.2		17.2		17.2		17.7
36.00	RUS	RSTREA11	CR																											-0.8				-0.8				-0.8				-0.8	
36.00	RUS	RSTREA12	CL																												-1.2				-1.2				-1.2				-0.4
36.00	RUS	RSTRED11	CR																											-0.8				-0.8				-0.8				-0.8	
36.00	RUS	RSTRED12	CL																												-1.2				-1.2				-1.2				-0.4
36.00	RUS	RSTRSD11	CR																									-0.5		-0.5		-0.5		-0.5		-0.5		-0.5		-0.5		-0.5	
36.00	RUS	RSTRSD12	CL																										-0.7		-0.7		-0.7		-0.7		-0.7		-0.7		-0.7		0.2
37.80	BLR	BLR06200	CL	2.1		0.4		0.2		0.4		0.2		0.4		0.2		0.4		0.4		0.4																					
38.00	TJK	TJK06900	CL		1.9		1.9		1.9		1.9		1.9		1.9		1.9		1.9		1.9		4.4																				
38.20	BEL	BEL01800	CR																						-1.2		0.6		1.3		1.3		1.3		1.3		1.3		1.3		1.3		4.2
38.20	HOL	HOL21300	CL																					-0.1		-0.8		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3	
38.20	UKR	UKR06300	CR		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.6		0.6		0.3																				
42.00	TUR	TUR14500	CL		7.9		7.9		7.9		7.9		7.9		7.9		7.9		7.9		7.9		7.9																				
42.50	SEY	SEY00000	CR																						19.9		20.1		20.2		20.2		20.2		20.2		20.2		20.2		20.2		21.0
44.50	EST	EST06100	CR	14.4		13.8		13.8		13.8		13.8		13.8		13.8		13.8		13.8		13.8																					
50.00	AFG	AFG24501	CL																													1.5		1.5		1.5		1.5		1.5		1.5	
50.00	AFG	AFG24502	CR																														1.5		1.5		1.5		1.5		1.5		4.0
50.00	CLN	CLN21900	CL	0.9		0.9		0.9		0.9		0.9		0.9		0.9		0.9		0.9		0.9		5.1		5.1																	
50.00	KGZ	KGZ07000	CR		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		0.4																				
50.00	MDA	MDA06300	CR																					3.2		0.8		1.0		1.0		0.7		0.5		0.5		0.5		0.5		0.5	
50.00	MLD	MLD30600	CR	5.5		5.3		5.3		5.3		5.3		5.3		5.3		5.3		5.3		5.3		5.6		5.8																	
50.00	POL	POL13200	CR	5.9		4.5		4.5		4.5		4.5		4.5		4.5		4.5		4.5		4.5																					
50.00	ROU	ROU13600	CL																						0.4		0.5		0.7		-0.1		-0.9		-0.9		-0.9		-0.9		-0.9		2.0
50.00	TKM	TKM06800	CL	-0.2		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0																					
52.50	UAE	UAE27400	CR																					28.2		28.8		34.7		35.0		26.8		26.2		26.2		26.2		26.2		26.2	
56.00	BIH	BIH14800	CR	12.7		12.3		12.3		12.3		12.3		12.3		12.3		12.3		12.3		12.3																					
56.00	IND	INDA_100	CL		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3		1.3		2.5		4.1		6.5																
56.00	IND	INDB_100	CR	2.8		1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.1		3.2		3.2																	
56.00	RUS	RSTRSD21	CR																									11.0		17.6		17.2		17.1		17.1		17.1		17.1		17.1	
56.00	RUS	RSTRSD22	CL																										17.7		17.6		17.2		17.2		17.2		17.2		17.2		18.2
56.40	KAZ	KAZ06600	CL	2.6		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0																					
62.00	ALB	ALB29600	CL																						12.8		14.1		46.6		46.5		46.3		46.3		46.3		46.3		46.3		47.4
62.00	CHN	CHN15400	CR		14.4		14.4		14.4		14.4		14.4		14.4		14.4		14.4		14.4		14.7		2.5		2.5																
62.00	CHN	CHN15500	CL	14.7		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0		14.0		2.4		-0.5																	
68.00	IND	IND03700	CL		5.2		5.2		5.2		5.2		5.2		5.2		5.2		5.2		5.2		5.2		5.2		8.2																
68.00	IND	IND04701	CR																													40.8		40.8		40.8		40.8		40.8		40.8	
68.00	IND	IND04702	CL																														44.2		44.2		44.2		44.2		44.2		47.1
68.00	IND	INDD_100	CR	12.6		9.6		9.6		9.6		9.6		9.6		9.6		9.6		9.6		9.6		9.6		9.6																	
74.00	BGD	BGD22000	CR	4.7		1.7		1.7		1.7		1.7		1.7		1.7		1.7		1.7		1.7		0.9		0.9																	
74.00	BRU	BRU3300A	CR		12.1		12.1		12.1		12.1		12.1		12.1		12.1		12.1		12.1		11.7		11.3		13.6																
74.00	MNG	MNG24800	CL																					8.1		8.1		15.8		999.9		48.6		48.1		48.1		48.1		48.1		48.1	
80.20	INS	INS02800	CR	16.0		14.6		14.6		14.6		14.6		14.6		14.6		14.6		14.6		14.6		14.5		14.5																	

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identification	Polarization type	Channel number																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum equivalent protection margin																																							
86.00	BTN	BTN03100	CR	8.6		5.6		5.6		5.6		5.6		5.6		5.6		5.6		5.6		5.6		5.6		5.6																	
86.00	CBG	CBG29900	CR		2.1		2.1		2.1		2.1		2.1		2.1		2.1		2.1		2.1		2.1		2.1		4.0																
86.00	RUS	RSTRSD31	CR																									1.9		999.9		999.9		999.9		999.9		999.9		999.9		999.9	
86.00	RUS	RSTRSD32	CL																										999.9		999.9		999.9		999.9		999.9		999.9		999.9		999.9
88.00	SNG	SNG15100	CL	15.4		13.0		13.0		13.0		13.0		13.0		13.0		13.0		13.0		13.0		13.0		13.0																	
91.50	MLA	MLA__100	CR		11.5		11.5		11.5		11.5		11.5		11.5		11.5		11.5		11.5		11.5		11.5		13.8																
92.20	CHN	CHN16000	CR	7.7		4.9		4.9		4.9		4.9		4.9		4.9		4.9		4.9		4.9		4.9		4.9																	
92.20	CHN	CHN16100	CL		11.1		11.1		11.1		11.1		11.1		11.1		11.1		11.1		11.1		11.1		11.1		11.2																
98.00	PHL	PHL28500	CL		5.1		5.1		5.1		5.1		5.1		5.1		5.1		5.1		5.1		5.1		5.1		7.9																
98.00	THA	THA14200	CR	8.1		5.3		5.3		5.3		5.3		5.3		5.3		5.3		5.3		5.3		5.3		5.3																	
104.00	BRM	BRM29800	CR	15.4		13.8		13.8		13.8		13.8		13.8		13.8		13.8		13.8		13.8		13.8		13.8																	
104.00	INS	INS03501	CL																													36.4		37.0		37.0		37.0		37.0		37.0	
104.00	INS	INS03502	CR																														42.1		42.1		42.1		42.1		42.1		45.1
107.00	VTN	VTN32500	CR		14.2		14.2		14.2		14.2		14.2		14.2		14.2		14.2		14.2		14.3		14.4		17.1																
109.85	J	000BS-3N	CR	21.6		19.4		19.2		19.2		19.2		19.2		19.9		21.0																									
109.85	J	J 10985	CR	23.9		21.6		21.4		21.4		21.4		21.4		22.1		23.1		21.7		21.4		21.4		21.4																	
110.00	J	J 11100	CR	23.7		21.4		21.2		21.2		21.2		21.2		22.0		23.0		21.6		21.2		21.3		21.3																	
110.00	J	J 1110E	CR	21.4		19.2		19.0		19.0		19.0		19.0		19.8		20.8																									
110.00	RUS	RUS00401	CR																									29.2		999.9		14.1		13.2		13.2		13.2		13.2		13.2	
110.00	RUS	RUS00402	CL																										999.9		20.8												
116.00	KOR	KOR11201	CL																													28.2		29.2		29.2		29.2		29.2		29.2	
116.00	KOR	KOR11202	CR																														31.8		31.8		31.8		31.8		31.8		34.7
121.80	USA	MRA33200	CR	3.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2																	
122.00	CHN	CHN20000	CL		13.8		13.8		13.8		13.8		13.8		13.8		13.9		13.9		13.8		13.8		13.8		15.9																
122.00	USA	GUM33101	CR																													29.3		28.6		28.6		28.6		28.6		28.6	
122.00	USA	GUM33102	CL																														28.6		28.6		28.6		28.6		28.6		29.3
122.20	LAO	LAO28400	CR		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.4		0.4		1.6																
128.00	SLM	SLM00000	CL	16.4		13.4		13.4		13.4		13.4		13.4		13.4		13.4		13.4		13.4		13.4		13.4																	
128.00	TMP	TMP00000	CR		19.6		19.6		19.6		19.6		19.6		19.6		19.6		19.6		19.6		19.6		19.6		22.6																
134.00	CHN	CHN15800	CL		0.6		0.6		0.6		0.6		0.6		0.6		0.6		0.6		0.6		0.6		0.6		3.6																
134.00	CHN	CHN15900	CR	2.0		2.0		2.0		2.0		2.0		2.0		2.0		2.0		2.0		2.0		2.0		2.0																	
134.00	NRU	NRU30900	CL	18.8		17.6		17.6		17.6		17.6		17.6		17.6		17.6		17.6		17.6		17.6		17.6																	
140.00	F	F____200	CL		3.4		3.4		3.4		3.4		3.4		3.4		3.4		3.4		3.4		3.4		3.4		5.9																
140.00	F	F____300	CR	4.0		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4		1.4																	
140.00	KRE	KRE28600	CL	13.6		12.2		12.2		12.2		12.2		12.2		12.2		12.2		12.2		12.2		12.2		12.2																	
140.00	PLW	PLW00000	CR		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7		9.7		7.9																
140.00	RUS	RSTRSD51	CR																									0.1		999.9		3.0		1.6		1.6		1.6		1.6		1.6	
140.00	RUS	RSTRSD52	CL																										999.9		7.3		1.6		1.6		1.6		1.6		1.6		3.0
140.00	VUT	VUT12801	CL																													8.9		8.9		8.9		8.9		8.9		8.9	
140.00	VUT	VUT12802	CR																														8.9		8.9		8.9		8.9		8.9		10.4
146.00	MHL	MHL00000	CR		41.3		40.8		41.3		40.8		41.3		41.1		41.6		41.1		41.6		41.1		41.6		41.8																
152.00	AUS	AUS00400	CL			-0.3				-0.3				-0.3				-0.3				-0.3				-0.3																	

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identification	Polarization type	Channel number																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum equivalent protection margin																																							
152.00	AUS	AUS00401	CL			6.0				6.0				6.0				6.0				6.0				6.0																	
152.00	AUS	AUS00402	CL			6.0				6.0				6.0				6.0				6.0				6.0																	
152.00	AUS	AUS00403	CL			6.0				6.0				6.0				6.0				6.0				6.0																	
152.00	AUS	AUS00404	CL			6.0				6.0				6.0				6.0				6.0				6.0																	
152.00	AUS	AUS00405	CL			6.0				6.0				6.0				6.0				6.0				6.0																	
152.00	AUS	AUS00406	CL			6.0				6.0				6.0				6.0				6.0				6.0																	
152.00	AUS	AUS0040A	CL			-0.4				-0.4				-0.4				-0.4				-0.4				-0.4																	
152.00	AUS	AUS00500	CR				-3.3				-3.3				-0.3				-0.3				-0.3				-0.3																
152.00	AUS	AUS00501	CR				3.0				3.0				6.0				6.0				6.0				6.0																
152.00	AUS	AUS00502	CR				3.0				3.0				6.0				6.0				6.0				6.0																
152.00	AUS	AUS00503	CR				3.0				3.0				6.0				6.0				6.0				6.0																
152.00	AUS	AUS00504	CR				3.0				3.0				6.0				6.0				6.0				6.0																
152.00	AUS	AUS00505	CR				3.0				3.0				6.0				6.0				6.0				6.0																
152.00	AUS	AUS00506	CR				3.0				3.0				6.0				6.0				6.0				6.0																
152.00	AUS	AUS00600	CR																										999.9		999.9		999.9		999.9				999.9				999.9
152.00	AUS	AUS00601	CR																										999.9		999.9		999.9		999.9				999.9				999.9
152.00	AUS	AUS00602	CR																										999.9		999.9		999.9		999.9				999.9				999.9
152.00	AUS	AUS00603	CR																										999.9		999.9		999.9		999.9				999.9				999.9
152.00	AUS	AUS00604	CR																										999.9		999.9		999.9		999.9				999.9				999.9
152.00	AUS	AUS00605	CR																										999.9		999.9		999.9		999.9				999.9				999.9
152.00	AUS	AUS00606	CR																										999.9		999.9		999.9		999.9				999.9				999.9
152.00	AUS	AUSA0000	CL	39.7				-0.4				-0.4																															
152.00	AUS	AUSA0001	CL	61.2				6.0				6.0																															
152.00	AUS	AUSA0002	CL	60.5				6.0				6.0																															
152.00	AUS	AUSA0003	CL	61.5				6.0				6.0																															
152.00	AUS	AUSA0004	CL	53.4				6.0				6.0																															
152.00	AUS	AUSA0005	CL	55.9				6.0				6.0																															
152.00	AUS	AUSA0006	CL	48.3				6.0				6.0																															
158.00	FSM	FSM00000	CR	8.8		5.7		5.7		5.7		5.7		5.7		5.7		5.7		5.7		5.7		5.7		5.7																	
158.00	NZL	NZL__100	CL		8.5		8.4		8.5		8.4		8.5		8.4		8.6		8.6		8.6		8.6		8.6		11.2																
164.00	AUS	AUS00700	CR			-2.9				-2.9				-2.9				0.1				0.1				0.1																	
164.00	AUS	AUS00701	CR			3.0				3.0				3.0				6.0				6.0				6.0																	
164.00	AUS	AUS00702	CR			3.0				3.0				3.0				6.0				6.0				6.0																	
164.00	AUS	AUS00703	CR			3.0				3.0				3.0				6.0				6.0				6.0																	
164.00	AUS	AUS00704	CR			3.0				3.0				3.0				6.0				6.0				6.0																	
164.00	AUS	AUS00705	CR			3.0				3.0				3.0				6.0				6.0				6.0																	
164.00	AUS	AUS00706	CR			3.0				3.0				3.0				6.0				6.0				6.0																	
164.00	AUS	AUS0070A	CR			-3.1				-3.1				-3.1				-0.1				-0.1				-0.1																	
164.00	AUS	AUS00800	CL		0.2				0.2				0.2				0.2				0.2				0.2																		
164.00	AUS	AUS00801	CL		6.0				6.0				6.0				6.0				6.0				6.0																		
164.00	AUS	AUS00802	CL		6.0				6.0				6.0				6.0				6.0				6.0																		
164.00	AUS	AUS00803	CL		6.0				6.0				6.0				6.0				6.0				6.0																		

1	2	3	4	5																																							
Orbital Position	Admin. symbol	Beam Identification	Polarization type	Channel number																																							
				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	29	30	31	32	33	34	35	36	37	38	39	40
				Minimum equivalent protection margin																																							
164.00	AUS	AUS00804	CL		6.0				6.0				6.0				6.0				6.0				6.0																		
164.00	AUS	AUS00805	CL		6.0				6.0				6.0				6.0				6.0				6.0																		
164.00	AUS	AUS00806	CL		6.0				6.0				6.0				6.0				6.0				6.0																		
164.00	AUS	AUS00900	CR																									31.9		999.9		38.1		36.8				36.8				36.8	
164.00	AUS	AUS00901	CR																									65.2		999.9		63.1		61.7				61.7				61.7	
164.00	AUS	AUS00902	CR																									65.4		999.9		63.3		61.9				61.9				61.9	
164.00	AUS	AUS00903	CR																									60.5		999.9		62.1		60.8				60.8				60.8	
164.00	AUS	AUS00904	CR																									50.2		999.9		60.8		59.5				59.5				59.5	
164.00	AUS	AUS00905	CR																									56.4		999.9		59.4		58.1				58.1				58.1	
164.00	AUS	AUS00906	CR																									48.1		999.9		57.0		55.8				55.8				55.8	
164.00	AUS	AUS0090A	CR																									42.0		999.9		40.3		38.9				38.9				38.9	
164.00	AUS	AUSB0000	CL				-0.1				-0.1				-0.1																												
164.00	AUS	AUSB0001	CL				6.0				6.0				6.0																												
164.00	AUS	AUSB0002	CL				6.0				6.0				6.0																												
164.00	AUS	AUSB0003	CL				6.0				6.0				6.0																												
164.00	AUS	AUSB0004	CL				6.0				6.0				6.0																												
164.00	AUS	AUSB0005	CL				6.0				6.0				6.0																												
164.00	AUS	AUSB0006	CL				6.0				6.0				6.0																												
170.00	USA	PLM33200	CL		10.4		10.4		10.4		10.4		10.4		10.4		10.4		10.4		10.4		10.4		10.4		10.4																
170.00	USA	USAA_101	CR																													45.5		45.5		999.9		45.5		999.9		45.5	
170.00	USA	USAA_102	CL																														45.5		48.5		48.5		48.5		48.5		48.5
170.75	TON	TON21500	CR		11.6		11.6		11.6		11.6		11.6		11.6		11.6		11.6		11.6		11.6		11.6		11.6																
176.00	KIR	KIR__100	CL	6.7		3.7		3.7		3.7		3.7		3.7		3.7		3.7		3.7		3.7		3.7		3.7																	
176.00	TUV	TUV00000	CR		4.7		4.7		4.7		4.7		4.7		4.7		4.7		4.7		4.7		4.7		4.7		7.7																

ANNEX 1

MOD

Limits for determining whether a service of an administration is considered to be affected by a proposed modification to the Region 2 feeder-link Plan or by a proposed new or modified assignment in the Regions 1 and 3 feeder-link Lists or when it is necessary under this Appendix to seek the agreement of any other administration

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3 Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Region 2 feeder-link Plan[15]

With respect to the modification to the Region 2 feeder-link 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[16] corresponding to a test point of its entry in that 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 feeder-link Plan as established by the 1983 Conference; *or*

– a modification of the assignment in accordance with this Appendix; *or*

– a new entry in the feeder-link Plan under Article 4; *or*

– any agreement reached in accordance with this Appendix except for Resolution **42 (Rev.Orb-88)**.

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[15] With respect to § 3 the limit specified relates to the overall equivalent protection margin calculated in accordance with § 1.12 of Annex 3.

[16] For the definition of the overall equivalent protection margin, see § 1.11 of Annex 5 to Appendix **S30**.

MOD

4 Limits to the interference into frequency assignments in conformity with the Regions 1 and 3 feeder-link Plan or with the Regions 1 and 3 feeder-link Lists or proposed new or modified assignments in the Regions 1 and 3 feeder-link Lists

Under assumed free-space propagation conditions, the power flux-density of a proposed new or modified assignment in the feeder-link Lists shall not exceed the value of –76 dB (W/(m^2 · 27 MHz)) at any point in the geostationary-satellite orbit, and the relative off-axis e.i.r.p. of the associated feeder-link antenna shall be in compliance with Fig. A (WRC-97 curves) of Annex 3.

With respect to § 4.1.1 *a)* or *b)* of Article 4, an administration in Region 1 or 3 shall be considered by the Bureau as being affected if the minimum orbital spacing between the wanted and interfering space stations, under worst-case station-keeping conditions, is less than 9°.

However, an administration shall not be considered as affected if, under assumed free-space propagation conditions, the effect of the proposed new or modified assignments in the feeder-link Lists is that the feeder-link equivalent protection margin[17] corresponding to a test point of its assignment in the feeder-link Plan or the feeder-link Lists or for which the procedure of Article 4 has been initiated, including the cumulative effect of any previous modification to the feeder-link Lists or any previous agreement, does not fall more than 0.45 dB below 0 dB, or, if already negative, more than 0.45 dB below the value resulting from:

– the Regions 1 and 3 feeder-link Plan and Lists as established by WRC-2000; *or*

– a proposed new or modified assignment to the feeder-link Lists in accordance with this Appendix; *or*

– a new entry in the Regions 1 and 3 feeder-link Lists as a result of the successful application of Article 4 procedures.

For a proposed new or modified assignment to the feeder-link Lists, in the interference analysis, for each test point, the antenna characteristics described in § 3.5 of Annex 3 shall apply.

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 an administration in Region 2 shall be considered affected by a proposed new or modified assignment in the Regions 1 and 3 feeder-link Lists when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link would cause an

[17] For the definition of the equivalent protection margin, see § 1.7 of Annex 3.

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 feeder-link Plan. However, this provision shall be applied to Region 2 interim systems with respect to the Regions 1 and 3 feeder-link Plan.

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6 Limits applicable to protect a frequency assignment in the band 17.8-18.1 GHz (Region 2) to a receiving feeder-link space station in the fixed-satellite service (Earth-to-space)

An administration in Region 2 shall be considered affected by a proposed new or modified assignment in the Regions 1 and 3 feeder-link Lists when the power flux-density arriving at the Region 2 receiving space station of a broadcasting-satellite feeder-link would cause an increase in the noise temperature of the receiving 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.

MOD

ANNEX 2

Basic characteristics to be furnished in notices 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

The data elements contained in this Annex are included in Appendix **S4**.

ANNEX 3

MOD

Technical data used in establishing the provisions and associated Plans and Regions 1 and 3 feeder-link Lists, which should be used for their application[18]

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1.7 Feeder-link equivalent protection margin for Regions 1 and 3[19]

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1.12 Overall equivalent protection margin

The overall equivalent protection margin M is given in dB by the expression[20]:

$$M = -10 \log \left(\sum_{i=1}^{n} 10^{(-M_i/10)} \right)$$

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).[21]

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[18] In revising this Annex at WRC-97 and at WRC-2000, no changes were made to the technical data applicable to the Region 2 feeder-link Plan. However, for all three Regions it should be noted that some of the parameters of networks proposed as modifications to the Region 2 feeder-link Plan and the Regions 1 and 3 feeder-link Lists may differ from the technical data presented herein.

[19] 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**) the Bureau will use the worst-case approach until a relevant ITU-R Recommendation is incorporated in this Annex by reference.

[20] 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.

[21] M_4 and M_5 are applicable only for Region 2.

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.

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**.

WRC-2000 generally applied the following protection ratio values for development of the WRC-2000 Regions 1 and 3 feeder-link Plan:

R_{cu} = 27 dB

R_{cd} = 21 dB

These values were used for all assignments in WRC-2000 planning except those for which WRC-2000 adopted different values (see § 3.3). The planning at WRC-2000 was based on use of the equivalent protection margin criterion.

MOD

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[22]:

– 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 feeder-link 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[23,24]:

– 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 feeder-link Plan by WRC-97 was, in accordance with Recommendation **521 (WRC-95)**, based on “simultaneous planning of feeder links and downlinks with calculation of overall equivalent protection margins” (as defined in § 1.11 of Annex 5 to Appendix **S30** 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 feeder-link Plan no overall co-channel single entry *C*/*I* ratio should be lower than 28 dB.

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22 These protection ratio values were 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.

23 These protection ratio values were 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 between 27 October 1997 and 12 May 2000.

24 These protection ratio values were used for protection of digital and analogue assignments from analogue emissions.

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 feeder-link Plan at WRC-97 and planning at WRC-2000 were 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*. The Regions 1 and 3 feeder-link Plan as established by WRC-2000 is generally based on the use of digital modulation.

WRC-2000 adopted for the protection of digital assignments from digital emissions the following protection ratio values to be applied for calculation of feeder-link equivalent protection margins of the WRC-2000 Regions 1 and 3 feeder-link Plan;

– 27 dB for co-channel signals;

– 22 dB for adjacent channel signals.

During planning at WRC-2000, these values were used for all assignments of the Regions 1 and 3 feeder-link Plan and Lists, except those for which WRC-2000 adopted different values to be used in the planning process[25].

Protection masks and associated calculation methods for interference into broadcasting-satellite systems involving digital emissions are given in Recommendation ITU-R BO.1293-1.

ADD

3.7.5 Composite beam

A composite beam represents a single beam (i.e. "simulated shaped beam") and is formed by combining two or more elliptical beams at a given orbital position. In general, composite beams were used at WRC-2000 for administrations which had more than one beam at a given orbital position in the WRC-97 Regions 1 and 3 feeder-link Plan.

ADD

3.17 Orbital separation limit for interference calculation

WRC-2000 has adopted the use of an orbital separation limit for interference calculation in Regions 1 and 3. Beyond this limit no interference was taken into account.

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[25] For analogue assignments, the protection ratios of WRC-97 (30 dB co-channel, 22 dB adjacent channel) were used.

Initially, the values used for the orbital separation limit were 15º for co-polar and 9º for cross-polar emissions. At a later stage, the unique value of the orbital separation limit of 9º was adopted by WRC-2000.

MOD

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, 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 service feeder link in the Regions 1 and 3 feeder-link Plan or the Region 2 feeder-link Plan is required when the power flux-density arriving at the receiving space station of a broadcasting-satellite service feeder link 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**.

2 Threshold values for determining when coordination is required between transmitting feeder-link earth stations in the fixed-satellite service in Region 2 and a receiving space station in the Regions 1 and 3 feeder-link Plan or List in the frequency band 17.8-18.1 GHz

With respect to § 7.1, Article 7, coordination of a transmitting feeder-link earth station in the fixed-satellite service with a receiving space station in a broadcasting-satellite feeder link in the Regions 1 and 3 feeder-link Plan or List is required when the power flux-density arriving at the receiving space station of a broadcasting-satellite service feeder link of another administration would cause an increase in the noise temperature of the feeder-link space station which exceeds a threshold value of $\Delta T/T$ 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.

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

ARTICLE 6

(MOD)

Procedures for implementation of the Plan and regulation of the fixed-satellite service in the planned bands[1]

ADD

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[1] If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication specified in § 6.26, 6.33 and 6.49 or cancel the entry in the List under § 6.44, as appropriate, after informing the administration concerned. The Bureau shall inform all administrations of such action and that the network specified in the publication in question no longer has to be taken into consideration by the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration not later than 60 days prior to due date of the payment if payment has not been received by that date. This provision was identified in reply to Resolution 88 (Minneapolis, 1998) of the Plenipotentiary Conference and shall enter into force at a date to be determined by the forthcoming Plenipotentiary Conference.

ARTICLE 8

Procedure for notification and recording in the Master Register of assignments in the planned bands for the fixed-satellite service

MOD

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**[2]. Consequently, the provisions of Article **S11** shall continue to be applicable except with respect to the coordination requirement vis-à-vis space radiocommunication stations of other administrations under No. **S11.32** and related provisions.

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[2] For existing systems in Part B of the Plan, see Section IB of Article 6.

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

MOD

1.4 *Dates* proposed for bringing into use. The date (actual or foreseen, as appropriate) of bringing the frequency assignment (new or modified) into use. The date of bringing into use denotes the date at which the frequency assignment is brought into regular operation to provide the published radiocommunication service with technical parameters within the technical characteristics notified to the Bureau.

APPENDIX S42

Table of allocation of international call sign series

Call sign series	Allocated to

ADD

*4WA-4WZ	United Nations

ADD

E4A-E4Z	Palestinian Authority[1]

MOD

VRA-VRZ	China (People's Republic of) – Hong Kong

MOD

VSA-VSZ	United Kingdom of Great Britain and Northern Ireland

1 In response to Resolution 99 (Minneapolis, 1998) of the Plenipotentiary Conference.

RESOLUTIONS

AND

RECOMMENDATIONS

List of Resolutions and Recommendations approved for deletion by WRC-2000

RESOLUTIONS	
8 (Rev.Mob-87)	Implementation of the changes in allocations in the bands between 4 000 kHz and 27 500 kHz
14	Relating to the transfer of technology
23 (WRC-95)	Provisions applicable to the frequency assignments in the non-planned bands below 28 000 kHz
24 (WRC-95)	Review of the provisions of the Constitution relating to revisions of the Radio Regulations
30 (WRC-97)	Publication of the Weekly Circular including special sections
50 (WRC-97)	Interval between world radiocommunication conferences
52 (WRC-97)	Provisional application of Nos. **S11.24** and **S11.26** of the Radio Regulations adopted by WRC-97 with regard to high altitude platform stations
54 (WRC-97)	Implementation of Resolution **46 (Rev.WRC-97)**
60	Relating to information on the propagation of radio waves used in the determination of the coordination area
70 (CAMR-92)	Establishment of standards for the operation of low-orbit satellite systems
121 (Rev.WRC-97)	Continued development of interference criteria and methodologies for fixed-satellite service coordination between feeder links of non-geostationary satellite networks in the mobile-satellite service and geostationary-satellite networks in the fixed-satellite service in the bands 19.3-19.7 GHz and 29.1-29.5 GHz
123 (WRC-97)	Feasibility of implementing feeder links of non-geostationary satellite networks in the mobile-satellite service in the band 15.43-15.63 GHz (space-to-Earth) while taking into account the protection of the radio astronomy service, the Earth exploration-satellite (passive) service and the space research (passive) service in the band 15.35-15.4 GHz
126 (WRC-97)	Use of the frequency band 31.8-33.4 GHz for high-density systems in the fixed service
129 (WRC-97)	Criteria and methodologies for sharing between the fixed-satellite service and other services with allocations in the band 40.5-42.5 GHz
130 (WRC-97)	Use of non-geostationary systems in the fixed-satellite service in certain frequency bands
131 (WRC-97)	Power flux-density limits applicable to non-geostationary fixed-satellite service systems for protection of terrestrial services in the bands 10.7-12.75 GHz and 17.7-19.3 GHz

RESOLUTIONS *(cont.)*	
133 (WRC-97)	Sharing between the fixed service and other services in the band 37-40 GHz
134 (WRC-97)	Use of the frequency band 40.5-42.5 GHz by the fixed-satellite service
213 (Rev.WRC-95)	Sharing studies concerning possible use of the band 1 675-1 710 MHz by the mobile-satellite service
218 (WRC-97)	Use of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz by the mobile-satellite service
219 (WRC-97)	Studies relating to consideration of the allocation to the non-geostationary mobile-satellite service in the meteorological aids band 405-406 MHz and the impact on primary services allocated in the adjacent bands
220 (WRC-97)	Studies to consider the feasibility of use of a portion of the band 1 559-1 610 MHz by the mobile-satellite service (space-to-Earth)
406	Relating to the use of frequency bands higher than the HF bands in the aeronautical mobile (R) service and the aeronautical mobile-satellite (R) service for communication and for meteorological broadcasts
411 (CAMR-92)	Implementation of the new provisions applicable in the frequency bands allocated exclusively to the aeronautical mobile (OR) service between 3 025 kHz and 18 030 kHz
412 (CAMR-92)	Transfer of frequency assignments of aeronautical stations operating in the frequency bands allocated exclusively to the aeronautical mobile (OR) service between 3 025 kHz and 18 030 kHz
500	Relating to the modification of carrier frequencies of LF broadcasting stations in Region 1
518 (Orb-88)	Country/geographical area symbols used in Appendices **S30**/**30** and **S30A**/**30A**
519 (Orb-88)	Possible extension to Regions 1 and 3 of provisions for interim systems
524 (WARC-92)	Future consideration of the Plans for the broadcasting-satellite service in the band 11.7-12.5 GHz (Region 1) and the band 11.7-12.2 GHz (Region 3) in Appendix **S30**/**30** and the associated feeder-link Plans in Appendix **S30A**/**30A**
531 (WRC-95)	Review of Appendices **S30**/**30** and **S30A**/**30A** of the Radio Regulations
534 (WRC-97)	Implementation of Annex 5 to Appendix **S30** and Annex 3 to Appendix **S30A** of the Radio Regulations
538 (WRC-97)	Use of the frequency bands covered by Appendices **S30**/**30** and **S30A**/**30A** by non-geostationary-satellite systems in the fixed-satellite service

RESOLUTIONS *(end)*	
712 (Rev.WRC-95)	Consideration by a future competent World Radiocommunication Conference of issues dealing with allocations to space services
721 (WRC-97)	Agenda for the 1999 World Radiocommunication Conference
722 (WRC-97)	Preliminary agenda for the 2001 World Radiocommunication Conference
726 (WRC-97)	Frequency bands above 30 GHz available for high-density applications in the fixed service

RECOMMENDATIONS	
32 (Orb-88)	International monitoring of emissions originating from space stations
61	Relating to technical standards for the assessment of harmful interference in the frequency bands above 28 MHz
105 (WRC-95)	Further work by ITU-R on determination of the coordination area around earth stations operating with geostationary-satellite networks in the fixed-satellite service and earth stations providing feeder links to non-geostationary-satellite networks in the mobile-satellite service operating in opposite directions of transmission
405	Relating to a study of the utilization of the aeronautical mobile-satellite (R) service
507	Relating to spurious emissions in the broadcasting-satellite service
518 (HFBC-87)	HF broadcast receivers
706	Frequency sharing by the Earth exploration-satellite service (passive sensors) and the space research service (passive sensors) with the fixed, mobile except aeronautical mobile, and fixed-satellite services in the band 18.6-18.8 GHz
711	Relating to the coordination of earth stations
720 (WRC-95)	The flexible and efficient use of the radio spectrum by fixed and some mobile services in the MF and HF bands using block allocations for adaptive systems

RESOLUTION 5 (Rev.WRC-2000)

Technical cooperation with the developing countries in the study of propagation in tropical areas

The World Radiocommunication Conference (Istanbul, 2000),

having noted

that the assistance provided for the developing countries by the Union in the field of telecommunications in cooperation with other United Nations specialized agencies, such as the United Nations Development Programme (UNDP), augurs well for the future,

aware

a) of the fact that the developing countries, particularly those in tropical areas, require adequate knowledge of radiowave propagation in their territories in order to make rational and economical use of the radio-frequency spectrum;

b) of the importance of propagation in radiocommunications;

c) of the importance of the work of ITU-T and ITU-R Study Groups for the development of telecommunications in general and radiocommunications in particular,

considering

a) the need for the developing countries themselves to study telecommunications in general and propagation in particular in their territories, this being the best means of enabling them to acquire telecommunication techniques and to plan their systems effectively and in conformity with the special conditions in the tropical areas;

b) the scarcity of resources available in these countries,

resolves to instruct the Secretary-General

1 to offer the assistance of the Union to developing countries in the tropical areas which endeavour to carry out national propagation studies in order to improve and develop their radiocommunications;

2 to assist these countries, if necessary with the collaboration of international and regional organizations such as the Asia-Pacific Broadcasting Union (ABU), Arab States Broadcasting Union (ASBU), African Telecommunication Union (ATU) and the Union of National Radio and Television Organizations of Africa (URTNA) which may be concerned, in carrying out national propagation measurement programmes, including collecting appropriate meteorological data, on the basis of ITU-R Recommendations and Questions in order to improve the use of the radio-frequency spectrum;

3

to arrange funds and resources for this purpose from the UNDP or other sources in order to enable the Union to provide the countries concerned with adequate and effective technical assistance for the purpose of this Resolution,

urges administrations

to submit the results of these propagation measurements to ITU-R for consideration in its studies,

invites the Council

to follow the progress made in carrying out programmes of propagation measurements and the results achieved, and to take any action that it considers necessary.

RESOLUTION 10 (Rev.WRC-2000)

Use of two-way wireless telecommunications by the International Red Cross and Red Crescent Movement

The World Radiocommunication Conference, (Istanbul, 2000),

considering

a) that the worldwide humanitarian operations carried out by the International Red Cross and Red Crescent Movement – composed of the International Committee of the Red Cross, the International Federation of Red Cross and Red Crescent Societies and national Red Cross and Red Crescent societies – are of great importance and often indispensable;

b) that in such circumstances normal communication facilities are frequently overloaded, damaged, completely interrupted or not available;

c) that it is necessary to facilitate by all possible measures the reliable intervention of these national and international organizations;

d) that rapid and independent contact is essential to the intervention of these organizations;

e) that for the efficient and safe conduct of their humanitarian operations, these organizations rely heavily on two-way wireless telecommunication facilities, and particularly on an extensive HF and VHF radio network,

resolves to urge administrations

1 to take account of the possible needs of the International Red Cross and Red Crescent Movement for two-way wireless telecommunication means when normal communication facilities are interrupted or not available;

2 to assign to these organizations the minimum number of necessary working frequencies in accordance with the Radio Regulations;

3 to take all practicable steps to protect such communications from harmful interference.

RESOLUTION 20 (Rev.WRC-2000)

Technical cooperation with developing countries in the field of aeronautical telecommunications

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the allocations of the frequency bands and the provisions concerning various aeronautical mobile services have been revised several times by recent conferences;

b) that some of these frequency bands and provisions support the worldwide implementation of new aeronautical telecommunication systems;

c) that on the other hand, some of these frequency bands and provisions support existing aeronautical systems that may be affected by the revision;

d) that, as a consequence of *a), b)* and *c)*, technological modernization will be necessary in order to maintain and improve the safety and regularity of international civil aviation, the accuracy and security of aeronautical radionavigation and the efficiency of distress and rescue systems;

e) that the developing countries may require assistance in improving the training of technical staff, as well as in introducing new systems, in coping with technological modernization and enhancing the operation of aeronautical telecommunications,

recognizing

a) the value of the assistance which, in conjunction with other international organizations, the Union has provided and may continue to provide to developing countries in the field of telecommunications;

b) that Resolution 20 (Mob-87) adopted by the WARC Mob-87 provides a good basis for the technical cooperation with developing countries in the field of aeronautical telecommunications that has been undertaken by the International Civil Aviation Organization (ICAO),

resolves to instruct the Secretary-General

1 to encourage ICAO to continue its assistance to developing countries which are endeavouring to improve their aeronautical telecommunications, in particular by providing them with technical advice for the planning, establishment, operation and maintenance of equipment, as well as help with the training of staff, essentially in matters relating to the new technologies;

2 for this purpose, to seek the continued collaboration of ICAO, the United Nations Conference for Trade and Development (UNCTAD) and other specialized agencies of the United Nations, as appropriate;

3 to continue to give special attention to seeking the aid of the United Nations Development Programme (UNDP) and other sources of financial support, to enable the Union to render sufficient and effective technical assistance in the field of aeronautical telecommunications,

invites the developing countries

so far as possible, to give a high level of priority to and include in their national programmes of requests for technical assistance projects relating to aeronautical telecommunications and to support multinational projects in that field.

RESOLUTION 25 (Rev.WRC-2000)

Operation of global satellite systems for personal communications

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that, in accordance with No. 6 of its Constitution (Geneva, 1992), one of the purposes of the Union is “to promote the extension of the benefits of the new telecommunication technologies to all the world’s inhabitants”;

b) that, to this end, the Union is fostering the use of new technologies in telecommunications and is studying questions relating to this use in the Radiocommunication and the Telecommunication Standardization Sectors;

c) that the Telecommunication Development Sector is studying questions aimed at identifying the benefits that developing countries may derive from using new technologies;

d) that, among these new technologies, constellations of low-Earth orbit satellites may provide global coverage and facilitate low-cost communications;

e) that the theme “global mobile personal communications by satellite” (GMPCS) was discussed at the first World Telecommunication Policy Forum established by Resolution 2 (Kyoto, 1994) of the Plenipotentiary Conference;

f) that Council Resolution 1116 instructs the Secretary-General to act as depositary of the GMPCS Memorandum of Understanding (MoU) and its Arrangements, to act as the registry for type-approval procedures and terminal types and to authorize the use of the abbreviation “ITU” as part of the GMPCS-MoU mark;

g) Recommendations ITU-R M.1343 and ITU-R M.1480 on the essential technical requirements of GMPCS earth stations that should be used by administrations as a common technical basis facilitating the global circulation and use of such GMPCS terminals in conformity with these Recommendations,

recognizing

a) that the spectrum available to global satellite systems for personal communications is limited;

b) that successful coordination does not in any way imply licensing authorization to provide a service within the territory of a Member State, *considering further*

that other countries intending to use these systems should be guaranteed that they will be operated in accordance with the Constitution, the Convention and the Administrative Regulations,

noting

a) that the Constitution recognizes the sovereign right of each State to regulate its telecommunications;

b) that the International Telecommunication Regulations "recognize the right of any Member, subject to national law and should it decide to do so, to require that administrations and private operating agencies, which operate in its territory and provide an international telecommunication service to the public, be authorized by that Member", and specifies that "within the framework of the present Regulations, the provision and operation of international telecommunication services in each relation is pursuant to mutual agreement between administrations";

c) that Article **S18** specifies the authorities for licensing the operation of stations within any given territory;

d) the right of each Member State to decide on its participation in these systems, and the obligations for entities and organizations providing international or national telecommunication services by means of these systems to comply with the legal, financial and regulatory requirements of the administrations in whose territory these services are authorized,

resolves

that administrations licensing global satellite systems and stations intended to provide public personal communications by means of fixed, mobile or transportable terminals shall ensure, when licensing these systems and stations, that they can be operated only from the territory or territories of administrations having authorized such service and stations in compliance with Articles **S17** and **S18**, in particular No. **S18.1**,

requests administrations

1 to continue cooperating with worldwide satellite system operators in improving the established arrangements for the provision of service within their territories and with the Secretary-General in implementing the GMPCS-MoU and its Arrangements;

2 to participate actively in ITU-R studies in developing and improving relevant Recommendations,

reminds operators of such systems

to take account, when contracting agreements on the operation of their systems from the territory of a country, of any potential loss of revenue that the country may suffer from a possible reduction of its international traffic existing at the time such agreements are executed.

RESOLUTION 27 (Rev.WRC-2000)

Use of incorporation by reference in the Radio Regulations

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the principles of incorporation by reference were adopted by WRC-95, revised by WRC-97 and further refined by this Conference (see Annexes 1 and 2 to this Resolution);

b) that there are provisions in the Radio Regulations containing references which fail to distinguish adequately whether the status of the referenced text is mandatory or non-mandatory;

noting

that references to Resolutions or Recommendations of a world radiocommunication conference (WRC) require no special procedures, and are acceptable for consideration, since such texts will have been agreed by a WRC,

resolves

1 that for the purposes of the Radio Regulations, the term "incorporation by reference" shall only apply to those references intended to be mandatory;

2 that when introducing new instances of incorporation by reference:

– only texts which are relevant to a specific WRC agenda item may be considered;

– for the correct method of reference, the principles set out in Annex 1 to this Resolution and the guidance contained in Annex 2 to this Resolution shall be applied;

3 that the procedure described in Annex 3 to this Resolution shall be applied during WRCs for the adoption of texts for incorporation by reference;

4 that all texts incorporated by reference at the conclusion of each WRC shall be collated and published in a volume of the Radio Regulations (see Annex 3 to this Resolution),

instructs the Director of the Radiocommunication Bureau

to bring this Resolution to the attention of the Radiocommunication Assembly and the ITU-R Study Groups,

urges administrations

to prepare proposals to future conferences in order to clarify the status of references, where ambiguities remain regarding the mandatory or non-mandatory status of the references in question, and where they are relevant to specific agenda items.

ANNEX 1 TO RESOLUTION 27 (Rev.WRC-2000)

Principles of incorporation by reference

1 For the purposes of the Radio Regulations, the term “incorporation by reference” shall apply only to those references intended to be mandatory.

2 Where the relevant texts are brief, the referenced material should be placed in the body of the Radio Regulations rather than using incorporation by reference.

3 Texts which are of a non-mandatory nature or which refer to other texts of a non-mandatory nature shall not be considered for incorporation by reference.

4 If, on a case-by-case basis, it is decided to incorporate material by reference on a mandatory basis, then the following provisions shall apply:

4.1 the text incorporated by reference shall have the same treaty status as the Radio Regulations themselves;

4.2 the reference must be explicit, specifying the specific part of the text (if appropriate) and the version or issue number;

4.3 the text incorporated by reference must be submitted for adoption by a competent WRC in accordance with *resolves* 3;

4.4 all texts incorporated by reference shall be published following a WRC, in accordance with *resolves* 4.

5 If, between WRCs, a text incorporated by reference (e.g. an ITU-R Recommendation) is updated, the reference in the Radio Regulations shall continue to apply to the earlier version incorporated by reference until such time as a competent WRC agrees to incorporate the new version. The mechanism for considering such a step is given in Resolution **28 (Rev.WRC-2000)**.

6 Where references are non-mandatory, it is not necessary to establish specific conditions in applying the texts quoted. In such cases, reference should be made using the terminology “the most recent version” of a Recommendation.

ANNEX 2 TO RESOLUTION 27 (Rev.WRC-2000)

Application of incorporation by reference

When introducing new instances of incorporation by reference in the provisions of the Radio Regulations or reviewing existing instances of incorporation by reference, administrations and ITU-R should address the following factors in order to ensure that the correct style of reference is employed for the intended purpose:

1 whether each reference is mandatory, i.e. incorporated by reference, or non-mandatory;

2 mandatory references shall use clear linking language, i.e. “shall”;

3 non-mandatory references, or ambiguous references that are determined to be of a non-mandatory character, shall use appropriate linking language, e.g. “should” or “may”;

4 mandatory references shall be explicitly and specifically identified, e.g. “Recommendation ITU-R M.541-8”;

5 if the intended reference material is, as a whole, unsuitable as treaty-status text, the reference shall be limited to just those portions of the material in question which are of a suitable nature, e.g. “Annex A to Recommendation ITU-R Z.123-4”.

SUP

ANNEX 3 TO RESOLUTION 27 (Rev.WRC-97)

Provisions of the Radio Regulations referring to ITU-R and ITU-T Recommendations

ADD

ANNEX 3 TO RESOLUTION 27 (Rev.WRC-2000)

Procedures applicable by WRC for the adoption of texts for incorporation by reference

The referenced texts shall be made available to delegations in sufficient time for all administrations to consult them in their final English, Spanish and French versions. A single copy of the texts shall be made available to each administration as a conference document.

During the course of each WRC, a list of the texts incorporated by reference shall be developed and maintained by the committees. This list shall be published as a conference document in line with developments during the conference.

Following the end of each WRC, the Radiocommunication Bureau and General Secretariat will update the volume of the Radio Regulations which serves as the repository of texts incorporated by reference in line with developments at the conference as recorded in the above-mentioned document.

SUP

ANNEX 4 TO RESOLUTION 27 (Rev.WRC-97)

List of ITU-R Recommendations referred to in the Radio Regulations[1]

RESOLUTION 28 (Rev.WRC-2000)

Revision of references to the text of ITU-R Recommendations incorporated by reference in the Radio Regulations

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the Voluntary Group of Experts on simplification of the Radio Regulations (VGE) proposed the transfer of certain texts of the Radio Regulations to other documents, especially to ITU-R Recommendations, using the incorporation by reference procedure;

b) that, in some cases, the provisions of the Radio Regulations imply an obligation on Member States to conform to the criteria or specifications incorporated by reference;

c) that references to incorporated texts shall be explicit and shall refer to a precisely identified provision (see Resolution 27 (Rev.WRC-2000)**);**

d) that all texts of ITU-R Recommendations incorporated by reference are published in a volume of the Radio Regulations;

e) that, taking into account the rapid evolution of technology, ITU-R may revise the ITU-R Recommendations containing text incorporated by reference at short intervals;

f) that, following revision of an ITU-R Recommendation containing text incorporated by reference, the reference in the Radio Regulations shall continue to apply to the earlier version until such time as a competent WRC agrees to incorporate the new version;

g) that it would be desirable that texts incorporated by reference reflect the most recent technical developments,

noting

that administrations need sufficient time to examine the potential consequences of changes to ITU-R Recommendations containing text incorporated by reference and would therefore benefit greatly from being advised, as early as possible, of which ITU-R Recommendations have been revised and approved during the elapsed study period,

resolves

1 that each radiocommunication assembly shall communicate to the following WRC a list of the ITU-R Recommendations containing text incorporated by reference in the Radio Regulations which have been revised and approved during the elapsed study period;

2 that, on this basis, WRC should examine those revised ITU-R Recommendations, and decide whether or not to update the corresponding references in the Radio Regulations;

3 that, if the WRC decides not to update the corresponding references, the currently referenced version shall be maintained in the Radio Regulations;

4 that WRCs shall place the examination of ITU-R Recommendations in conformity with *resolves 1* and *resolves* 2 of this Resolution on the agenda of future WRCs,

instructs the Director of the Radiocommunication Bureau

to provide the CPM immediately preceding each WRC with a list, for inclusion in the CPM Report, of those ITU-R Recommendations containing texts incorporated by reference that have been revised or approved since the previous WRC, or that may be revised in time for the following WRC,

urges administrations

1 to participate actively in the work of the radiocommunication study groups and the radiocommunication assembly on revision of those Recommendations to which mandatory references are made in the Radio Regulations;

2 to examine any indicated revisions of ITU-R Recommendations containing text incorporated by reference and to prepare proposals on possible updating of relevant references in the Radio Regulations.

RESOLUTION 46 (Rev.WRC-97)

Interim procedures for the coordination and notification of frequency assignments of satellite networks in certain space services and the other services to which certain bands are allocated*

* WRC-2000 reviewed this Resolution and decided to maintain it with no change, as it is applicable to satellite networks whose frequency assignments were received by the Bureau prior to 1 January 1999.

RESOLUTION 49 (Rev.WRC-2000)

Administrative due diligence applicable to some satellite radiocommunication services

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that Resolution 18 (Kyoto, 1994) of the Plenipotentiary Conference instructed the Director of the Radiocommunication Bureau to initiate a review of some important issues concerning international satellite network coordination and to make a preliminary report to WRC-95 and a final report to WRC-97;

b) that the Director of the Radiocommunication Bureau provided a comprehensive report to WRC-97, including a number of recommendations for action as soon as possible and for identifying areas requiring further study;

c) that one of the recommendations in the Director's report to WRC-97 was that administrative due diligence should be adopted as a means of addressing the problem of reservation of orbit and spectrum capacity without actual use;

d) that experience may need to be gained in the application of the administrative due diligence procedures adopted by WRC-97, and that several years may be needed to see whether administrative due diligence measures produce satisfactory results;

e) that new regulatory approaches may need to be carefully considered in order to avoid adverse effects on networks already going through the different phases of the procedures;

f) that Article 44 of the Constitution sets out the basic principles for the use of the radio-frequency spectrum and the geostationary-satellite and other satellite orbits, taking into account the needs of developing countries,

considering further

g) that WRC-97 decided to reduce the regulatory time-frame for bringing a satellite network into use;

h) that this Conference has considered the results of the implementation of the administrative due diligence procedures and prepared a report to the 2002 Plenipotentiary Conference in response to Resolution 85 (Minneapolis, 1998),

resolves

1 that the administrative due diligence procedure contained in Annex 1 to this Resolution shall be applied as from 22 November 1997 for a satellite network or satellite system of the fixed-satellite service, mobile-satellite service or broadcasting-satellite service for which the advance publication information under No. **S9.2B**, or for which the request for modifications of the Region 2 Plan under Article 4, § 4.2.1 *b)* of Appendices **S30** and **S30A** that involve the addition of new frequencies or orbit positions, or for which the request for modifications of the Region 2 Plan under Article 4, § 4.2.1 *a)* of Appendices **S30** and **S30A** that extend the service area to another country or countries in addition to the existing service area, or for which the request for additional uses in Regions 1 and 3 under § 4.1 of Article 4 of Appendices **S30** and **S30A**, or for which the submission of information of Annex 2 of Appendix **S30B** under supplementary provisions applicable to additional uses in the planned bands as defined in Article 2 of that Appendix (Section III of Article 6 of Appendix **S30B**) has been received by the Bureau from 22 November 1997;

2 that for a satellite network or satellite system within the scope of § 1, 2 or 3 of Annex 1 to this Resolution not yet recorded in the Master International Frequency Register (MIFR) by 22 November 1997, for which the advance publication information under No. **1042** or the request for a modification to the Plans of Appendices **30** and **30A** or for the application of Section III of Article 6 of Appendix **30B** has been received by the Bureau before 22 November 1997, the responsible administration shall submit to the Bureau the complete due diligence information in accordance with Annex 2 to this Resolution not later than 21 November 2003, or before the expiry of the notified period for bringing the satellite network into use, plus any extension period which shall not exceed three years pursuant to the application of No. **1550** or the dates specified in the relevant provisions of Article 4 of Appendix **30**, Article 4 of Appendix **30A** or Article 6 of Appendix **30B**, whichever date comes earlier. If the date of bringing into use, including extension specified above, is before 1 July 1998, the responsible administration shall submit to the Bureau the complete due diligence information in accordance with Annex 2 to this Resolution not later than 1 July 1998;

3 that for a satellite network or satellite system within the scope of § 1, 2 or 3 of Annex 1 to this Resolution recorded in the MIFR by 22 November 1997, the responsible administration shall submit to the Bureau the complete due diligence information in accordance with Annex 2 to this Resolution not later than 21 November 2000, or before the notified date of bringing the satellite network into use (including any extension period), whichever date comes later;

4 that six months before the expiry date specified in *resolves* 2 or 3 above, if the responsible administration has not submitted the due diligence information, the Bureau shall send a reminder to that administration;

5 that if the due diligence information is found to be incomplete, the Bureau shall immediately request the administration to submit the missing information. In any case, the complete due diligence information shall be received by the Bureau before the expiry date specified in *resolves* 2 or 3 above, as appropriate, and shall be published by the Bureau in the International Frequency Information Circular (BR IFIC);

6 that if the complete due diligence information is not received by the Bureau before the expiry date specified in *resolves* 2 or 3 above, the request for coordination or request for a modification to the Plans of Appendices **S30/30** and **S30A/30A** or for application of Section III of Article 6 of Appendix **S30B/30B** as covered by *resolves* 1 above submitted to the Bureau shall be cancelled. Any modifications of the Plans (Appendices **S30/30** and **S30A/30A**) shall lapse and any recording in the MIFR as well as recordings in the Appendix **S30B/30B** List shall be deleted by the Bureau after it has informed the concerned administration. The Bureau shall publish this information in the BR IFIC,

further resolves

that the procedures in this Resolution are in addition to the provisions under Article **S9** or **S11** of the Radio Regulations or Appendices **S30/30**, **S30A/30A** or **S30B/30B**, as applicable, and, in particular, do not affect the requirement to coordinate under those provisions (Appendices **S30/30**, **S30A/30A**) in respect of extending the service area to another country or countries in addition to the existing service area,

instructs the Director of the Radiocommunication Bureau

to report to WRC-03 and future competent world radiocommunication conferences on the results of the implementation of the administrative due diligence procedure,

instructs the Secretary-General

to bring this Resolution to the attention of the 2002 Plenipotentiary Conference.

ANNEX 1 TO RESOLUTION 49 (Rev.WRC-2000)

1 Any satellite network or satellite system of the fixed-satellite service, mobile-satellite service or broadcasting-satellite service with frequency assignments that are subject to coordination under Nos. **S9.7**, **S9.11**, **S9.12**, **S9.12A** and **S9.13**, Resolution **33 (Rev.WRC-97)**, and Resolution **46 (Rev.WRC-97)** shall be subject to these procedures.

2 Any request for modifications of the Region 2 Plan under the relevant provisions of Article 4 of Appendices **S30/30** and **S30A/30A** that involve the addition of new frequencies or orbit positions or for modifications of the Region 2 Plan under the relevant provisions of Article 4 of Appendices **S30/30** and **S30A/30A** that extend the service area to another country or countries in addition to the existing service area or request for additional uses in Regions 1 and 3 under the relevant provisions of Article 4 of Appendices **S30** and **S30A** shall be subject to these procedures.

3 Any submission of information under Annex 2 of Appendix **S30B/30B** under supplementary provisions applicable to additional uses in the planned bands as defined in Article 2 of that Appendix (Section III of Article 6 of Appendix **S30B/30B**) shall be subject to these procedures.

4 An administration requesting coordination for a satellite network under § 1 above shall send to the Bureau as early as possible before bringing into use, but in any case to be received before the end of the five-year period established as a limit to bringing into use in No. **S9.1**, the due diligence information relating to the identity of the satellite network and the spacecraft manufacturer specified in Annex 2 to this Resolution.

5 An administration requesting a modification of the Region 2 Plan or additional uses in Regions 1 and 3 under Appendices **S30/30** and **S30A/30A** under § 2 above shall send to the Bureau as early as possible before bringing into use, but in any case to be received before the end of the period established as a limit to bringing into use in accordance with the relevant provisions of Article 4 of Appendix **S30/30** and the relevant provisions of Article 4 of Appendix **S30A/30A**, the due diligence information relating to the identity of the satellite network and the spacecraft manufacturer specified in Annex 2 to this Resolution.

6 An administration applying Section III of Article 6 of Appendix **S30B/30B** relating to additional uses under § 3 above shall send to the Bureau as early as possible before the bringing into use, but in any case so as to be received before the bringing into use, the due diligence information relating to the identity of the satellite network and the spacecraft manufacturer specified in Annex 2 to this Resolution.

7 The information to be submitted in accordance with § 4, 5 or 6 above shall be signed by an authorized official of the notifying administration or of an administration that is acting on behalf of a group of named administrations.

8 On receipt of the due diligence information under § 4, 5 or 6 above, the Bureau shall promptly examine that information for completeness. If the information is found to be complete, the Bureau shall publish the complete information in a special section of the BR IFIC within 30 days.

9 If the information is found to be incomplete, the Bureau shall immediately request the administration to submit the missing information. In all cases, the complete due diligence information shall be received by the Bureau within the appropriate time period specified in § 4, 5 or 6 above, as the case may be, relating to the date of bringing the satellite network into use.

10 Six months before expiry of the period specified in § 4, 5 or 6 above and if the administration responsible for the satellite network has not submitted the due diligence information under § 4, 5 or 6 above, the Bureau shall send a reminder to the responsible administration.

11 If the complete due diligence information is not received by the Bureau within the time limits specified in this Resolution, the networks covered by § 1, 2 or 3 above shall no longer be taken into account and shall not be recorded in the MIFR. The provisional recording in the MIFR shall be deleted by the Bureau after it has informed the concerned administration. The Bureau shall publish this information in the BR IFIC.

With respect to the request for modification of the Region 2 Plan or for additional uses in Regions 1 and 3 under Appendices **S30/30** and **S30A/30A** under § 2 above, the modification shall lapse if the due diligence information is not submitted in accordance with this Resolution.

With respect to the request for application of Section III of Article 6 of Appendix **S30B/30B** under § 3 above, the network shall also be deleted from the Appendix **S30B/30B** List, if applicable.

12 Before the Bureau extends the date of bringing into use under No. **S11.44**, the complete due diligence information under § 4 above shall have been submitted by the responsible administration.

13 An administration notifying a satellite network under § 1, 2 or 3 above for recording in the MIFR shall send to the Bureau as early as possible before bringing into use, but in any case before the date of bringing into use, the due diligence information relating to the identity of the satellite network and the launch services provider specified in Annex 2 to this Resolution.

14 When an administration has completely fulfilled the due diligence procedure but has not completed coordination, this does not preclude the application of No. **S11.41** by that administration.

ANNEX 2 TO RESOLUTION 49 (Rev.WRC-2000)

A Identity of the satellite network

a) Identity of the satellite network

b) Name of the administration

c) Country symbol

d) Reference to the advance publication information or to the request for modification of the Region 2 Plan or for additional uses in Regions 1 and 3 under Appendices **S30/30** and **S30A/30A**

e) Reference to the request for coordination (not applicable for Appendices **S30/30** and **S30A/30A**)

f) Frequency band(s)

g) Name of the operator

h) Name of the satellite

i) Orbital characteristics.

B Spacecraft manufacturer*

a) Name of the spacecraft manufacturer

b) Date of execution of the contract

c) Contractual “delivery window”

d) Number of satellites procured.

C Launch services provider

a) Name of the launch vehicle provider

b) Date of execution of the contract

c) Launch or in-orbit delivery window

d) Name of the launch vehicle

e) Name and location of the launch facility.

* NOTE – In cases where a contract for satellite procurement covers more than one satellite, the relevant information shall be submitted for each satellite.

RESOLUTION 51 (Rev.WRC-2000)

Transitional arrangements relating to the advance publication and coordination of satellite networks

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that as a result of the review under Resolution 18 (Kyoto, 1994) of the Plenipotentiary Conference, a number of provisions relating to the advance publication, coordination and notification of assignments for satellite networks have been modified and these should be applied provisionally as soon as possible;

b) that WRC-97 decided to reduce the regulatory time-frame for bringing a satellite network into use, and to delete the advance publication information (API) if not followed by the coordination data within 24 months of the date of receipt of the API;

c) that there are a number of satellite networks for which the relevant information has been communicated to ITU prior to the end of WRC-97, and it is necessary to provide for some transitional measures for the treatment of this information by the Radiocommunication Bureau;

d) that WRC-97 decided that the provisions of Sections I, IA and IB of Article **S9** and provisions of Article **S11** (Nos. **S11.43A**, **S11.44**, **S11.44B** to **S11.44I**, **S11.47** and **S11.48**), as revised by WRC-97, were to be applied by the Bureau and by administrations on a provisional basis from 22 November 1997;

e) that WRC-97 decided that, for satellite networks which were subject to coordination for which the API had been received by the Bureau prior to 22 November 1997 but the coordination data had not been received by the Bureau prior to that date, the responsible administration would have until 22 November 1999 or the end of the period pursuant to the application of No. **1056A**, whichever date came earlier, to submit the coordination data in accordance with the applicable provisions of the Radio Regulations; otherwise the Bureau would cancel the relevant API in accordance with No. **1056A** or No. **S9.5D** as applicable;

f) that WRC-97 decided that the revised Appendix **S4** with respect to the API for satellite networks which were subject to coordination under Section II of Article **S9** was to be applied as of 22 November 1997,

resolves

that, for satellite networks for which the API was received by the Bureau prior to 22 November 1997, the maximum allowed time period from the date of publication of the API to bring the relevant frequency assignments into use shall be six years plus the extension pursuant to No. **1550** (see also Resolution **49 (WRC-97)**).

RESOLUTION 53 (Rev.WRC-2000)

Updating of the "Remarks" columns in the tables of Article 9A of Appendix S30A and Article 11 of Appendix S30 to the Radio Regulations

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has adopted new methodologies and criteria for the calculation of compatibility between the Regions 1 and 3 Plans in Appendices **S30/S30A** adopted at WRC-2000 and other services having primary allocations in the Plan bands in all three Regions and with the Region 2 Plan, and that these methodologies and criteria are included in, or referenced in, Article 11 of Appendix **S30** and Article 9A of Appendix **S30A** and in the Annexes to Appendices **S30/S30A**;

b) that the Regions 1 and 3 downlink Plan (and the associated Regions 1 and 3 feeder-link Plan) were not analysed to identify any incompatibility with other services having primary allocations in the Plan bands in all three Regions and with the Region 2 Plan during this Conference using the revised criteria it adopted;

c) that "existing"[1] systems and "Part B"[2] systems included in the Regions 1 and 3 downlink and feeder-link Plans and the Lists as established by this Conference have already been determined to be compatible with other services having primary allocations in the Plan bands in all three Regions and with the Region 2 Plan;

d) that, by inclusion of symbols in the "Remarks" columns of Article 9A to Appendix **S30A** and Article 11 of Appendix **S30** and their associated Notes explaining the nature of entries in the "Remarks" column, a mechanism is available to identify potential incompatibilities, both in terms of causing interference and receiving interference, that shall be subject to a coordination process before the assignments concerned may be brought into service;

e) that, in order to analyse the effect of assignments that have not been fully processed, it is necessary to process the assignments which were received prior to this Conference,

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[1] Whenever the term "existing" is used in this Resolution, it refers to notified assignments that are in conformity with Appendices **S30** and **30A**, which have been brought into use and for which the date of bringing into use has been confirmed to the Bureau before 1700 h (Istanbul time) on 12 May 2000.

[2] Wherever the term "Part B" is used in this Resolution, it refers to assignments for which the procedures of Article 4 of Appendices **S30** and **S30A** have been successfully completed and for which the due diligence information (when required) has been provided before 1700 h (Istanbul time) on 12 May 2000, but which have not been brought into use and/or for which the date of bringing into use has not been confirmed to the Bureau.

recognizing

a) that the integrity of the Region 2 Plan and its associated provisions must be preserved, by providing the same protection to the assignments contained in that Plan as is now received under the relevant provisions of the Radio Regulations, and by not requiring more protection from assignments in the Region 2 Plan than that provided under the Radio Regulations;[3]

b) that the required compatibility between BSS in Regions 1 and 3 and the other services in all three Regions must be ensured;

c) that the Bureau requires clear instructions from this Conference on how to complete the analyses and to finalize the entries to be included in the "Remarks" column of both Article 9A of Appendix **S30A** and Article 11 of Appendix **S30**;

d) that the instructions to the Bureau shall take effect on 3 June 2000,

resolves

1 that the Bureau, using the methodology and criteria adopted at this Conference, shall complete the required analyses based on the following Notes explaining the nature of the "Remarks" column entries: Notes 3 to 7 in section 9A.2 of Article 9A of Appendix **S30A** and Notes 5 to 8 in section 11.2 of Article 11 of Appendix **S30**;

2 that the Radiocommunication Bureau shall publish, after the Conference, the results of its analyses together with its related conclusions, in a Circular Letter;

3 that, once the Circular Letter referred to in *resolves* 2 has been sent, administrations will have a period of 120 days to decide whether they do or do not wish to continue appearing as "affected or affecting administrations". In the case of a request by an administration appearing in a remark as an affecting administration, its deletion from the remark is subject to the agreement of the affected administration. The Bureau shall send a reminder to all administrations 45 days before the expiry of the above-mentioned deadline in the form of a circular telefax requesting comment/reply. If no reply is received from administrations within that period, it will be taken that there is no need to make any change;

4 that the Bureau shall report the results of its review in a further Circular Letter containing the final lists of administrations to be included in the modified "Remarks" columns of the Regions 1 and 3 Plans adopted at WRC-2000;

5 that the coordination requirements identified in the Circular Letter referred to in *resolves* 4 shall apply from the date of that Circular Letter until the remarks are included in the Radio Regulations by a competent conference;

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[3] WRC-2000 decided to apply the procedure of section 3 of Annex 1 to Appendix **S30** and section 5 of Annex 1 to Appendix **S30A** in order to preserve this integrity.

6 that any request for notification of an assignment included in the Regions 1 and 3 downlink Plan or the Regions 1 and 3 feeder-link Plan adopted at WRC-2000 which may be received before the date of the Circular Letter mentioned in *resolves* 4 will be subject to an examination by the Bureau with respect to its compatibility with other services having primary allocations in the planned bands in all three Regions and with the Region 2 Plan, using the methodology and criteria adopted at this Conference,

instructs the Director of the Radiocommunication Bureau

to include the results of this analysis in his report to the next world radiocommunication conference.

RESOLUTION 55 (WRC-2000)

Temporary procedures for improving satellite network coordination and notification procedures

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) Resolution 86 (Minneapolis, 1998) of the Plenipotentiary Conference;

b) that there is now such a large backlog of satellite network coordination requests pending with the Radiocommunication Bureau that, at current processing rates and with no new filings, it could take the Bureau more than three years to absorb it;

c) that 95% of this backlog consists of coordination requests for geostationary-satellite networks,

recognizing

a) that, in view of the processing delays, an administration may have to wait three years for the Bureau to publish a coordination request and, because of the five-year limit for bringing a network into use, can thus be faced with a short time window in which to effect coordination;

b) that extraordinary measures are needed to enable the Bureau to absorb the backlog in processing satellite network coordination requests;

c) that the current breakdown of ITU's satellite coordination process seriously undermines the ability of such networks to provide services and compromises the role of ITU in this process;

d) that this Conference needs to take extraordinary measures to ensure the continued viability and credibility of the ITU satellite coordination process,

resolves

1 that, for those networks for which complete coordination information is received by the Bureau on or after 3 June 2000, the Bureau and administrations shall apply the following provisions, as revised by this Conference:

a) Nos. **S9.36**, **S9.36.2**, **S9.41** and **S9.42**;

b) Section D of Annex 2A to Appendix **S4**;

c) No. **S9.7** (GSO/GSO) in Table S5-1 of Appendix **S5**;

2 that, as from 3 June 2000, for those networks for which complete coordination information has been received by the Bureau prior to 3 June 2000 but not yet published in a Special Section of the International Frequency Information Circular (BR IFIC), the Bureau and administrations shall apply the following provisions, as revised by this Conference:

a) Nos. **S9.36**, **S9.36.2**, **S9.41** and **S9.42**;

b) Section D of Annex 2A to Appendix **S4**;

c) No. **S9.7** (GSO/GSO) in Table S5-1 of Appendix **S5**;

3 that, when the Bureau, under No. **S11.32**, conducts its examination of notifications of satellite networks in respect of compliance with the coordination procedure, it shall base its findings on the coordination requirements set by No. **S9.7** (GSO/GSO) in Table S5-1 of Appendix **S5**, as revised by this Conference, only for those networks published and coordinated pursuant to the provisions of this Resolution;

4 that an administration in need of assistance may inform the Bureau that it has previously filed systems which might be affected by the proposed satellite network, and may request the Bureau's assistance, under No. **S9.41**, in determining the need for coordination by applying the provisions of No. **S9.7** (GSO/GSO) in Table S5-1 of Appendix **S5** (§ 1), 2) and 3) of the frequency band column), as revised by this Conference; this request shall be considered as a disagreement, pending the results of the analysis by the Bureau of the need for coordination;

5 that, as from 3 June 2000, all notice forms (APS4/II and APS4/III), radio astronomy notices (APS4/IV) and API (APS4/V and APS4/VI) and due diligence information (Resolution **49 (WRC-97)**) for satellite networks and earth stations submitted to the Radiocommunication Bureau pursuant to Articles **S9** and **S11** shall be submitted in electronic format which is compatible with the BR electronic notice form capture software (SpaceCap)[1]:

a) all notice forms submitted between 3 June and 3 September 2000 may initially be submitted in paper format if administrations deem it necessary;

b) these forms must be resubmitted in electronic format not later than 3 October 2000, without any modification in relation to the paper filing, in order to retain the date of receipt of the original filing; the Bureau will not compare the paper and electronic filing, but both filings will be made available to administrations who may report inconsistencies to the Bureau until 1 March 2001;

c) if these notice forms are not resubmitted in electronic format by 3 October 2000, they shall be considered as incomplete and returned to the administration;

d) all notice forms initially submitted after 3 September 2000 shall be submitted in electronic format; if the data for these notice forms are not received in electronic format, the notice forms shall be considered as incomplete and returned to the administration;

1 Administrations of developing countries making no more than three filings a year may continue to submit filings on paper until 3 June 2001.

6 that, as from 3 June 2000, all graphical data associated with the submissions addressed in *resolves* 5 should be submitted in graphics data format which is compatible with the Bureau's data capture software (graphical interference management system (GIMS)); submission of graphics in paper form will, however, continue to be accepted,

instructs the Radiocommunication Bureau

1 to keep Member States periodically informed of the results of these measures, and report on them to the next competent conference;

2 together with administrations, to monitor, in the interval until WRC-03, whether assistance to administrations in applying the provisions of this Resolution has been effective, or whether any further actions are necessary;

3 to make available coordination requests and notifications, “as received”, on its BR IFIC CD-ROM, within 30 days of receipt, and also on its website;

4 to provide administrations with the latest versions of the capture and validation software and any necessary technical means, training and manuals, along with any assistance requested by administrations to enable them to comply with *resolves* 5 and 6 above;

5 to integrate the validation software with the capture software to the extent practicable,

urges administrations

1 to resubmit in electronic format notices previously submitted in paper format, after consultation with the Bureau;

2 to submit, as soon as practicable, the graphical data relating to their notices in a format compatible with the Bureau's graphic data capture software.

RESOLUTION 56 (WRC-2000)

Modification of the procedures and requirements for advance publication

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) Resolution 86 (Minneapolis, 1998) of the Plenipotentiary Conference;

b) that there is concern among a number of administrations that some of the current procedures and requirements for advance publication may give rise to inequalities in the satellite filing and coordination process,

resolves

1 that, as of 3 June 2000, the Bureau and administrations shall apply the provisions of Nos. **S9.2** and **S9.5B**, as revised by this Conference;

2 that any request for coordination or modifications to a previously submitted API received by the Bureau after 3 June 2000 shall be examined in accordance with the provisions of No. **S9.2** as revised by this Conference.

RESOLUTION 57 (WRC-2000)

Modification of bringing into use and administrative due diligence requirements as a consequence of allocation changes above 71 GHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that, pursuant to agenda item 1.16 identified in Resolution **721 (WRC-97)**, the preparatory work for this Conference included consideration of the allocation of frequency bands above 71 GHz to the Earth exploration-satellite (passive) and radio astronomy services;

b) that agenda item 1.16 took into account Resolution **723 (WRC-97)**, which also included consideration of the allocation of frequency bands above 71 GHz to the space research service (passive);

c) that changes made to the allocations for these passive science services were accompanied by consequential changes to allocations above 71 GHz to active services;

d) that the allocation changes may cause delays in the design and development of space stations planning to use these allocations;

e) that the delays also have an impact on transmitters and receivers, on the same space stations, planning to use frequencies below 71 GHz;

f) that the Bureau has already received advance publication and coordination information for satellite networks in the fixed-satellite, mobile-satellite or broadcasting-satellite services that includes the use of frequencies above 71 GHz;

g) that this advance publication or coordination information for satellite networks in the fixed-satellite, mobile-satellite or broadcasting-satellite services will have been based on the frequency allocations in force at the time the information was submitted;

h) that No. **S11.44** requires that the notified date of bringing into use of any space station of a satellite network be no later than nine years (for advance publication information received prior to 22 November 1997) or seven years (for advance publication information received on or after 22 November 1997) after the date of receipt by the Bureau of the advance publication information under No. **S9.1**;

i) that No. **S11.44B** allows the notified date of bringing into use to be extended by the Bureau only if the due diligence information required by Resolution **49 (Rev.WRC-2000)** is provided for the satellite network; if the procedure for effecting coordination has commenced; and if the notifying administration certifies that the reason for the extension is one or more specific circumstances listed in Nos. **S11.44C** to **S11.44I**;

j) that none of the specific circumstances listed in Nos. **S11.44C** to **S11.44I** includes changes to the frequency allocations as a result of the decisions of a world radiocommunication conference;

k) that, in order to provide the necessary protection to the passive science services, satellite networks in the fixed-satellite, mobile-satellite or broadcasting-satellite services using frequencies above 71 GHz for which advance publication or coordination information is considered as having been received by the Bureau prior to 3 June 2000 must adhere to the revised Table of Frequency Allocations resulting from WRC-2000,

resolves

1 that, for satellite networks using frequencies above 71 GHz in the fixed-satellite, mobile-satellite or broadcasting-satellite services for which advance publication or coordination information is considered as having been received by the Bureau prior to 3 June 2000, the Bureau will extend the notified date of bringing into use under No. **S11.44** up to 3 June 2007 at the request of the notifying administration;

2 that, notwithstanding the notified date of bringing into use in *resolves* 1, there shall be no change in the date that the advance publication or coordination information is considered as having been received by the Bureau;

3 that, for any satellite network subject to this Resolution, the notifying administration shall have until 31 December 2000 to resubmit to the Bureau the Appendix **S4** advance publication information and coordination information for the space station reflecting the proposed modification in the frequency band above 71 GHz, and that this Appendix **S4** information shall be excluded from the cost-recovery procedures;

4 that the provisions contained in Nos. **S11.44B** to **S11.44I** are applicable with respect to the date of bringing into use communicated to the Bureau under *resolves* 3;

5 that, for any satellite network subject to this Resolution and Resolution **49 (WRC-97)**, the notifying administration shall have until the new date of bringing into use under *resolves* 3 to send the administrative due diligence information to the Bureau, including any revision of administrative due diligence information submitted before 3 June 2000;

6 that, for any satellite network that is not brought into use in the frequency bands above 71 GHz within the time-limits, any extension of the date of bringing into use or due diligence requirements that has been granted under this Resolution shall be revoked and the date requirements that were in effect prior to the extension shall apply to all the frequency bands used by the network;

7 that, six months before the date specified in *resolves* 3, the Bureau will provide administrations with a list of the networks to which this Resolution applies, and the options under the above *resolves*;

8 that satellite networks using frequencies above 71 GHz for which the advanced publication or coordination information is considered as having been received by the Bureau prior to 3 June 2000 shall adhere to the revised Table of Frequency Allocations resulting from WRC-2000.

RESOLUTION 58 (WRC-2000)

Transitional measures for coordination between certain specific geostationary fixed-satellite service receive earth stations and non-geostationary fixed-satellite service transmit space stations in the frequency bands 10.7-12.75 GHz, 17.8-18.6 GHz, and 19.7-20.2 GHz where epfd$_\downarrow$ limits apply

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that WRC-97 adopted, in Article **S22**, provisional equivalent power flux-density (epfd) limits to be met by non-geostationary fixed-satellite service (non-GSO FSS) systems in order to protect GSO FSS and GSO broadcasting-satellite service networks in parts of the frequency range 10.7-30 GHz;

b) that this Conference has revised these limits to ensure that they provide adequate protection to GSO systems without causing undue constraints to any of the systems and services sharing these frequency bands;

c) that additional protection above that provided by the revised epfd$_\downarrow$ limits in *considering b)* is required for certain GSO FSS networks with specific receive earth stations having all of the following characteristics:

– earth station antenna maximum isotropic gain greater than or equal to 64 dBi for the frequency band 10.7-12.75 GHz or 68 dBi for the frequency bands 17.8-18.6 GHz and 19.7-20.2 GHz;

– G/T of 44 dB/K or higher; and

– emission bandwidth of 250 MHz or more for the frequency bands below 12.75 GHz or 800 MHz or more for the frequency bands above 17.8 GHz;

d) that, as a consequence, this Conference adopted an alternative regulatory procedure to protect the earth stations referred to in *considering c)*;

e) that this regulatory procedure, specified in Nos. **S9.7A** and **S9.7B** and associated provisions in Articles **S9** (Nos. **S9.7A**, **S9.7B**, **S9.7.A.1** and **S9.7.B.1**, and **S9.7.A.2** and **S9.7.B.2**), **S11** (Nos. **S11.32A** and **S11.32A.1**), and **S22** and Appendices **S4** and **S5**, defines the conditions for effecting coordination between a specific earth station referred to in *considering c)* in respect of a non-GSO FSS system, and between a non-GSO FSS system in respect of a specific earth station referred to in *considering c)*;

f) that there was no requirement to provide the specific locations of earth stations referred to in *considering c)* prior to WRC-2000, except in respect of coordination with terrestrial stations or earth stations operating in the opposite direction of transmission under Nos. **S9.17** and **S9.17A**;

g) that coordination of an earth station referred to in *considering c)* shall remain within the authority of the administration on whose territory the station is located;

h) that complete coordination information for GSO FSS networks with typical earth stations having all the characteristics specified in *considering c)* have been received by the Bureau before WRC-2000;

i) that complete notification or coordination information, as appropriate, for non-GSO FSS systems has been received by the Bureau prior to WRC-2000 and, in some cases, prior to WRC-97,

recognizing

that transitional measures are needed for the regulatory procedures referred to in *considering e),*

resolves

1 that, in the frequency bands 10.7-12.75 GHz, 17.8-18.6 GHz and 19.7-20.2 GHz, the requirement for coordination and associated provisions referred to in *considering e)* shall be applied as from 3 June 2000;

2 that, in the frequency bands 10.7-12.75 GHz, 17.8-18.6 GHz and 19.7-20.2 GHz, the requirement for coordination under No. **S9.7A** shall be applied to specific earth stations for which complete coordination or notification information, as appropriate, is considered as having been received by the Bureau prior to 3 June 2000;

3 that, in the frequency bands 10.7-12.75 GHz, 17.8-18.6 GHz and 19.7-20.2 GHz, the requirement for coordination under No. **S9.7B** shall be applied to non-GSO FSS systems for which complete coordination or notification information, as appropriate, has been received by the Bureau after 21 November 1997;

4 that, in the frequency bands 10.7-12.75 GHz, 17.8-18.6 GHz and 19.7-20.2 GHz, the requirement for coordination under No. **S9.7B** shall not apply to non-GSO FSS systems for which complete coordination or notification information, as appropriate, has been received by the Bureau before 22 November 1997 but No. **S22.2** shall apply in respect of any specific earth stations for which complete coordination information is considered as having been received before 22 November 1997 if coordination under No. **S9.7A** has not been concluded;

5 that coordination information relating to a specific earth station received by the Bureau prior to 30 June 2000 shall be considered as complete information under No. **S9.7A** or No. **S9.7B** as from the date of receipt of complete coordination information of the associated GSO FSS satellite network under No. **S9.7**, provided that:

5.1 the maximum isotropic gain, lowest total receiving system noise temperature and necessary bandwidth of the specific earth station are the same as those of any typical earth station included in the GSO FSS network that has previously entered coordination;

5.2 the coordination or notification information, as appropriate, of the GSO FSS network containing the typical earth station referred to in *resolves* 5.1 was received by the Bureau prior to 8 May 2000;

6 that, in cases other than those covered in *resolves* 5, the date of receipt by the Bureau of the complete coordination information under Nos. **S9.7A** or **S9.7B** or the complete coordination or notification information, as appropriate, of the associated GSO network, whichever is later, shall be used;

7 that the administration on whose territory the specific earth station is located shall submit the coordination information contained in Annex 1 to this Resolution,

instructs the Director of the Radiocommunication Bureau

1 to draw up appropriate forms of notice and instructions to assist administrations in providing the information in Annex 1 of this Resolution immediately after this Conference, taking into account the deadline established by *resolves* 5;

2 as of the end of WRC-2000, to review and, if appropriate, identify in accordance with No. **S9.27**, any administration with which coordination may need to be effected in accordance with Nos. **S9.7A** or **S9.7B** in cases covered by *resolves* 2 and 3.

ANNEX 1 TO RESOLUTION 58 (WRC-2000)

Appendix S4 characteristics to be provided for specific receive GSO FSS earth stations

A.1.e.1 Type of earth station (i.e. specific)

A.1.e.2 Earth station name

A.1.e.3 Country and geographical coordinates of the antenna site

A.2.a Date of bringing into use

A.3 Operating administration or agency

A.4.c Identity of associated space station (i.e. name and nominal orbital longitude)

A.13 As appropriate, reference to the special section of the Bureau's International Frequency Information Circular (BR IFIC)

B.1 Associated satellite transmitting beam designation

B.5.a Maximum isotropic gain

B.5.c Earth station antenna reference radiation pattern

C.2.a Assigned frequency

C.3.a Assigned frequency band

C.4 Class of station and nature of service

C.5.b Lowest total receiving system noise temperature

C.7.a Class of emission and the necessary bandwidth

RESOLUTION 59 (WRC-2000)

Transitional and implementation arrangements in certain frequency bands for the use of geostationary networks in the fixed-satellite service and the broadcasting-satellite service, and non-geostationary systems in the fixed-satellite service as well as for the use of networks in the radionavigation-satellite service and terrestrial services

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has revised the sharing criteria and associated regulatory provisions between and among geostationary (GSO) fixed-satellite service (FSS) and broadcasting-satellite service (BSS) networks, non-GSO FSS systems, and terrestrial stations in certain parts of the 10.7-30 GHz band;

b) that it is important for GSO networks and terrestrial stations, and for non-GSO FSS systems for which complete notification or coordination information, as appropriate, has been received by the Radiocommunication Bureau after 21 November 1997, that the new and revised power limits in Articles **S21** and **S22** and associated provisions be immediately brought into force;

c) that, by the end of the year 2000, the Bureau is expected to have modified its database and capture software, and to have issued a circular letter defining the format in which the data should be submitted, along with any other necessary information,

considering further

a) that this Conference has decided to introduce new or revised allocations for the radionavigation-satellite service (space-to-Earth) (space-to-space) in the bands 960-1 300 MHz, 1 559-1 610 MHz and 5 000-5 150 MHz, and for the radionavigation-satellite service (Earth-to-space) in the bands 1 300-1 350 MHz and 5 000-5 150 MHz, as well as for other services in these bands;

b) that certain provisions regarding the new allocations shall apply as of 3 June 2000 (see Resolution **604 (WRC-2000)** and Resolution **605 (WRC-2000)**);

c) that some administrations have expressed the wish to start the notification procedure for radionavigation-satellite networks and other systems as soon as possible following this Conference,

resolves

1 that, as of 22 November 1997, in the frequency bands specified in Tables **S22-1A, S22-1B, S22-1C, S22-1D, S22-2** and **S22-3** of Article **S22**, non-GSO FSS systems for which complete notification or coordination information, as appropriate, has been received by the Bureau after 21 November 1997 shall be subject to the power limits in these Tables, as established by WRC-2000;

2 that, as of 3 June 2000, in any case where complete coordination or notification information, as appropriate, is considered as having been received between 22 November 1997 and 2 June 2000 for a non-GSO FSS system in the frequency bands specified in *resolves* 1 above, the responsible administration shall, within six months after the Bureau's circular letter referred to in *considering c)* or by 1 July 2001, whichever is later, submit all necessary supplementary information (see Annex 2A, Sections A.4 *b)* 6), A.4 *b)* 7), and A.14 and C.9 *d)* of Appendix **S4**) to permit the Bureau to make a finding in compliance with the limits in Tables **S22-1A, S22-1B, S22-1C, S22-1D, S22-2** and **S22-3**, as established by WRC-2000;

3 that, as of 22 November 1997, in the frequency bands specified in Tables **S22-4A** (including Table **S22-4A1**)**, S22-4B** and **S22-4C**, non-GSO FSS systems for which complete notification or coordination information, as appropriate, is considered as having been received by the Bureau after 21 November 1997 shall be subject to the power limits in these Tables, as established by WRC-2000;

4 that, as of 3 June 2000, in any case where complete coordination or notification information, as appropriate, is considered as having been received between 22 November 1997 and 2 June 2000 for a non-GSO FSS system in the frequency bands specified in *resolves* 3 above, the responsible administration shall, within six months after the Bureau's circular letter referred to in *considering c)* or by 1 July 2001, whichever is later, submit the commitment in Section A.15 of Annex 2A of Appendix **S4** to meeting the single-entry additional operational equivalent power flux-density, epfd$_{\downarrow}$, limits in Table **S22-4A1**, as established by WRC-2000;

5 that, in the frequency bands specified in Table **S22-1D**, which are allocated to the BSS and subject to the Plan of Appendix **S30**, no advance publication, coordination or notification information for non-GSO FSS systems shall be considered as having a date of receipt before 22 November 1997;

6 that, as of 3 June 2000, the following provisions of these Regulations, as revised or established by WRC-2000, shall apply: Nos. **S22.5B** to **S22.5K**; **S9.11A** to **S9.16**; **S22.26** to **S22.39**; **S5.520**; **S5.516**; **S5.441**; **S5.484A**; **S5.487A**; **S5.488**; **S5.491**; **S5.502**, **S5.503**; **S9.7A** to **S9.7B**; **S9.35.1**; **S11.32A** to **S11.33**; Annexes 2A and 2B to Appendix **S4**; Table S5-1 of Appendix **S5**; and Table **S21-4** and its associated footnotes in Article **S21**,

further resolves

that the new or revised allocations in the bands 960-1 300 MHz, 1 300-1 350 MHz, 1 559-1 610 MHz and 5 000-5 150 MHz shall enter into force on 3 June 2000,

instructs the Radiocommunication Bureau

as of 3 June 2000, and taking into account *resolves* 2, to review and, if appropriate, revise, any finding previously made on the compliance with the limits contained in Article **S22** (WRC-97) for a non-GSO FSS system for which complete coordination or notification information, as appropriate, has been received between 22 November 1997 and 2 June 2000, inclusive; this review shall be based on the limits in Tables **S22-1A**, **S22-1B**, **S22-1C**, **S22-1D**, **S22-2** and **S22-3**, as adopted by WRC-2000.

RESOLUTION 72 (Rev.WRC-2000)

Regional preparations for world radiocommunication conferences

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that many regional telecommunication organizations have coordinated their preparations for WRC-2000;

b) that many common proposals have been submitted to this Conference from administrations participating in the preparations of regional telecommunication organizations;

c) that this consolidation of views at regional level, together with the opportunity for interregional discussions prior to the Conference, has eased the task of reaching a consensus during the Conference;

d) that the burden of preparation for future conferences is likely to increase;

e) that there is consequently great benefit to the Member States of coordination of preparations at regional level;

f) that the success of future conferences will depend on greater efficiency of regional coordination and interaction at interregional level prior to future conferences;

g) that some regional organizations lack the necessary resources to adequately organize and to participate in such preparations;

h) that there is a need for overall coordination of the interregional consultations,

recognizing

a) *resolves* 2 of Resolution 80 (Minneapolis, 1998) of the Plenipotentiary Conference:

"to support the regional harmonization of common proposals, as stated in Resolution 72 (WRC-97), for submission to world radiocommunication conferences";

b) *resolves* 3 of Resolution 80 (Minneapolis, 1998) of the Plenipotentiary Conference:

"to encourage both formal and informal collaboration in the interval between conferences with a view to resolving differences on items already on the agenda of a conference or new items",

noting

a) that at the World Telecommunication Development Conference (Valletta, 1998) many regional telecommunication organizations expressed the need for the Union to cooperate more closely with regional telecommunication organizations;

b) that, consequently, the Plenipotentiary Conference (Minneapolis, 1998) resolved that the Union should develop stronger relations with regional telecommunication organizations;

c) that the Radiocommunication Assembly (Istanbul, 2000) adopted Resolution ITU-R 48 which sought a strengthening of the regional presence in ITU-R study group work, including WRC-related studies,

further noting

that in some regions the relationship with the ITU-D regional offices has proved to be of great benefit,

resolves to instruct the Director of the Radiocommunication Bureau

1 to continue consulting the regional telecommunication organizations on the means by which assistance can be given to their preparations for future world radiocommunication conferences in the following areas:

– organization of regional preparatory meetings;

– organization of information sessions, preferably before and after the second session of the Conference Preparatory Meeting (CPM);

– development of coordination methods;

– identification of major issues to be resolved by the future world radiocommunication conference;

– facilitation of regional and interregional informal and formal meetings, with the objective of reaching a convergence of interregional views on major issues;

2 pursuant to Resolution ITU-R 2-3 of the Radiocommunication Assembly on the CPM, to assist in ensuring that overview presentations of the chapters of the CPM Report will be made by the CPM management at an early stage in the CPM session, as part of the regularly scheduled meetings, in order to help all participants understand the contents of the CPM Report;

3 to submit a report on the results of such consultations to both the next Plenipotentiary Conference and WRC-03,

invites the Director of the Telecommunication Development Bureau

to collaborate with the Director of the Radiocommunication Bureau in implementing this Resolution.

RESOLUTION 73 (Rev.WRC-2000)

Measures to solve the incompatibility between the broadcasting-satellite service in Region 1 and the fixed-satellite service in Region 3 in the frequency band 12.2-12.5 GHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the band 12.2-12.5 GHz is allocated on a primary basis to the broadcasting-satellite service (BSS) in Region 1 and to the fixed-satellite service (FSS) in Region 3;

b) that both services should have equitable access to the orbit and spectrum;

c) that several modifications to the Regions 1 and 3 BSS Plan, which have assignments in the band 12.2-12.5 GHz, have entered into the Plan by successfully applying Article 4 of Appendix **30** procedure and that some of these assignments have already been brought into use;

d) that some Region 3 FSS systems are currently operating, or are under coordination, applying relevant provisions of the Radio Regulations;

e) that the WRC-97 Regions 1 and 3 Plan included frequency assignments which may not be compatible with Region 3 FSS networks for which notification or coordination data as per Appendix **S3** or Appendix **S4** information had been received by the Bureau before 27 October 1997;

f) that WRC-97, in its Resolution **73 (WRC-97)**, adopted measures to resolve such incompatibilities between the BSS in Region 1 and the FSS in Region 3 in the frequency band 12.2-12.5 GHz which included instructions to the Bureau to identify both the administrations whose assignments affect Region 1 BSS networks in the 12.2-12.5 GHz band, and also to identify those administrations whose assignments affect Region 3 FSS networks in the 12.2-12.5 GHz band;

g) that this Conference has adopted procedures in Appendix **S30** for coordination between the BSS in Region 1 and the FSS in Region 3 in the frequency band 12.2-12.5 GHz,

noting

that, in response to Resolution **73 (WRC-97)**, the Bureau has developed necessary software tools for analysing the incompatibility situations mentioned under *considering f)*,

resolves

1 that, upon request, the Bureau shall provide the results of the analysis carried out in response to Resolution **73 (WRC-97)** regarding incompatibilities between the BSS in Region 1 and the FSS in Region 3 in the frequency band 12.2-12.5 GHz to the administrations concerned;

2 that the administrations which have been identified by the Bureau in *resolves* 1 above shall make all possible mutual efforts to solve the interference problems;

3 that provision of this assistance shall in no way have any implications regarding the status of assignments in both the BSS and the FSS as identified by the Bureau.

RESOLUTION 74 (WRC-2000)

Process to keep the technical bases of Appendix S7 current

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that Appendix **S7** provides the method for the determination of the coordination area of an earth station, and the assumed technical coordination parameters for unknown terrestrial stations or earth stations;

b) that the technical coordination parameters are contained in Tables 7, 8 and 9 of Annex 7 to Appendix **S7**;

c) that the technical coordination parameter tables are based on Recommendation ITU-R SM.1448;

d) that ITU-R studies on methods for the determination of the coordination area of an earth station are continuing, and the conclusions of these studies could lead to revision of Appendix **S7**; these methods under study are:

– methods considering the cumulative impact in determining the coordination areas for high-density earth stations (fixed and mobile);

– methods to address the modelling of VHF/UHF frequencies for percentages of time less than 1%;

– methods to address propagation mode (2) water vapour density for both radio climatic Zones B and C;

– refinements to propagation mode (2) to address elevation angle dependency and the displacement of the centre of the propagation mode (2) contour from the coordinating earth station;

e) that the technical coordination parameter tables may also need to be modified when changes are made to the Table of Frequency Allocations at future WRCs, or due to changes in technology or in applications;

f) that the technical coordination parameter tables do not include values for all the necessary parameters of certain space radiocommunication services and terrestrial radiocommunication services sharing frequency bands with equal rights,

recognizing

a) that Recommendation ITU-R SM.1448 was developed by ITU-R as a basis for the revision of Appendix **S7**;

b) that there is a need for future WRCs to keep Appendix **S7** current with the latest techniques and to ensure protection of other radiocommunication services sharing the same frequency bands with equal rights, particularly through revision of the tables of technical coordination parameters,

invites ITU-R

1 to continue its study, as required, of the technical bases used for determination of the coordination area of an earth station, including recommended values for the missing entries in the tables of technical coordination parameters (Annex 7 to Appendix **S7**);

2 to maintain the relevant ITU-R texts in a format which would facilitate the future revision of Appendix **S7**;

3 to assess the significance of changes to the technical bases,

resolves

1 that when ITU-R concludes, based on its studies of the methods in *considering d)* for determination of the coordination area of an earth station and/or the values of technical coordination parameters, that a revision of Appendix **S7** is warranted, the matter shall be brought to the attention of the Radiocommunication Assembly;

2 that, if the Radiocommunication Assembly confirms the improvements of the methods in *considering d)* for determination of the coordination area of an earth station and/or the values of technical coordination parameters which have been presented by ITU-R, the Director of the Radiocommunication Bureau shall identify the matter in the Director's report to the following WRC,

invites

1 WRCs, when presented with any significant changes through the Director's report, to consider the revision of Appendix **S7** in light of the recommendation of the Radiocommunication Assembly, pursuant to *resolves* 1 and 2 above;

2 each WRC, when modifying the Table of Frequency Allocations, to consider any consequential changes that may be required to the technical coordination parameters of Annex 7 to Appendix **S7** and, if necessary, request ITU-R to study the matter.

RESOLUTION 75 (WRC-2000)

Development of the technical basis for determining the coordination area for coordination of a receiving earth station in the space research service (deep space) with transmitting stations of high-density systems in the fixed service in the 31.8-32.3 GHz and 37-38 GHz bands

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the band 31.8-32.3 GHz is allocated to the space research service for deep space operations only, the band 37-38 GHz is allocated to the space research service (space-to-Earth), and both bands are allocated to the fixed service for the use of high-density applications and to other services on a primary basis;

b) that the 31.8-32.3 GHz band offers unique advantages in support of deep-space missions;

c) that space research service earth stations operating in these bands employ very high-gain antennas and very low-noise amplifiers in order to receive weak signals from deep space;

d) that fixed-service stations in these bands are expected to be deployed in large numbers over urban areas of large geographical extent;

e) that studies are being initiated to characterize short-term (of the order of 0.001% of the time, commensurate with the protection criteria given in Recommendations ITU-R SA.1396 and ITU-R SA.1157) anomalous propagation from transmitting stations dispersed over a large geographical area to a single receiving earth station (area-to-point propagation);

f) that preliminary ITU-R studies have indicated that the coordination distance between a space research service (deep space) earth station and a single urban area may be of the order of 250 km;

g) that there are currently three space research service (deep space) earth stations in operation or planned for operation near Goldstone (United States of America), Madrid (Spain) and Canberra (Australia), and there are up to ten more earth stations planned in the future,

noting

that Resolution **74 (WRC-2000)** provides a mechanism to update Appendix **S7** as required, *resolves to invite ITU-R*

to develop, as a matter of urgency, the technical basis for determining the coordination area for coordination of a receiving earth station in the space research service (deep space) with transmitting stations of high-density systems in the fixed service in the 31.8-32.3 GHz and 37-38 GHz bands,

urges administrations

to participate actively in the aforementioned studies by submitting contributions to ITU-R.

RESOLUTION 76 (WRC-2000)

Protection of geostationary fixed-satellite service and geostationary broadcasting-satellite service networks from the maximum aggregate equivalent power flux-density produced by multiple non-geostationary fixed-satellite service systems in frequency bands where equivalent power flux-density limits have been adopted

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that WRC-97 adopted, in Article **S22**, provisional equivalent power flux-density (epfd) limits to be met by non-geostationary fixed-satellite service (GSO FSS) systems in order to protect GSO FSS and GSO broadcasting-satellite service (BSS) networks in parts of the frequency range 10.7-30 GHz;

b) that this Conference has revised Article **S22** to ensure the limits contained therein provide adequate protection to GSO systems without placing undue constraints on any of the systems and services sharing these frequency bands;

c) that this Conference has decided that a combination of single-entry validation, single-entry operational and, for certain antenna sizes, single-entry additional operational epfd limits, contained in Article **S22**, along with the aggregate limits in Tables 1A to 1D, which apply to non-GSO FSS systems, protects GSO networks in these bands;

d) that these single-entry validation limits have been derived from aggregate epfd masks contained in Tables 1A to 1D, assuming a maximum effective number of non-GSO FSS systems of 3.5;

e) that the aggregate interference caused by all co-frequency non-GSO FSS systems in these bands into GSO FSS systems should not exceed the aggregate epfd levels in Tables 1A to 1D;

f) that WRC-97 decided, and this Conference has confirmed, that non-GSO FSS systems in the bands in question are to mutually coordinate the use of frequencies in these bands under the provisions of No. **S9.12**;

g) that the orbital characteristics of such systems are likely to be inhomogeneous;

h) that, as a result of this likely inhomogeneity, the aggregate epfd levels from multiple non-GSO FSS systems will not be directly related to the actual number of systems sharing a frequency band, and the number of such systems operating co-frequency is likely to be small;

i) that the possible misapplication of single-entry limits should be avoided,

recognizing

a) that non-GSO FSS systems are likely to need to implement interference mitigation techniques to mutually share frequencies;

b) that, on account of the use of such interference mitigation techniques, it is likely that the number of non-GSO systems will remain small, as will the aggregate interference caused by non-GSO FSS systems into GSO systems;

c) that, notwithstanding *considering d)* and *e)* and *recognizing b)*, there may be instances where the aggregate interference from non-GSO systems could exceed the interference levels given in Tables 1A to 1D;

d) that administrations operating GSO systems may wish to ensure that the aggregate epfd produced by all operating co-frequency non-GSO FSS systems in the frequency bands referred to in *considering a)* above into GSO FSS and/or GSO BSS networks does not exceed the aggregate interference levels given in Tables 1A to 1D,

resolves

1 that administrations operating or planning to operate non-GSO FSS systems, for which coordination or notification information, as appropriate, was received after 21 November 1997, in the frequency bands referred to in *considering a)* above, individually or in collaboration, shall take all possible steps, including, if necessary, by means of appropriate modifications to their systems, to ensure that the aggregate interference into GSO FSS and GSO BSS networks caused by such systems operating co-frequency in these frequency bands does not cause the aggregate power levels given in Tables 1A to 1D to be exceeded (see No. **S22.5K**);

2 that, in the event that the aggregate interference levels in Tables 1A to 1D are exceeded, administrations operating non-GSO FSS systems in these frequency bands shall take all necessary measures expeditiously to reduce the aggregate epfd levels to those given in Tables 1A to 1D, or to higher levels where those levels are acceptable to the affected GSO administration (see No. **S22.5K)**,

invites ITU-R

1 to develop, as a matter of urgency and in time for the next WRC, a suitable methodology for calculating the aggregate epfd produced by all non-GSO FSS systems operating or planning to operate co-frequency in the frequency bands referred to in *considering a)* above into GSO FSS and GSO BSS networks, which may be used to determine whether the systems are in compliance with the aggregate power levels given in Tables 1A to 1D;

2 to continue its studies and to develop, as a matter of urgency, a Recommendation on the accurate modelling of interference from non-GSO FSS systems into GSO FSS and GSO BSS networks in the frequency bands referred to in *considering a)* above, in order to assist administrations planning or operating non-GSO FSS systems in their efforts to limit the aggregate epfd levels produced by their systems into GSO networks, and to provide guidance to GSO network designers on the maximum $epfd_{\downarrow}$ levels expected to be produced by all non-GSO FSS systems when accurate modelling assumptions are used;

3 to develop, as a matter of urgency, a Recommendation containing procedures to be used among administrations in order to ensure that the aggregate epfd limits given in Tables 1A to 1D are not exceeded by operators of non-GSO FSS systems;

4 to attempt to develop measurement techniques to identify the interference levels from non-GSO systems in excess of the aggregate limits given in Tables 1A to 1D, and to confirm compliance with these limits,

instructs the Director of the Radiocommunication Bureau

1 to assist in the development of the methodology referred to in *invites ITU-R* 1 above;

2 to report to WRC-03 on the results of studies in *invites ITU-R* 1 and 3 above.

ANNEX 1 TO RESOLUTION 76 (WRC-2000)

TABLE 1A[1, 2, 3]

Limits on aggregate epfd↓ radiated by non-GSO FSS systems in certain frequency bands

Frequency band (GHz)	epfd↓ (dB(W/m^2))	Percentage of time during which epfd↓ may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern[4]
10.7-11.7 in all Regions 11.7-12.2 in Region 2 12.2-12.5 in Region 3 12.5-12.75 in Regions 1 and 3	–170 –168.6 –165.3 –160.4 –160 –160	0 90 99 99.97 99.99 100	40	60 cm Recommendation ITU-R S.1428
	–176.5 –173 –164 –161.6 –161.4 –160.8 –160.5 –160 –160	0 99.5 99.84 99.945 99.97 99.99 99.99 99.9975 100	40	1.2 m Recommendation ITU-R S.1428
	–185 –184 –182 –168 –164 –162 –160 –160	0 90 99.5 99.9 99.96 99.982 99.997 100	40	3 m[5] Recommendation ITU-R S.1428
	–190 –190 –166 –160 –160	0 99 99.99 99.998 100	40	10 m[5] Recommendation ITU-R S.1428

1 For certain GSO FSS receive earth stations, see also Nos. **S9.7A** and **S9.7B**.

2 In addition to the limits shown in Table 1A, the following aggregate epfd↓ limits apply to all antenna sizes greater than 60 cm in the frequency bands listed in Table 1A:

100% of the time epfd↓ (dB(W/(m^2 · 40 kHz)))	Latitude (North or South) (degrees)
–160	0 ≤ | Latitude| ≤ 57.5
–160 + 3.4(57.5 – |Latitude|)/4	57.5 < | Latitude| ≤ 63.75
–165.3	63.75 < | Latitude|

3 For each reference antenna diameter, the limit consists of the complete curve on a plot which is linear in decibels for the epfd↓ levels and logarithmic for the time percentages, with straight lines joining the data points.

4 For this Table, reference patterns in Recommendation ITU-R S.1428 shall be used only for the calculation of interference from non-GSO FSS systems into GSO FSS systems.

5 The values for the 3 m and 10 m antennas are applicable only for the methodology referred to *invites ITU-R* 1.

TABLE 1B[1, 2, 3]

Limits on aggregate epfd↓ radiated by non-GSO FSS systems in certain frequency bands

Frequency band (GHz)	epfd↓ (dB(W/m^2))	Percentage of time during which epfd↓ may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern[4]
17.8-18.6	–170 –170 –164 –164	0 90 99.9 100	40	1 m Recommendation ITU-R S.1428
	–156 –156 –150 –150	0 90 99.9 100	1 000	
	–173 –173 –166 –164 –164	0 99.4 99.9 99.92 100	40	2 m Recommendation ITU-R S.1428
	–159 –159 –152 –150 –150	0 99.4 99.9 99.92 100	1 000	
	–180 –180 –172 –164 –164	0 99.8 99.8 99.992 100	40	5 m Recommendation ITU-R S.1428
	–166 –166 –158 –150 –150	0 99.8 99.8 99.992 100	1 000	

1 For certain GSO FSS receive earth stations, see also Nos. **S9.7A** and **S9.7B**.

2 For each reference antenna diameter, the limit consists of the complete curve on a plot which is linear in decibels for the epfd↓ levels and logarithmic for the time percentages, with straight lines joining the data points.

3 A non-GSO system shall meet the limits of this Table in both the 40 kHz and the 1 MHz reference bandwidths

4 For this Table, reference patterns in Recommendation ITU-R S.1428 shall be used only for the calculation of interference from non-GSO FSS systems into GSO FSS systems.

TABLE 1C[1, 2, 3]

Limits on aggregate $\text{epfd}_\downarrow$ radiated by non-GSO FSS systems in certain frequency bands

Frequency band (GHz)	**$\text{epfd}_\downarrow$ $(\text{dB(W/m}^2))$**	**Percentage of time during which $\text{epfd}_\downarrow$ may not be exceeded**	**Reference bandwidth (kHz)**	**Reference antenna diameter, and reference radiation pattern[4]**
19.7-20.2	–182 –172 –154 –154	0 90 99.94 100	40	70 cm Recommendation ITU-R S.1428
	–168 –158 –140 –140	0 90 99.94 100	1 000	
	–185 –176 –165 –160 –154 –154	0 91 99.8 99.8 99.99 100	40	90 cm Recommendation ITU-R S.1428
	–171 –162 –151 –146 –140 –140	0 91 99.8 99.8 99.99 100	1 000	
	–191 –162 –154 –154	0 99.933 99.998 100	40	2.5 m Recommendation ITU-R S.1428
	–177 –148 –140 –140	0 99.933 99.998 100	1 000	
	–195 –184 –175 –161 –154 –154	0 90 99.6 99.984 99.9992 100	40	5 m Recommendation ITU-R S.1428
	–181 –170 –161 –147 –140 –140	0 90 99.6 99.984 99.9992 100	1 000	

1 For certain GSO FSS receive earth stations, see also Nos. **S9.7A** and **S9.7B**.

2 For each reference antenna diameter, the limit consists of the complete curve on a plot which is linear in decibels for the $\text{epfd}_\downarrow$ levels and logarithmic for the time percentages, with straight lines joining the data points.

3 A non-GSO system shall meet the limits of this Table in both the 40 kHz and the 1 MHz reference bandwidths.

4 For this Table, reference patterns in Recommendation ITU-R S.1428 shall be used only for the calculation of interference from non-GSO FSS systems into GSO FSS systems.

TABLE 1D[1, 2]

Limits on aggregate epfd↓ radiated by non-GSO FSS systems in certain frequency bands into 30 cm, 45 cm, 60 cm, 90 cm, 120 cm, 180 cm, 240 cm and 300 cm BSS antennas

Frequency band (GHz)	epfd↓ (dB(W/m^2))	Percentage of time during which epfd↓ may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern[3]
11.7- 12.5 in Region 1 11.7-12.2 and 12.5-12.75 in Region 3 12.2-12.7 in Region 2	–160.4 –160.1 –158.6 –158.6 –158.33 –158.33	0 25 96 98 98 100	40	30 cm Recommendation ITU-R BO.1443, Annex 1
	–170 –167 –164 –160.75 –160 –160	0 66 97.75 99.33 99.95 100	40	45 cm Recommendation ITU-R BO.1443, Annex 1
	–171 –168.75 –167.75 –162 –161 –160.2 –160 –160	0 90 97.8 99.6 99.8 99.9 99.99 100	40	60 cm Recommendation ITU-R BO.1443, Annex 1
	–173.75 –173 –171 –165.5 –163 –161 –160 –160	0 33 98 99.1 99.5 99.8 99.97 100	40	90 cm Recommendation ITU-R BO.1443, Annex 1
	–177 –175.25 –173.75 –173 –169.5 –167.8 –164 –161.9 –161 –160.4 –160	0 90 98.9 98.9 99.5 99.7 99.82 99.9 99.965 99.993 100	40	120 cm Recommendation ITU-R BO.1443, Annex 1

TABLE 1D[1, 2] (*end*)

Frequency band (GHz)	epfd↓ (dB(W/m²))	Percentage of time during which epfd↓ may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern[3]
11.7-12.5 in Region 1 11.7-12.2 and 12.5-12.75 in Region 3 12.2-12.7 in Region 2	–179.5 –178.66 –176.25 –163.25 –161.5 –160.35 –160 –160	0 33 98.5 99.81 99.91 99.975 99.995 100	40	180 cm Recommendation ITU-R BO.1443, Annex 1
	–182 –180.9 –178 –164.4 –161.9 –160.5 –160 –160	0 33 99.25 99.85 99.94 99.98 99.995 100	40	240 cm Recommendation ITU-R BO.1443, Annex 1
	–186.5 –184 –180.5 –173 –167 –162 –160 –160	0 33 99.5 99.7 99.83 99.94 99.97 100	40	300 cm Recommendation ITU-R BO.1443, Annex 1

1 For BSS antenna diameters of 180 cm, 240 cm and 300 cm, in addition to the aggregate limits shown in Table 1D, the following aggregate 100% of the time epfd↓ limits also apply:

100% of the time epfd↓ (dB(W/(m² · 40 kHz))	Latitude (North or South) (degrees)
–160	0 ≤ | Latitude| ≤ 57.5
–160 + 3.4(57.5 – |Latitude|)/4	57.5 < | Latitude| ≤ 63.75
–165.3	63.75 < | Latitude|

2 For each reference antenna diameter, the limit consists of the complete curve on a plot which is linear in decibels for the epfd↓ levels and logarithmic for the time percentages, with straight lines joining the data points. For BSS antenna of diameter 240 cm, in addition to the above aggregate 100% of the time epfd↓ limit, a -167 dB(W/(m² · 40 kHz)) aggregate 100% of the time operational epfd↓ limit also applies to receive antennas located in Region 2, west of 140° W, north of 60° N, pointing toward GSO BSS satellites at 91° W, 101° W, 110° W, 119° W and 148° W with elevation angles greater than 5°. This limit is implemented during a transition period of 15 years.

3 For this Table, reference patterns in the Annex 1 to Recommendation ITU-R BO.1443 shall be used only for the calculation of interference from non-GSO FSS systems into GSO BSS systems.

RESOLUTION 77 (WRC-2000)

Protection of terrestrial services in all Regions from geostationary-satellite networks in the fixed-satellite service in Region 2 using the frequency band 11.7-12.2 GHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that, in Regions 1 and 3, the band 11.7-12.2 GHz is allocated on a co-primary basis to terrestrial services and to the broadcasting-satellite service (BSS);

b) that, in Region 2, the band 11.7-12.1 GHz is allocated on a co-primary basis to terrestrial services (except in the countries listed in No. **S5.486**) and to the fixed-satellite service (FSS);

c) that, in Region 2, the band 12.1-12.2 GHz is allocated on a co-primary basis to terrestrial services in Peru (see No. **S5.489**) and to the FSS;

d) that protection of the BSS in Regions 1 and 3 from the FSS in Region 2 is assured by Article 7 and Annex 4 of Appendix **S30**;

e) that protection of the FSS in Region 2 from the FSS in that Region is assured either by Article **S9** (Nos. **S9.7** or **S9.12**) or Article **S22**;

f) that protection of terrestrial services in Regions 1, 2 and 3 from non-geostationary-satellite (non-GSO) systems in the FSS in Region 2 is assured by Article **S21**;

g) that there is a need to protect terrestrial services in Regions 1, 2 and 3 from GSO networks in the FSS in Region 2;

h) that this Conference has modified No. **S5.488** by revising the regulatory limitations on the operation of GSO networks in the FSS in Region 2 in the band 11.7-12.2 GHz,

recognizing

that ITU-R has developed Recommendation ITU-R SF.674-1, dealing with sharing between the FSS and the fixed service in the band 11.7-12.2 GHz in Region 2,

resolves

that, before an administration notifies to the Bureau or brings into use, in Region 2, a frequency assignment for a GSO network in the FSS in the 11.7-12.2 GHz band, it shall seek the agreement of any administration of Regions 1, 2, and 3 having a primary allocation to terrestrial services in the same frequency band if the power flux-density (pfd) produced on its territory exceeds the following thresholds:

-124	$\text{dB(W/(m}^2 \cdot \text{MHz))}$	for	$0° \leq \theta \leq 5°$
$-124 + 0.5\,(\theta - 5)$	$\text{dB(W/(m}^2 \cdot \text{MHz))}$	for	$5° < \theta \leq 25°$
-114	$\text{dB(W/(m}^2 \cdot \text{MHz))}$	for	$\theta > 25°$

where θ is the angle of arrival of the incident wave above the horizontal plane (degrees),[1]

instructs the Radiocommunication Bureau

in its examination of requests for coordination for any geostationary space station in the FSS operating in the band 11.7-12.2 GHz in Region 2, to determine if the pfd thresholds under *resolves* above are exceeded on the territory of any administration, other than the notifying administration, having a primary allocation to terrestrial services and, if so, to so notify both the notifying and the affected administrations.

[1] These values relate to the pfd and angles of arrival which would be obtained under free-space propagation conditions.

RESOLUTION 78 (WRC-2000)

Development of procedures in case the operational or additional operational limits in Article S22 are exceeded

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has adopted in Article **S22** single-entry operational limits (see Tables **S22-4A** through **S22-4C)** and single-entry additional operational limits (see Table **S22-4A1**) applicable to non-geostationary (non-GSO) fixed-satellite service (FSS) systems (space-to-Earth) in certain parts of the frequency range 10.7-20.2 GHz;

b) that, taking into account Nos. **S22.5H** and **S22.5I**, wherever the limits referred to in *considering a)* are exceeded by a non-GSO FSS system to which the limits apply, this constitutes a violation of No. **S22.2**;

c) that ITU-R has identified the need for specific procedures that correct in the most expeditious manner any cases where the limits in *considering a)* are exceeded, by the inclusion of appropriate procedures in the Radio Regulations;

d) that the growth in use of non-GSO satellites is unlikely to lead to many cases of the limits mentioned in *considering a)* being exceeded before WRC-03,

resolves

that further study is needed to develop procedures suitable for application in the long term,

invites ITU-R

taking into consideration the guidelines in Annex 1, to conduct, as a matter of urgency, and in time for consideration by WRC-03, the appropriate regulatory studies to develop procedures, not limited to modification of Article **S15**, for application in cases where the power limits referred to in *considering a)* are exceeded at an operational earth station.

ANNEX 1 TO RESOLUTION 78 (WRC-2000)

Guidelines for the development of procedures for ensuring compliance with single-entry operational and additional operational limits in Section II of Article S22

1 It is essential that Member States exercise the utmost goodwill and mutual assistance in the application of the provisions of Article 45 of the Constitution and of these procedures for the settlement of problems stemming from the equivalent power flux-density, $epfd_{\downarrow}$, interference from non-GSO FSS systems in excess of the operational limits given in Tables **S22-4A**, **S22-4B** and **S22-4C** and/or the additional operational limits given in Table **S22-4A1** (excess $epfd_{\downarrow}$ interference).

2 In the settlement of such problems, due consideration shall be given to all factors involved, including the relevant technical and operational factors.

3 For the purpose of these procedures, the term “administration” may include the centralizing office designated by the administration, in accordance with No. **S16.3**.

4 Administrations shall cooperate in the detection and elimination of excess $epfd_{\downarrow}$ interference.

5 Where practicable, and subject to agreement between the administrations concerned, the case of excess $epfd_{\downarrow}$ interference may be dealt with directly between their operating organizations.

6 When a case of excess $epfd_{\downarrow}$ interference to a receiving GSO earth station associated with a transmitting space station is reported, and such excess $epfd_{\downarrow}$ interference cannot be accepted by the affected administration, the affected administration should first attempt to identify the source of the excess $epfd_{\downarrow}$ interference.

7 If the administration having jurisdiction over the receiving earth station has difficulty in determining the source or characteristics of the excess $epfd_{\downarrow}$ interference:

a) It may send a request for cooperation to all administrations responsible for non-GSO FSS systems with overlapping frequency assignments that have been brought into use, providing all relevant details. A copy of any such request shall be sent to Bureau.

b) Upon receipt of such a request, each administration shall, as soon as possible, acknowledge receipt and send to the requesting administration, within 15 days, with a copy to the Bureau, the information that may be used to identify the source of the problem. Such acknowledgement shall not constitute acceptance of responsibility.

c) If an administration fails to respond within 15 days, the affected administration may request the assistance of the Bureau, in which case Bureau shall immediately send a fax to the administration responsible for the non-GSO system, requesting action within an additional 15 days.

d) If the administration fails to respond to the Bureau within the time period established in § 7 *c)* above, the Bureau shall enter a remark in the Remarks column of the Master Register against the relevant frequency assignments of the non-GSO FSS system in question to the effect that the responsible administration did not respond to a request for cooperation regarding an unresolved complaint of excess epfd↓ interference.

8 Once the administration having jurisdiction over the receiving GSO earth station identifies the source(s) of the excess epfd↓ interference, it may send a letter, by fax or other mutually agreed electronic means, to the administration(s) concerned and request immediate corrective action. It shall give all useful information to enable the responding administration(s) to take such steps as may be necessary to reduce the interference to the epfd↓ levels required in Table **S22-4A**, **S22-4A1**, **S22-4B** or **S22-4C**, as appropriate, or to a higher level that is acceptable to the administration having jurisdiction over the receiving GSO earth station suffering the interference.

9 Upon receipt of such a request, an administration shall acknowledge receipt to the requesting administration within 15 days, with a copy to the Bureau. Such acknowledgement shall not constitute acceptance of responsibility.

10 Within 15 days after receipt of a request for corrective action pursuant to § 7 above, the administration receiving the request shall either:

a) provide the requesting administration and the Bureau with information indicating that no non-GSO FSS system for which it is responsible could have caused the excess epfd↓ interference experienced by the receiving GSO earth station; or

b) acknowledge responsibility for causing the excess epfd↓ interference and immediately reduce emissions of the interfering system into the affected receiving GSO earth station to the epfd↓ levels laid down in Table **S22-4A**, **S22-4A1**, **S22-4B** or **S22-4C**, as appropriate.

In either case, the Bureau shall be informed of the action taken.

11 If an administration fails to respond within 15 days, the affected administration may request the assistance of the Bureau, in which case the Bureau shall immediately send a fax to the administration responsible for the non-GSO system, requesting action within an additional 15 days.

12 If the administration fails to respond to the Bureau within the time period established in § 11 above, the Bureau shall enter a remark in the Remarks column of the Master Register against the relevant frequency assignments of the non-GSO FSS system in question to the effect that the responsible administration did not respond to a request for cooperation regarding an unresolved complaint of excess epfd↓ interference.

13 If an administration acknowledges responsibility for causing the excess epfd↓ interference pursuant to § 10 *b)* above, but fails to reduce immediately emissions of the interfering system as required:

a) The administration responsible for the interference shall have an additional ten days to take the necessary action to correct the excess epfd↓ interference situation pursuant to No. **S15.21**.

b) If, after the ten-day period, the administration responsible for the interference has still not reduced emissions of the interfering system as required, the Bureau shall enter a remark in the Remarks column of the Master Register against the relevant frequency assignments of the non-GSO FSS system in question to the effect that the use of the affected frequency bands by the interfering system is in violation of Nos. **S22.2** and **S22.5I**. Notice of the entry of the remark shall be included in the Bureau's International Frequency information Circular (BR IFIC).

14 The Bureau shall retain any entry in the Remarks column of the Master Register made pursuant to § 7 *d)*, 12 or 13 *b)* above, which shall remain in place until such time as the non-responding administration responds and/or remedies the excess $epfd_{\downarrow}$ interference, as appropriate.

15 If it considers necessary, and particularly if the steps taken in accordance with the procedures described above have not produced satisfactory results, the administration concerned shall forward details of the case to the Bureau for its information.

16 In such a case, the administration concerned may also request the Bureau to act in accordance with the provisions of Section I of Article **S13**; but it shall then supply the Bureau with the full facts of the case, including all the technical and operational details and copies of the correspondence.

RESOLUTION 79 (WRC-2000)

Development of the technical basis for coordination of radio astronomy stations with transmitting high-density fixed systems in the fixed service, in the band 42.5-43.5 GHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has decided that the band 42.5-43.5 GHz, which is allocated to the fixed service, should become available for high-density applications;

b) that the 42.5-43.5 GHz band is also allocated to the radio astronomy service on a primary basis worldwide, and is used intensively for both continuum and spectral line observations, at a limited number of sites;

c) that radio astronomy observatories operating in the band are generally located far from urban population centres, employ very high-gain antennas and very low-noise amplifiers to receive extremely weak cosmic radio emissions over which astronomers have no control;

d) that high-density fixed system (HDFS) stations are expected to be deployed in large numbers over areas of large geographical extent in urban population centres;

e) that studies are being initiated to characterize short-term anomalous propagation from transmitting stations dispersed over a large geographical area to a single receiving earth station (area-to-point propagation);

f) that no studies are yet available on the coordination distance that may be required to protect a radio astronomy station from HDFS transmissions associated with a single urban population centre, but that, based on preliminary studies made at lower frequencies, a provisional coordination distance of 250 km may be appropriate,

resolves to invite ITU-R

to conduct studies on the coordination distance between radio astronomy stations operating in the 42.5-43.5 GHz band and HDFS stations with a view to developing ITU-R Recommendations,

urges administrations

to participate actively in the aforementioned studies by submitting contributions to ITU-R.

RESOLUTION 80 (Rev.WRC-2000)

Due diligence in applying the principles embodied in the Constitution

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that Articles 12 and 44 of the Constitution lay down the basic principles for the use of the radio-frequency spectrum and the geostationary-satellite and other satellite orbits;

b) that those principles have been included in the Radio Regulations;

c) that Article I of the Agreement between the United Nations and the International Telecommunication Union provides that "the United Nations recognizes the International Telecommunication Union (hereinafter called "the Union") as the specialized agency responsible for taking such action as may be appropriate under its basic instrument for the accomplishment of the purposes set forth therein";

d) that, in accordance with Nos. **S11.30**, **S11.31** and **S11.31.2**, notices shall be examined with respect to the provisions of the Radio Regulations, including the provision relating to the basic principles, appropriate rules of procedure being developed for the purpose;

e) that WRC-97 instructed the Radio Regulations Board (RRB) to develop, within the framework of Nos. **S11.30**, **S11.31** and **S11.31.2**, rules of procedure to be followed in order to be in compliance with the principles in No. **S0.3**;

f) that the Board, in accordance with Resolution **80 (WRC-97)**, submitted a report to this Conference suggesting possible solutions and stating that, after examining the Radio Regulations, it had concluded that there are no provisions currently in the Radio Regulations that link the formal notification or coordination procedures with the principles stated in No. **S0.3** of the Preamble to the Radio Regulations;

g) that the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space of the United Nations General Assembly has drawn up recommendations in this respect,

noting

a) that, in accordance with the provisions of No. 127 of the Convention, the Conference may give instructions to the Sectors of the Union;

b) that, according to No. 160C of the Convention, the Radiocommunication Advisory Group shall review any matter as directed by a conference;

c) that in the RRB report to the Conference, several members of the Board noted some difficulties likely to be experienced by administrations, particularly administrations of developing countries, as follows:

– the "first-come first-served" concept restricts and sometimes prevents access to and use of certain frequency bands and orbit positions;

– a relative disadvantage for developing countries in coordination negotiations due to various reasons such as a lack of resources and expertise;

– perceived differences in consistency of application of the Radio Regulations;

– the submitting of "paper" satellites that restricts access options;

– the growing use of the bands of the Plans of Appendices **S30** and **S30A** by regional, multichannel systems, which may modify the main purpose of these Plans to provide equitable access to all countries;

– the considerable processing delays in the Radiocommunication Bureau are due to the very complex procedures required and the large number of filings submitted; these delays contribute to a coordination backlog of 18 months which could extend to three years and creates uncertain regulatory situations, additional delay in the coordination process that cannot be overcome by administrations, and the possible loss of the assignment because the allotted time is exceeded;

– satellite systems may already be in orbit before completion of coordination;

– statutory time-frames, such as those in No. **S11.48**, may often be insufficient for developing countries to be able to complete the regulatory requirements as well as the design, construction and launch of satellite systems;

– no provisions for international monitoring to confirm the bringing into use of satellite networks (assignments and orbits),

resolves

1 to instruct the Radiocommunication Advisory Group to carry out studies and consider possible draft recommendations and draft provisions linking the formal notification, coordination and registration procedures with the principles contained in Article 44 of the Constitution and No. **S0.3** in the Preamble to the Radio Regulations; the studies will take into account, *inter alia,* the report of the Radio Regulations Board to this Conference (Document 29), in particular the difficulties pointed out in § 3.2 thereof, and contributions, if any, from members;

2 to instruct the Radio Regulations Board to carry out studies and consider possible draft recommendations and draft provisions linking the formal notification, coordination and registration procedures with the principles contained in Article 44 of the Constitution and No. **S0.3** in the Preamble to the Radio Regulations, and to report to WRC-03 with regard to this Resolution;

3 to instruct the Director of the Radiocommunication Bureau to submit to WRC-03 a detailed report on the action taken on this Resolution,

invites

the other organs of the ITU-R to make contributions to the Director of the Radiocommunication Bureau for inclusion in his report to WRC-03 under *resolves* 3.

RESOLUTION 81 (WRC-2000)

Evaluation of the administrative due diligence procedure for satellite networks

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that WRC-97 adopted Resolution **49 (WRC-97)** establishing administrative due diligence procedure applicable to some satellite radiocommunication services with effect from 22 November 1997;

b) that the Plenipotentiary Conference adopted Resolution 85 (Minneapolis, 1998) on evaluation of the administrative due diligence procedure for satellite networks;

c) that Resolution 85 (Minneapolis, 1998) instructs the Director of the Radiocommunication Bureau to inform WRC-2000 about the effectiveness of the administrative due diligence procedure, in accordance with Resolution **49 (WRC-97)**;

d) that Resolution 85 (Minneapolis, 1998) resolves that WRC-2000 shall evaluate the results of the implementation of the administrative due diligence procedure and shall inform the next Plenipotentiary Conference, in 2002, of its conclusions in that regard;

e) the report of the Director of the Radiocommunication Bureau on the administrative due diligence procedure applicable to some satellite networks;

f) the proposals made to this Conference to strengthen the administrative due diligence procedure, and to adopt financial due diligence procedures,

noting

a) that the Bureau has not encountered any administrative difficulty in applying the provisions and in gathering and publishing information;

b) that the Bureau has taken action pursuant to *resolves* 6 of Resolution **49 (WRC-97)** to cancel the submissions, and accordingly publish the related special sections, in respect of 36 satellite networks;

c) that, for all of these cancellations, the maximum (nine-year) period for bringing into use pursuant to *resolves* 1 and 2 of Resolution **51 (WRC-97)** and No. **S11.44** had been reached and hence the submissions would have been cancelled in any event;

d) that, when requested to provide due diligence information (triggered by the original date of bringing into use of their satellite networks), administrations have generally requested, wherever possible, extensions of the regulatory period for bringing into use up to the maximum limit authorized by the Radio Regulations;

e) that the effect of the administrative due diligence procedure may not, therefore, be fully apparent until at least 21 November 2003,

recognizing

that the administrative due diligence procedure has not yet had any impact on the problem of reservation of orbit and spectrum capacity without actual use,

resolves

1 that further experience is needed in the application of the administrative due diligence procedures adopted by WRC-97, and that several years may be needed to see whether the procedure produces satisfactory results;

2 that it is premature to consider the adoption, among other procedures, of any financial due diligence procedures,

instructs the Director of the Radiocommunication Bureau

to report to the 2002 Plenipotentiary Conference on the results of the implementation of the administrative due diligence procedure,

instructs the Secretary-General

to bring this Resolution to the attention of the 2002 Plenipotentiary Conference.

RESOLUTION 82 (WRC-2000)

Provisions relating to earth stations located on board vessels which operate in fixed-satellite service networks in the bands 3 700-4 200 MHz and 5 925-6 425 MHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that there is a demand for global wideband satellite communication services on vessels;

b) that the technology exists that enables earth stations on board vessels (ESVs) to use fixed-satellite service (FSS) networks operating in the 3 700-4 200 MHz and 5 925-6 425 MHz bands;

c) that ESVs have the potential to cause unacceptable interference to other services in the band 5 925-6 425 MHz;

d) that ESVs operating in these bands require considerably less than the full bandwidth in this FSS allocation and only a portion of the visible geostationary arc;

e) that there are a limited number of geostationary FSS systems that have global coverage;

f) that the number of vessels equipped with ESVs may be such as to place a heavy coordination burden on some administrations, especially those in developing countries;

g) that in order to ensure the protection and future growth of other services, ESVs shall operate with requisite technical and operational constraints;

h) that, based on appropriate assumptions, a minimum distance can be calculated beyond which an ESV will not have the potential to cause unacceptable interference to other services in this band,

noting

a) that ESVs may operate in FSS networks in the bands 3 700-4 200 MHz and 5 925-6 425 MHz under No. **S4.4** and shall not claim protection from, nor cause interference to, other services having allocations in the band;

b) that there is no need for new regulatory procedures for ESVs operating at specified fixed points,

recognizing

a) that progress has been made within ITU-R in determining the technical and operational provisions under which ESVs could operate;

b) that further studies are needed,

resolves

1 to invite ITU-R to continue to study, as a matter of urgency, the regulatory, technical and operational constraints to be applied to ESV operations, having regard to the provisional guidelines for ESV use in Annex 1 and the provisional technical guidelines given in Annex 2 and, in particular, to determine the appropriate value for the minimum distance from ESV stations beyond which these stations are assumed not to have the potential to cause unacceptable interference to stations of other services of any administration and beyond which no coordination would be required;

2 to invite ITU-R, as a matter of urgency:

– to develop Recommendations on methods for coordination between terrestrial services and ESVs;

– to study the feasibility of mitigation techniques, such as various frequency arrangements or dual-band systems, as a way to avoid the need for detailed coordination of ESVs without constraining existing services;

– to study, as a complement to the 3 700-4 200 MHz and 5 925-6 425 MHz bands, the use of other FSS allocations for ESVs transmitting in the 6 GHz and 14 GHz bands;

3 to invite WRC-03 to assess, in the light of these studies, the provisions under which ESVs could operate in FSS networks in the bands 3 700-4 200 MHz and 5 925-6 425 MHz, without causing unacceptable interference to radiocommunication services operating in accordance with the Radio Regulations;

4 that, until a decision is adopted for ESVs by WRC-03, agreement between the administrations licensing ESVs and affected administrations should be reached on a bilateral or multilateral basis, in accordance with the guidelines in Annexes 1 and 2;

5 that, until a decision is adopted for ESVs by WRC-03, administrations licensing ESVs that enter into bilateral or multilateral agreements under *resolves* 4 above should ensure that, as part of the licensing process, ESVs operate in compliance with such agreements, taking into consideration the interests of concerned neighbouring countries,

encourages concerned administrations

to cooperate with administrations which license ESVs while seeking agreement under *resolves* 4, *encourages ESV licensing administrations*

to consider registering their ESV frequency assignments in the Master International Frequency Register, for information purposes only,

urges all administrations

to participate actively in the above-mentioned studies by submitting contributions,

instructs the Secretary-General

to bring this Resolution to the attention of the Secretary-General of the International Maritime Organization (IMO) and to invite IMO to participate in the work on this issue.

ANNEX 1 TO RESOLUTION 82 (WRC-2000)

Provisional guidelines for ESV use

1 The administration that issues the licence for the use of ESVs in these bands (licensing administration) shall ensure that such stations do not cause unacceptable interference to the services of other concerned administrations.

2 Operators of ESVs shall comply with the technical guidelines listed in Annex 2 and/or those agreed by the licensing and concerned administrations.

3 ESVs shall not claim protection from transmissions of other services operating in accordance with the Radio Regulations.

4 Any transmissions from ESVs within an agreed distance, as identified in *resolves* 1 of this Resolution, shall be based upon the prior agreement of the concerned administration.

5 Administrations which issue ESV licences shall ensure that ESV operators endeavour to provide the necessary assistance to the concerned administrations in order to facilitate the agreement.

6 Administrations, in determining the distance referred to in § 4 above, are encouraged to exclude those parts of their territory, such as remote small islands, where other services in the band 5 925-6 425 MHz are neither operating nor planned.

7 If an administration changes its actual or planned deployment of stations in other services, it may require revision of the agreement with the ESV licensing administration(s).

8 The ESV system should include means of identification and automatic mechanisms to terminate transmissions whenever the station operates outside its authorized geographic (see § 4 above) or operational limits.

9 ESVs should be equipped so as to enable the licensing administration under the provisions of Article **S18** to verify earth station performance and to terminate ESV transmissions immediately upon request by an administration whose services may be affected.

10 When ESVs operating beyond the territorial waters but within a specified distance (as referred to in § 4 above) fail to comply with the terms required by the concerned administration pursuant to § 2 and 4, then that administration may:

– request the ESV to comply with such terms or cease operation immediately; or

– request the licensing administration to require such compliance or immediate cessation of the operation.

11 Any licensing authority that licenses ESVs should maintain at all times a point of contact that may be contacted by a concerned administration.

ANNEX 2 TO RESOLUTION 82 (WRC-2000)

Provisional technical guidelines applicable to ESVs operating in the bands 3 700-4 200 MHz and 5 925-6 425 MHz

Minimum diameter of ESV antenna:	2.4 m
Maximum half-power beamwidth of ESV antenna:	1.5º
Minimum elevation angle of ESV antenna:	10°
Maximum necessary bandwidth per vessel:	2.346 MHz
Maximum necessary bandwidth in a single operating area:	36 MHz (see Note)
Maximum ESV transmitter power spectral density at the input to the antenna:	17 dB(W/MHz)
Tracking accuracy of ESV antenna:	0.2º

NOTE – The actual bandwidth required in an operating area will depend on the number of ESVs that would be present simultaneously in that area, and in many areas the required bandwidth will be less than 36 MHz. In addition, because ESVs are frequency agile, the necessary bandwidth per vessel (2.346 MHz) can be generally identified anywhere within the 4/6 GHz bands and does not have to be contiguous with bandwidth of other ESVs.

RESOLUTION 83 (WRC-2000)

Administrative procedures for cost recovery for satellite network filings

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) Resolution 88 (Minneapolis, 1998) of the Plenipotentiary Conference;

b) Decision 482 of the Council, which provides for one free entitlement per year per administration of a satellite filing;

c) Decision 482 of the Council, which instructed this Conference to consider whether, in light of the Council decision, any relevant amendments to the Radio Regulations with respect to the procedures covered by the Council Decision may be necessary;

d) that this Conference, pursuant to Resolution 88 (Minneapolis, 1998) and Council Decision 482, identified the following note associated with Nos. **S9.2B** and **S9.38** in Article **S9**, § 4.2.8 of Appendix **S30**, § 4.1.5 and 4.2.8 of Appendix **S30A** and the title of Article 6 of Appendix **S30B**:

"If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication, after informing the administration concerned. The Bureau shall inform all administrations of such action, and that the network specified in the publication in question no longer has to be taken into consideration by the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration, not later than 60 days prior to due date of the payment if payment has not been received by that date. This provision was identified in reply to Resolution 88 (Minneapolis, 1998) of the Plenipotentiary Conference (Minneapolis, 1998) and shall enter into force at a date to be determined by the forthcoming plenipotentiary conference.",

considering further

a) that some Member States are of the view that the rights and obligations of Member States are specified in the Constitution and that any modification of these rights based on financial considerations should be decided by the Plenipotentiary Conference;

b) that other Member States consider that despite the financial implications, a WRC may adopt and decide on provisions such as those referred to in *considering d)* above;

c) that a non-payment would result in an inequitable situation between the Member State concerned and the other Member States,

resolves

to recommend that the 2002 Plenipotentiary Conference consider the extent to which the provisions identified by WRC-2000 satisfy the purpose of Resolution 88 (Minneapolis, 1988), and consider the date at which they shall enter into force.

RESOLUTION 84 (WRC-2000)

Power flux-density limits in the bands 37.5-42.5 GHz for the fixed-satellite service, broadcasting-satellite service and mobile-satellite service

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has established power flux-density (pfd) limits in accordance with the provisions of Nos. **S21.16.11** and **S21.16.12** for the fixed-satellite service (FSS) (space-to-Earth) in the bands 37.5-40.0 GHz and 40.5-42.5 GHz, and the mobile-satellite service (MSS) (space-to-Earth) in the band 39.5-40 GHz;

b) that, in the band 37.5-42.5 GHz, Recommendation ITU-R SF.1484 recommends pfd limits for non-geostationary (non-GSO) FSS systems;

c) that, in the bands 37.5-40 GHz and 40.5-42.5 GHz, the pfd limits adopted by this Conference for GSO FSS systems are based on ITU-R studies;

d) that this Conference has harmonized the allocation to FSS in the band 40.5-42.5 GHz across all the Regions;

e) that there exists an allocation to the broadcasting-satellite service (BSS) on a co-primary basis in the band 40.5-42.5 GHz;

f) that there are only provisional pfd limits for the BSS in the range 40.5-42.5 GHz;

g) that, although sharing is feasible between FSS earth stations and terrestrial stations provided that appropriate coordination procedures and/or operational techniques are employed, sharing may in practice become difficult when high geographic densities of such stations are deployed in bands heavily used by either service;

h) that the band 40-40.5 GHz has not been identified as being available for high-density applications in the fixed service,

noting

a) that Recommendation ITU-R SF.1484 indicates that some fixed service systems employing small net fade margins and which operate at elevation angles greater than 10° in the band 37.5-40 GHz may not be fully protected from interference from FSS systems without imposing undue constraints on FSS systems;

b) that the fixed service parameters for sharing studies are given in Recommendation ITU-R F.758;

c) that new studies taking account of high-density fixed service deployments with new characteristics (as documented in Recommendation ITU-R F.1498) in some countries have been presented and discussed at this Conference;

d) that the new studies submitted to this Conference, in which requirements are identified for the protection of high-density fixed service systems vis-à-vis GSO FSS and non-GSO FSS systems, but on which consensus has not been reached, indicate clear-sky pfd protection requirements that are about 13.5 dB more stringent at elevation angles above 25° than the table entries in Table **S21-4** of Article **S21** for the band 37.5-40 GHz;

e) that No. **S5.551AA** may provide additional protection to the fixed service,

recognizing

a) that some downlink fade compensation techniques, such as adaptive power control, could reduce the operational pfd levels of satellite networks under normal operating conditions while enhancing the ability of FSS networks to overcome rain fading;

b) that there is a need for further study to determine the percentage of time during which fade conditions will require downlink fade compensation techniques;

c) that, within the range 39.5-42 GHz, some administrations plan to deploy FSS systems using ubiquitous very small aperture terminals,

recognizing further

a) that the use of downlink fade compensation techniques by satellite systems may affect the performance of fixed service and FSS links operating in unfaded conditions in the same frequency band;

b) that the use of downlink fade compensation techniques affects the design of FSS links,

resolves

1 that the limits in Table **S21-4** for the bands 37.5-40 GHz and 40.5-42.5 GHz, as revised by this Conference, shall be applied for verification purposes by the Radiocommunication Bureau and by administrations as of 2 June 2000 in accordance with the provisions of Nos. **S21.16.11** and **S21.16.12**;

2 that, taking into account *recognizing a)*, in the interim period before WRC-03, before an administration brings into use in Region 2 a frequency assignment for a GSO FSS network in the 37.5-40 GHz band, it shall seek the agreement of any administration in Region 2 on whose territory the pfd produced exceeds the values in Table **S21-4** minus 12 dB,

urges administrations

1 to meet the requirements of No. **S5.551AA**;

2 when considering regulatory provisions in relation to the band 40-40.5 GHz, to take into account that there were a number of proposals to WRC-2000 to identify the band 40-40.5 GHz for high-density applications in the FSS,

invites ITU-R

1 taking into account the *resolves*, to conduct as a matter of urgency and in time for WRC-03, studies to determine whether the pfd limits included in Table **S21-4** adequately protect the fixed service in the bands 37.5-40 GHz and 42-42.5 GHz from FSS and MSS space-to-Earth transmissions;

2 taking into account the *resolves,* to conduct as a matter of urgency and in time for WRC-03, studies to determine whether the pfd limits included in Table **S21-4** adequately protect the fixed service in the band 40.5-42 GHz from FSS space-to-Earth transmissions, taking into account the requirements of the FSS and *recognizing c)*;

3 to study technical and operational characteristics and pfd values for the BSS in the range 40.5-42.5 GHz;

4 in conducting studies under *invites ITU-R* 1, 2 and 3 above, to take into account the need to ensure a proper balance in terms of the impact on both the fixed service and space services sharing the same band;

5 to conduct, as a matter of urgency and taking into account the *considering* paragraphs above, studies on mitigation techniques to improve sharing conditions between the space services referred to under *considering* above and fixed service systems, taking account of the impact on both the systems of these space services and the fixed service systems;

6 to undertake, as a matter of urgency, studies on the appropriate criteria and techniques for addressing interference from transmitters of the fixed service into earth station receivers in high-density applications in the FSS having allocations in the bands 39.5-40 GHz and 40.5-42 GHz and intended for operation in the same geographic area;

7 in the bands 37.5-40 GHz and 42-42.5 GHz, to study the nominal clear-sky pfd levels, and the percentage of time during which they may be exceeded to overcome fading conditions between the satellite and one or more geographically separated earth stations, in order to protect the fixed service while permitting operation of FSS earth stations using, for example, coordinated large antennas, taking into account the balance of constraints on both FSS systems and the fixed service;

8 to report on the results of these studies in time for WRC-03,

recommends

that WRC-03 take appropriate action based on the results of these studies.

RESOLUTION 95 (Rev.WRC-2000)

General review of the Resolutions and Recommendations of world administrative radio conferences and world radiocommunication conferences

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that it is important to keep the Resolutions and Recommendations of past world administrative radio conferences and world radiocommunication conferences under constant review, in order to keep them up to date;

b) that the reports of the Director of the Radiocommunication Bureau submitted to previous conferences provided a useful basis for a general review of the Resolutions and Recommendations of past conferences;

c) that some principles and guidelines are necessary for future conferences to treat the Resolutions and Recommendations of previous conferences which are not related to the agenda of the conference,

resolves to invite future competent world radiocommunication conferences

1 to review the Resolutions and Recommendations of previous conferences that are related to the agenda of the conference with a view to their possible revision, replacement or abrogation and to take appropriate action;

2 to review the Resolutions and Recommendations of previous conferences that are not related to any agenda item of the conference with a view to:

– abrogating those Resolutions and Recommendations that have served their purpose or have become no longer necessary;

– updating and modifying Resolutions and Recommendations, or parts thereof that have become out of date, and to correct obvious omissions, inconsistencies, ambiguities or editorial errors and effect any necessary alignment;

3 at the beginning of the conference, to determine which committee within the conference has the primary responsibility to review each of the Resolutions and Recommendations referred to in *resolves* 1 and 2 above,

instructs the Director of the Radiocommunication Bureau

1 to conduct a general review of the Resolutions and Recommendations of previous conferences and, after consultation with the Radiocommunication Advisory Group and the Chairmen and Vice-Chairmen of the Radiocommunication Study Groups, submit a report to the second session of the Conference Preparatory Meeting in respect of *resolves* 1 and *resolves* 2;

2 if practicable, to include in the above report an indication of the agenda item, if appropriate, and possible responsible committees within the conference for each text, based on the available information as to the possible structure of the conference,

invites the Conference Preparatory Meeting

to include, in its Report, the results of a general review of the Resolutions and Recommendations of previous conferences.

RESOLUTION 122 (Rev.WRC-2000)

Use of the bands 47.2-47.5 GHz and 47.9-48.2 GHz by high altitude platform stations (HAPS) in the fixed service and by other services and the potential use of bands in the range 18-32 GHz by HAPS in the fixed service

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the band 47.2-50.2 GHz is allocated to the fixed, mobile and fixed-satellite services on a co-primary basis;

b) that WRC-97 made provision for operation of HAPS, also known as stratospheric repeaters, within the fixed service in the bands 47.2-47.5 GHz and 47.9-48.2 GHz;

c) that ITU has among its purposes “to promote the extension of the benefits of the new telecommunication technologies to all the world’s inhabitants” (No. 6 of the Constitution);

d) that systems based on new technologies using high altitude platforms will be able to provide high-capacity, competitive services to urban and rural areas;

e) that the development of any service requires major investment and that manufacturers and operators should be given the confidence to make the necessary investment;

f) that high altitude platform systems are in an advanced stage of development and some countries have notified such systems to ITU in the bands 47.2-47.5 GHz and 47.9-48.2 GHz;

g) that WRC-97 adopted a definition of HAPS in Article **S1**, modified No. **S11.24** and added No. **S11.26** providing for notices relating to assignments for HAPS in the bands 47.2-47.5 GHz and 47.9-48.2 GHz and that the Radio Regulations Board issued a provisional rule of procedure concerning notification periods in No. **S11.24/1228** in February 1997;

h) that in spite of the urgency attached to the development of such systems, technical, sharing and regulatory issues should be further studied in order to achieve the most efficient use of the spectrum available for these systems;

i) that while the decision to deploy HAPS can be taken on a national basis, such deployment may affect neighbouring administrations, particularly in small countries;

j) that technical studies have been undertaken on the characteristics of a system using HAPS in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz and on the coordination and sharing requirements between systems using HAPS and systems in the conventional fixed service, radio astronomy and in other services, but that further studies are still in progress on the potential for interference between such systems;

k) that the radio astronomy service has primary allocations in the bands 42.5-43.5 GHz and 48.94-49.04 GHz;

l) that results of ITU-R studies have been presented which indicate that in WRC-97 designated bands at 47.2-47.5 GHz and 47.9-48.2 GHz, sharing between fixed-service systems using HAPS and other conventional fixed-service systems in the same area will require appropriate interference mitigation techniques to be developed and implemented;

m) that No. **S5.552** urges administrations to reserve fixed-satellite service (FSS) use of the band 47.2-49.2 GHz for feeder links for the broadcasting-satellite service, and that ITU-R studies indicate that HAPS in the fixed service may share with broadcasting-satellite feeder links;

n) that ITU-R studies in the bands 47.2-47.5 GHz and 47.9-48.2 GHz indicate that sharing between fixed-service systems using HAPS and the FSS could be feasible under certain limitations, such as geographical separation between HAPS-based systems and FSS earth stations;

o) that since the 47 GHz bands are more susceptible to rain attenuation in certain areas of Region 3, the range 18-32 GHz has been proposed for Region 3 for possible identification of additional spectrum in ITU-R, and preliminary ITU-R studies are in progress for these bands;

p) that the 18-32 GHz range is already heavily used by a number of different services and a number of other types of applications in the fixed service;

q) that Nos. **S5.537A** and **S5.543A** permit the use of HAPS in the fixed service in the bands 27.5-28.35 GHz and 31.0-31.3 GHz in certain countries on a non-interference, non-protection basis in order to address issues of rain attenuation associated with the 47 GHz bands referred to in *considering b)* above;

r) that technical, sharing and regulatory issues should be studied in order to determine criteria for the operation of HAPS in the bands referred to in *considering q)* above;

s) that the 31.3-31.8 GHz band is allocated to the radio astronomy, Earth exploration-satellite (passive) and space research (passive) services and the 31.8-32.3 GHz band is allocated to the space research (deep space) service, and that there is a need to appropriately protect these services from unwanted emissions, taking into account No. **S5.340** and the interference criteria given in Recommendations ITU-R SA.1029 and ITU-R RA.769,

resolves

1 to urge administrations to facilitate coordination between HAPS in the fixed service operating in the bands 47.2-47.5 GHz and 47.9-48.2 GHz and other co-primary services in their territory and adjacent territories;

2 that, on a provisional basis, the procedures of Article **S9** shall be used for coordination between satellite systems and systems using HAPS in the bands 47.2-47.5 GHz and 47.9-48.2 GHz;

3 to invite WRC-03 to review the results of the studies specified below and consider refinement of the regulatory provisions that might facilitate a broader application of these high altitude platform technologies,

requests ITU-R

1 to study the regulatory provisions that might be needed in order to address those cases where the deployment of HAPS in the territory of one administration may affect neighbouring administrations;

2 to continue to carry out studies on the appropriate technical sharing criteria for the situations referred to in *considering j)* above;

3 to conduct studies, as a matter of urgency, and taking into account the requirements of other fixed-service systems and other services, on the feasibility of identifying suitable frequencies, in addition to the 2 × 300 MHz paired band at 47 GHz, for the use of HAPS in the fixed service in the range 18-32 GHz in Region 3, focusing particularly, but not exclusively, on the bands 27.5-28.35 GHz and 31.0-31.3 GHz,

instructs the Director of the Radiocommunication Bureau

1 that notices concerning HAPS that were received by the Bureau prior to 22 November 1997, and provisionally recorded in the Master International Frequency Register in accordance with the provisional rule of procedure issued by the Board, shall be maintained;

2 that from 22 November 1997, and pending review of the sharing studies in *considering j)* and review of the notification process by WRC-03, the Bureau shall accept notices in the bands 47.2-47.5 GHz and 47.9-48.2 GHz only for HAPS in the fixed service and for feeder links for the broadcasting-satellite service, shall continue to process notices for FSS networks (except for feeder links for the broadcasting-satellite service) for which complete information for advance publication has been received prior to 27 October 1997, and shall inform the notifying administrations accordingly.

RESOLUTION 124 (Rev.WRC-2000)

Protection of the fixed service in the frequency band 8 025-8 400 MHz sharing with geostationary-satellite systems of the Earth exploration-satellite service (space-to-Earth)

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that prior to WRC-97, the band 8 025-8 400 MHz was allocated to the Earth exploration-satellite service (space-to-Earth) on a secondary basis in Regions 1 and 3, except for those countries listed in former No. **S5.464**;

b) that the power flux-density limits given in Table **S21-4** of Article **S21** apply to emissions from space stations of the Earth exploration-satellite service (space-to-Earth);

c) that, for those administrations where the secondary allocation applied before WRC-97, geostationary orbital avoidance was not required for the fixed service and, therefore, the power flux-density limits given in Table **S21-4** of Article **S21** may give rise to excessive interference to the fixed service;

d) that WRC-97 adopted provisional power flux-density limits as specified in No. **S5.462A** which are lower than those shown in Table **S21-4** of Article **S21** to protect the fixed service;

e) that, prior to WRC-97, no studies had been conducted in this frequency band by ITU-R on the power flux-density values to apply to space stations of geostationary-satellite systems in the Earth exploration-satellite service where geostationary orbital avoidance had not been implemented by stations of the fixed service,

considering further

a) that the band 8 025-8 400 MHz is used extensively by the fixed service in accordance with ITU-R radio-frequency channel arrangements for the 8 GHz band (see Recommendation ITU-R F.386) and is also used by some countries for television outside broadcast applications;

b) that Recommendation ITU-R F.1502, which was developed in response to Resolution **124 (WRC-97)** and approved by the Radiocommunication Assembly (Istanbul, 2000), recommends power flux-density limits different from those in No. **S5.462A**,

resolves

to invite a future competent world radiocommunication conference to review No. **S5.462A**, taking into account Recommendation ITU-R F.1502, and to take appropriate action.

RESOLUTION 127 (Rev.WRC-2000)

Studies relating to consideration of allocations in bands around 1.4 GHz for feeder links of the non-geostationary-satellite systems in the mobile-satellite service with service links operating below 1 GHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the agenda of WRC-97 included consideration of the adoption of additional allocations for the non-geostationary (non-GSO) mobile-satellite service (MSS);

b) that the Report of the 1999 Conference Preparatory Meeting (CPM-99) stated that the Radiocommunication Bureau has identified 25 non-GSO MSS networks as at 26 November 1999 at frequencies below 1 GHz, at some stage of coordination under Resolution **46 (Rev.WRC-97)**, and that many of the proposed networks cannot be implemented in the existing allocations because there is not enough spectrum;

c) that CPM-97 stated that due to the extreme sensitivity of radio astronomy observations interference from unwanted (spurious and out-of-band) emissions can be a problem, but also noted that interference to radio astronomy can be avoided using various techniques including low-power transmitter levels, choice of modulation, symbol shaping, output filtering and band limiting filters, the use of which can minimize the band separation necessary to meet the recommended interference threshold levels for out-of-band emissions;

d) that factors taken into account by post-CPM-97 activities in order to protect the passive services around 1.4 GHz from out-of-band emissions include: the use of narrow-band non-GSO MSS feeder-link transmissions; the use of spectrum-efficient modulation methods, such as Gaussian filtered minimum shift keying, having inherently rapid roll-off of out-of-band emissions; the use, where necessary, of band-pass filters in satellite transmitters and MSS feeder-link transmitting earth stations; and guardbands where necessary;

e) that factors taken into account by post-CPM-97 activities concerning sharing with the radiolocation service include the use of conventional techniques that may be applied in MSS satellite receivers, such as intermediate frequency limiters and time diversity, which have long been employed to protect radiolocation receivers, and techniques such as transmitted waveforms employing time diversity, which have been employed to protect receivers in other services from high-power pulsed radar transmitters;

f) that, since CPM-97, ITU-R studies have been carried out, containing theoretical analyses, with a view to determining if the operation of non-GSO MSS feeder links in bands around 1.4 GHz would be compatible with the Earth exploration-satellite (passive), radio astronomy and space research (passive) services;

g) that the theoretical analyses have indicated that sufficient reduction of out-of-band and spurious emissions could be achieved to protect the sensitive science services in the band 1 400-1 427 MHz;

h) that it is necessary to conduct additional tests and measurements of feeder-link transmissions from systems having the characteristics, performance and reliability of equipment that would be used in operational systems;

i) that such additional tests and measurements will be completed prior to WRC-03,

recognizing

that the bands near 1.4 GHz are extensively used by many other services operating in accordance with the Radio Regulations, including fixed and mobile services,

noting

a) that Resolution **214 (Rev.WRC-2000)** states under *resolves* 1 that further studies are urgently required on operational and technical means to facilitate sharing between non-GSO MSS and other radiocommunication services having allocations and operating below 1 GHz;

b) that, since WRC-95, ITU-R studies have been carried out on sharing between space and terrestrial services and feeder links near 1.4 GHz for non-GSO MSS systems with service links below 1 GHz,

invites ITU-R, as a matter of urgency

1 to continue studies, and to carry out additional tests and demonstrations to validate the studies on operational and technical means to facilitate sharing, in portions of the band 1 390-1 393 MHz, between existing and currently planned services and feeder links (Earth-to-space) for non-GSO MSS systems with service links operating below 1 GHz;

2 to carry out additional tests and demonstrations to validate the studies on operational and technical means to facilitate sharing, in portions of the band 1 429-1 432 MHz, between existing and currently planned services and feeder links (space-to-Earth) for non-GSO MSS systems with service links operating below 1 GHz;

3 to carry out additional studies, including the measurement of emissions from equipment that would be employed in operational systems to protect passive services in the band 1 400-1 427 MHz from unwanted emissions from feeder links near 1.4 GHz for non-GSO MSS systems with service links operating below 1 GHz;

resolves

to recommend that WRC-03 consider, on the basis of completion of studies referred to in *invites ITU-R, as a matter of emergency,* 1, 2 and 3, additional allocations for feeder links on a worldwide basis for non-GSO MSS systems with service links below 1 GHz,

urges administrations

to participate actively in such studies, with the involvement of interested parties.

RESOLUTION 128 (Rev.WRC-2000)

Protection of the radio astronomy service in the 42.5-43.5 GHz band

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that WRC-97 added a primary allocation to the fixed-satellite service (FSS) (space-to-Earth) in the band 40.5-42.5 GHz in Regions 2 and 3 and in certain countries in Region 1, that this Conference has extended this allocation to include all of Region 1, and that this band is adjacent to the band 42.5-43.5 GHz which is allocated, *inter alia*, to the radio astronomy service for both continuum and spectral line observations;

b) that there is also a worldwide primary allocation to the broadcasting-satellite service (BSS) in the 40.5-42.5 GHz band;

c) that unwanted emissions from geostationary (GSO) BSS and FSS (space-to-Earth) space stations in the band 42-42.5 GHz may result in harmful interference to the radio astronomy service in the band 42.5-43.5 GHz;

d) that aggregate unwanted emissions from non-GSO BSS and FSS (space-to-Earth) space stations in the band 41.5-42.5 GHz may result in harmful interference to the radio astronomy service in the band 42.5-43.5 GHz;

e) that various technical and operational means may be used to reduce unwanted emissions from these space stations;

f) that a limited number of radio astronomy stations worldwide require protection in the band 42.5-43.5 GHz, and that there may be means to limit the susceptibility of radio astronomy stations to interference,

recognizing

a) that WRC-97 required that FSS systems not be implemented in the band 41.5-42.5 GHz band until technical and operational measures have been identified and agreed within ITU-R to protect the radio astronomy service from harmful interference in the band 42.5-43.5 GHz;

b) that this Conference has established provisional power flux-density limits for out-of-band emissions from BSS and FSS stations in accordance with No. **S5.551G**,

resolves

that, notwithstanding any further studies, the power flux-density limits in No. **S5.551G** shall be applied to BSS and FSS stations for which complete coordination (GSO) or notification (non-GSO) information, as appropriate, has been received by the Bureau after the end of WRC-2000 and before the end of WRC-03,

invites ITU-R

1 to study, as a matter of urgency and in time for WRC-03, the provisional power flux-density limits given in No. **S5.551G**;

2 to identify technical and operational measures in the band 41.5-42.5 GHz, including possible mitigation techniques, that may be implemented to protect stations in the radio astronomy service operating in the band 42.5-43.5 GHz, including geographical separation and out-of-band emission limits to be applied to BSS and FSS space stations, as well as measures that may be implemented to reduce the susceptibility of stations in the radio astronomy service to harmful interference,

urges administrations

1 to participate actively in the aforementioned studies by submitting contributions to ITU-R; and

2 when planning to implement BSS or FSS space stations in the band 41.5-42.5 GHz for which complete coordination (GSO) or notification (non-GSO) has been received prior to this Conference, to take into consideration the provisions of No. **S5.551G** in order to protect the radio astronomy service in the band 42.5-43.5 GHz,

recommends

that WRC-03 take appropriate action based on those studies.

RESOLUTION 135 (WRC-2000)

Criteria and process for the resolution of possible cases of misapplication of non-geostationary fixed-satellite service single-entry limits in Article S22

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the non-geostationary fixed-satellite service (non-GSO FSS) single-entry limits are based on certain assumptions;

b) that these single-entry limits can be misapplied and that any misapplication of single-entry limits should be avoided,

noting

that avoiding misapplication of the single-entry limits is of interest to all administrations,

recognizing

a) that misapplication of single-entry limits can reduce the number of competing non-GSO FSS systems;

b) that misapplication of single-entry limits can lead to differing regulatory effect for non-GSO FSS systems which meet the limits and those which misapply the limits in Article **S22**;

c) that misapplication of single-entry limits can disadvantage non-GSO FSS systems meeting, and intending to always meet, the single-entry limits in Article **S22**,

resolves

that misapplication of the single-entry limits in Article **S22**, either by artificial splitting or by combining of non-GSO systems, shall not be permitted,

invites ITU-R

as a matter of urgency, and in time for consideration by WRC-03, to conduct technical studies and develop regulatory procedures to avoid misapplication of the single-entry limits included in Tables **S22-1**, **S22-2** and **S22-3** of Article **S22**, *instructs the Director of the Radiocommunication Bureau*

1 as of the end of WRC-03, to review and, if appropriate, revise any finding previously made in respect of compliance with the limits contained in Article **S22** for a non-GSO FSS system for which notification information has been received on or after 22 November 1997; this review and revision shall be based on the result of the studies under *invites ITU-R*;

2 to determine if and when misapplication of single-entry limits has occurred or will occur based on the process described in Annex 1;

3 to assist in the development of procedures to verify compliance with the intent of this Resolution.

ANNEX 1 TO RESOLUTION 135 (WRC-2000)

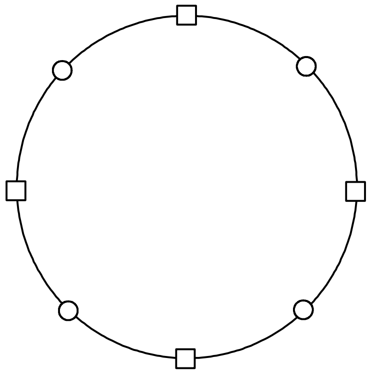
Process to be followed by the Radiocommunication Bureau in developing and implementing procedures to avoid misapplication of non-GSO FSS single-entry limits in Article S22

1 In following the process described below, the Bureau will take all information available to it, or made available to it, into account in arriving at a decision or at a course of action to ensure that the requirements of this Resolution are met.

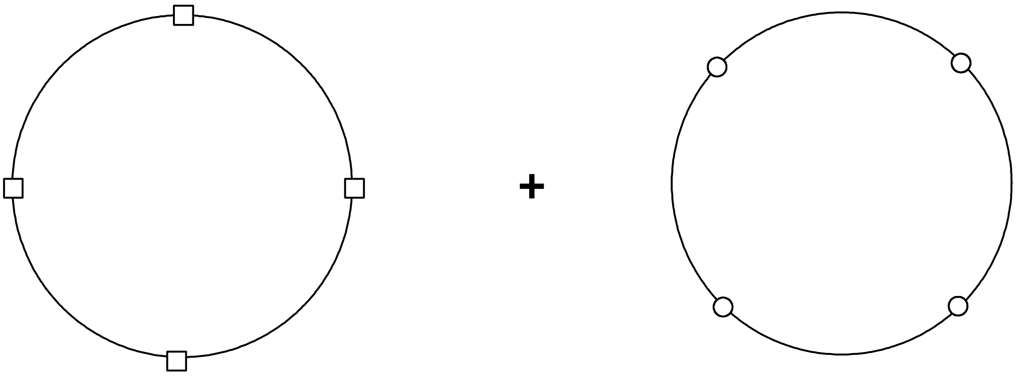
2 For the purpose of determining if misapplication of non-GSO FSS single-entry limits has occurred or will occur, it is necessary for the regulatory solutions to focus not just on "the splitting of systems", but on the "combining of systems" as well. While it is necessary to avoid the misapplication of single-entry limits through the "splitting or combining of systems", reasonable allowance needs to be made for the fact that some applications will use two or more different systems at certain times. The key then is to define certain limits in a way that will allow single-entry criteria to work effectively in practice, while at the same time allowing certain practical combinations of systems up to a point, from time to time.

Example of splitting

Before splitting: The whole system - as a single system - does not meet single-entry limits.

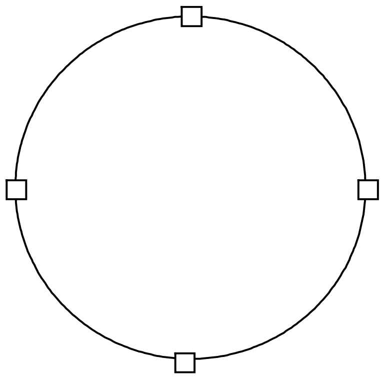


After splitting: When broken into two (or more) parts, each part system meets single-entry limits.

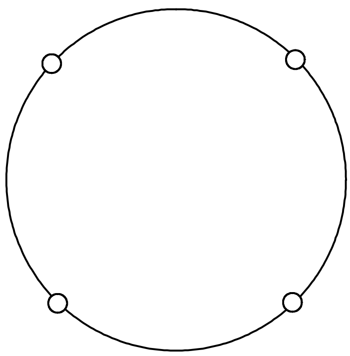


Example of combining

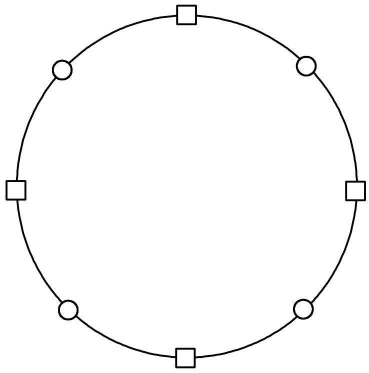
At filing stage (before combining): XYZ Ltd. owns system A. System A meets single-entry limits.



At filing stage (before combining): ABC Ltd. owns system B. System B meets single-entry limits.



At implementation stage (after combining): XYZ Ltd. and ABC Ltd. combine networks A and B to implement round-the-clock end-to-end non-GSO services (if filed as such, the total of networks A and B would fail to meet the single-entry limits).



RESOLUTION 136 (WRC-2000)

Frequency sharing in the range 37.5-50.2 GHz between geostationary fixed-satellite service networks and non-geostationary fixed-satellite service systems

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has made provisions for the operation of geostationary fixed-satellite service (GSO FSS) networks and non-GSO FSS systems in the 10-30 GHz frequency range;

b) that there is an emerging interest in operating GSO FSS networks and non-GSO FSS systems in the 37.5-50.2 GHz frequency range;

c) that there is a need to provide for the orderly development and implementation of new satellite technologies in the 37.5-50.2 GHz frequency range;

d) that systems based on the use of new technologies associated with both GSO FSS networks and non-GSO FSS systems are capable of providing the most isolated regions of the world with high-capacity and low-cost means of communication;

e) that there should be equitable access to the radio-frequency spectrum and orbital resources in a mutually acceptable manner that allows for new entrants in the provision of services;

f) that the Radio Regulations should be sufficiently flexible to accommodate the introduction and implementation of innovative technologies as they evolve;

g) that the CPM Report to WRC-2000 stated that in the bands 37.5-50.2 GHz where there has been little or no deployment of satellite systems to date, both GSO FSS and non-GSO FSS operators should be expected to exhibit flexibility in achieving the appropriate balance in the sharing environment,

resolves to urge administrations

in the application of Article **S22** to their GSO FSS networks and non-GSO FSS systems in the 37.5-50.2 GHz frequency range prior to WRC-03, to seek balanced sharing arrangements between these systems,

invites ITU-R

1 to undertake, as a matter of urgency, the appropriate technical, operational and regulatory studies on sharing arrangements which achieve an appropriate balance between GSO FSS networks and non-GSO FSS systems in the frequency range 37.5-50.2 GHz;

2 to report the results of these studies to WRC-03.

RESOLUTION 137 (WRC-2000)

Further studies on the sharing conditions between geostationary fixed-satellite service networks and non-geostationary fixed-satellite service systems and between non-geostationary fixed-satellite service systems

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has adopted, in Article **S22**, equivalent power-flux density (epfd) limits to be met by non-geostationary fixed-satellite service (non-GSO FSS) systems in order to protect GSO FSS and GSO broadcasting-satellite service (BSS) networks in parts of the frequency range 10.7-30.0 GHz;

b) that Article **S22** includes single-entry validation (Tables **S22-1A** to **S22-1D**, **S22-2** and **S22-3**), single-entry operational (Tables **S22-4A**, **S22-4B** and **S22-4C**) and, for certain antenna sizes, single-entry additional operational (Table **S22-4A1**) epfd↓ limits which apply to non-GSO FSS systems for the protection of GSO networks;

c) that compliance of a proposed non-GSO FSS system with the single-entry validation limits will be checked by the Bureau, under Nos. **S9.35** and **S11.31**;

d) that compliance of a proposed non-GSO FSS system with the single-entry operational and, for certain antenna sizes, single-entry additional operational epfd↓ limits is not subject to verification by the Bureau;

e) that Appendix **S4**, as modified by this Conference, requires an administration responsible for a non-GSO FSS system to commit to meeting the single-entry additional operational epfd↓ limits;

f) that administrations with assignments to GSO FSS and/or BSS networks that have been brought into use, as well as administrations with assignments to non-GSO FSS systems that have been brought into use, in frequency bands where operational epfd↓ limits have been established, require reliable means of ascertaining that non-GSO FSS systems with overlapping frequency assignments that have been brought into use are in compliance with the single-entry operational limits referred to in *considering b)*;

g) that administrations with assignments to non-GSO FSS systems in frequency bands where additional operational epfd limits have been established require reliable means of ascertaining whether their non-GSO FSS systems would be in compliance with the single-entry additional operational limits referred to in *considering b)*;

h) that administrations with assignments to GSO FSS networks that have been brought into use in bands where additional operational epfd limits have been established require reliable means of ascertaining whether a particular non-GSO FSS system having assignments which have been brought into use in those bands is in compliance with the single-entry additional operational limits referred to in *considering b),*

recognizing

a) that assignments to GSO FSS and/or GSO BSS networks have already been brought into use or will be brought into use in the frequency bands where operational epfd↓ limits and/or additional operational epfd↓ limits apply, and that assignments to non-GSO FSS systems subject to the limits have been submitted to the Bureau in the same bands;

b) that ITU-R has developed a recommendation containing the functional specifications for the software to be used by the Bureau to verify the compliance of proposed non-GSO FSS systems with the single-entry validation limits included in Tables **S22-1A**, **S22-1B**, **S22-1C**, **S22-1D**, **S22-2** and **S22-3**;

c) that ITU-R has indicated that administrations will be able to check compliance of a proposed non-GSO FSS system with the single-entry operational limits by measurements at GSO earth stations and has confirmed the feasibility of such measurements;

d) that ITU-R has indicated it is not practicable for administrations to verify compliance with the single-entry additional operational epfd↓ limits by measurements at GSO earth stations;

e) that, in the light of *recognizing d)*, ITU-R is revising an existing Recommendation to enable accurate prediction of the levels produced by a proposed non-GSO FSS system;

f) that ITU-R has initiated studies on the sharing criteria to be applied during coordination between non-GSO FSS systems with a view to promoting efficient use of spectrum/orbit resources and equitable access to these resources by all countries,

recognizing further

that, taking into account Nos. **S22.5H** and **S22.5I**, it is important to discourage violations of the operational epfd↓ limits and additional operational epfd↓ limits by a non-GSO FSS system, but that if a violation nevertheless occurs, it should be corrected in the most expeditious manner, *resolves to invite ITU-R*

1 to develop, with the aim of completion by 2003, methodologies to assess the interference levels (through measurement for operational limits or simulation for additional operational limits) that would be produced by a non-GSO FSS system in the frequency bands specified in Tables **S22-4A** to **S22-4C** which may be used by administrations to verify compliance of an individual non-GSO FSS system with the operational limits and additional operational limits contained in Tables **S22-4A**, **S22-4A1**, **S22-4B** and **S22-4C**;

2 to develop, with the aim of completion by 2003, an appropriate Recommendation or Recommendations describing suitable formats for administrations operating or planning to operate non-GSO FSS systems to make available all necessary information to be used by administrations when checking compliance with the operational limits and/or the additional operational limits;

3 to develop a methodology for the generation of continuous curves of $\mathrm{epfd}_{\downarrow}$ versus percentage time for a range of antenna diameters of the GSO FSS earth station to be protected, in order for designers of GSO FSS satellite networks to determine the expected single-entry validation and additional operational interference levels for antenna sizes other than those given in Tables **S22-1A** to **S22-1D** and **S22-4A1**;

4 to develop a methodology for the generation of values of $\mathrm{epfd}_{\uparrow}$ for different antenna beamwidths of the GSO FSS space station to be protected, in order for designers of GSO FSS satellite networks to determine the expected single-entry interference level for antenna beamwidths other than those given in Table **S22-2**;

5 to conduct, with the aim of completion by 2003, the studies relating to the sharing criteria to be applied during coordination between non-GSO FSS systems with a view to promoting efficient use of spectrum/orbit resources and equitable access to these resources by all countries,

urges administrations

to participate actively in the aforementioned studies by submitting contributions to ITU-R.

RESOLUTION 138 (WRC-2000)

Possible identification of spectrum for non-geostationary fixed-satellite service (Earth-to-space) gateway type operations

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has adopted equivalent power flux-density, epfd↑, limits that apply to non-geostationary fixed-satellite service (non-GSO FSS) in the Earth-to-space direction in portions of the 10.7-30 GHz band, including the 17.3-17.8 GHz band in Regions 1 and 3;

b) that this Conference has decided that, due to incompatibilities in the 17.3-17.8 GHz band between non-GSO FSS (Earth-to-space) and existing and planned operations (including broadcasting-satellite and radiolocation services), non-GSO FSS (Earth-to-space) operations are not allowed in Region 2 in this band;

c) that, in the 10-30 GHz band, the amount of spectrum identified for use by non-GSO FSS Earth-to-space transmission is limited compared to the amount of spectrum for space-to-Earth transmission;

d) that non-GSO FSS systems may need additional spectrum in the Earth-to-space direction for very low density gateway type operations that could be constrained by a minimum antenna diameter,

resolves to invite ITU-R

to study the necessity and suitability of frequency bands for non-GSO FSS (Earth-to-space) gateway operations outside those bands allocated to non-GSO FSS subject to No. **S9.11A**, on the basis of the compatibility between this type of non-GSO FSS operation and existing and planned services in these bands,

instructs the Director of the Radiocommunication Bureau

to report the results of these studies to a future competent world radiocommunication conference.

RESOLUTION 139 (WRC-2000)

Use of fixed-satellite service systems for the provision of direct-to-home television broadcasting

The World Radiocommunication Conference (Istanbul, 2000),

noting

a) that, in some regions, a number of fixed-satellite service (FSS) systems provide direct-to-home (DTH) television broadcasting;

b) that FSS frequency bands are used for a wide variety of services and applications;

c) that, however, the adoption of the revised Regions 1 and 3 broadcasting-satellite service (BSS) Plans contained in Appendices **S30** and **S30A** will encourage greater use of the BSS bands,

considering

a) that, in the minutes of the thirteenth Plenary Meeting of WRC-97, the Inter-conference Representative Group (IRG) was requested to review the possibility of combining DTH transmission services by satellite and satellite-broadcasting services in the planned and non-planned bands and its implications for the relevant Articles of the Radio Regulations;

b) that some administrations proposed that the above item be included in the agenda of WRC-03;

c) that other administrations were of the view that more studies are required before placing such an item on the agenda of a WRC,

resolves to invite ITU-R

to study the current and expected future use of FSS allocations for DTH television transmissions in the different ITU Regions, as a matter of urgency, and the technical, operational and regulatory aspects of DTH television broadcasting in the FSS bands,

instructs the Director of the Radiocommunication Bureau

to report the results of these studies to WRC-03 for consideration, as appropriate, in the development of future conference agendas.

RESOLUTION 207 (Rev.WRC-2000)

Measures to address unauthorized use of and interference to frequencies in the bands allocated to the maritime mobile service and to the aeronautical mobile (R) service

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the HF frequencies currently used by the aeronautical and maritime mobile services for distress, safety and other communications, including allotted operational frequencies, suffer from harmful interference and are often subject to difficult propagation conditions;

b) that WRC-97 considered some aspects of the use of the HF bands for distress and safety communications in the context of the Global Maritime Distress and Safety System (GMDSS), especially with regard to regulatory measures;

c) that unauthorized operations using maritime and aeronautical frequencies in the HF bands are continuing to increase and are already a serious risk to HF distress, safety and other communications;

d) that some administrations have resorted to, for example, transmitting warning messages on operational HF channels as a means of deterring unauthorized users;

e) that provisions of the Radio Regulations prohibit the unauthorized use of certain safety frequencies for communications other than those related to safety;

f) that enforcing compliance with these regulatory provisions is becoming increasingly difficult with the availability of low-cost HF single side-band (SSB) transceivers;

g) that monitoring observations of the use of frequencies in the band 2 170-2 194 kHz and in the bands allocated exclusively to the maritime mobile service between 4 063 kHz and 27 500 kHz and to the aeronautical mobile (R) service between 2 850 kHz and 22 000 kHz show that a number of frequencies in these bands are still being used by stations of other services, many of which are operating in contravention of No. **S23.2**;

h) that, in certain situations, HF radio is the sole means of communication for the maritime mobile service and that certain frequencies in the bands mentioned in *considering g)* are reserved for distress and safety purposes;

i) that, in certain situations, HF radio is the sole means of communication for the aeronautical mobile (R) service and that this is a safety service;

j) that this Conference has reviewed the use of the HF bands by the aeronautical mobile (R) and maritime mobile services with a view to protecting operational, distress and safety communications,

considering in particular

a) that it is of paramount importance that the distress and safety channels of the maritime mobile service be kept free from harmful interference, since they are essential for the protection of the safety of life and property;

b) that it is also of paramount importance that channels directly concerned with the safe and regular conduct of aircraft operations be kept free from harmful interference, since they are essential for the safety of life and property,

resolves to invite ITU-R and ITU-D, as appropriate

1 to study possible technical and regulatory solutions to assist in the mitigation of interference to operational distress and safety communications in the maritime mobile service and aeronautical mobile (R) service;

2 to increase regional awareness of appropriate practices in order to help mitigate interference in the HF bands, especially on distress and safety channels;

3 to report the results of the above studies to the next competent conference,

urges administrations

1 to ensure that stations of services other than the maritime mobile service abstain from using frequencies in distress and safety channels and their guardbands and in the bands allocated exclusively to that service, except under the conditions expressly specified in Nos. **S4.4**, **S5.128**, **S5.129**, **S5.137** and **S4.13** to **S4.15**; and to ensure that stations of services other than the aeronautical mobile (R) service abstain from using frequencies allocated to that service except under the conditions expressly specified in Nos. **S4.4** and **S4.13**;

2 to make every effort to identify and locate the source of any unauthorized emission capable of endangering human life or property and the safe and regular conduct of aircraft operations, and to communicate their findings to the Radiocommunication Bureau;

3 to participate in the monitoring programmes that the Radiocommunication Bureau may organize pursuant to this Resolution;

4 to make every effort to prevent unauthorized transmissions in bands allocated to the maritime mobile service and the aeronautical mobile (R) service;

5 to request their competent authorities to take, within their respective jurisdiction, such legislative or regulatory measures which they consider necessary or appropriate in order to prevent stations from unauthorized use of distress and safety channels or from operating in contravention of No. **S23.2**;

6 to take all necessary steps in such cases of contravention of No. **S23.2** to ensure the cessation of any transmissions contravening the provisions of the Radio Regulations on the frequencies or in the bands referred to in this Resolution;

7 to participate actively in the studies requested by this Resolution,

instructs the Radiocommunication Bureau

1 to continue to organize monitoring programmes, at regular intervals, in the maritime distress and safety channels and their guardbands and in the bands allocated exclusively to the maritime mobile service between 4063 kHz and 27500 kHz and to the aeronautical mobile (R) service between 2850 kHz and 22000 kHz, with a view to ensuring the timely distribution of monitoring data and identifying the stations of other services operating on these channels or in these bands;

2 to seek the cooperation of administrations in identifying the sources of those emissions by all available means and in securing the cessation of those emissions;

3 when the station of another service transmitting in a band allocated to the maritime mobile service or to the aeronautical mobile (R) service has been identified, to inform the administration concerned;

4 to include the problem of interference to maritime and aeronautical distress and safety channels on the agenda of relevant regional radiocommunication seminars,

instructs the Secretary-General

to bring this Resolution to the attention of the International Maritime Organization and the International Civil Aviation Organization and to invite them to participate in these studies.

RESOLUTION 214 (Rev.WRC-2000)

Sharing studies relating to consideration of the allocation of bands below 1 GHz to the non-geostationary mobile-satellite service

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the agenda of this Conference included consideration of additional allocations on a worldwide basis for the non-geostationary mobile-satellite service (non-GSO MSS) below 1 GHz;

b) that the 1999 Conference Preparatory Meeting, in its Report, indicated that for the non-GSO MSS below 1 GHz there is not enough spectrum currently allocated to allow development of all the systems currently in coordination, and that, in order to meet projected MSS requirements below 1 GHz, a range of an additional 7 to 10 MHz will be required in the near future although, as well, it recognized that a number of these systems may not be implemented for reasons not connected with spectrum availability;

c) that there is an urgent need to make usable spectrum available on a worldwide basis for non-GSO MSS systems operating below 1 GHz;

d) that some non-GSO MSS systems are already operated by some administrations in existing MSS allocations and are at an advanced stage of consideration for operation in many other administrations, and that studies have been conducted within ITU-R on sharing between non-GSO MSS and certain terrestrial services which demonstrate the feasibility of sharing in the cases studied;

e) that issues concerning the technical and operational means to facilitate sharing between the terrestrial services and non-GSO MSS in the bands below 1 GHz remain to be studied;

f) that the requirements for the introduction of these new technologies have to be balanced with the needs of other services having allocations below 1 GHz;

g) that the bands below 1 GHz are extensively used by administrations for many services, although the extent to which they are used by each administration varies throughout the world;

h) that the bands 410-430 MHz and 440-470 MHz are extensively used by existing services in Region 1, in many countries in Region 3, and in some countries in Region 2, and new terrestrial systems are planned to be introduced in these bands;

i) that studies of certain bands have not yet been completed,

noting

a) that additional studies may identify suitable bands below 1 GHz and appropriate sharing techniques to be considered for worldwide allocations to non-GSO MSS;

b) that constraints on the duration of any single transmission from an individual MSS mobile earth station and constraints on the period between consecutive transmissions from an individual MSS mobile earth station operating on the same frequency may facilitate sharing with terrestrial services;

c) that interference mitigation techniques, such as the dynamic channel activity assignment system described in Recommendation ITU-R M.1039, may be used by non-GSO MSS systems below 1 GHz in the Earth-to-space direction to promote compatibility with terrestrial systems when operating in the same frequency band;

d) that new technologies employed by some radiocommunication services, especially within the terrestrial mobile and broadcasting services, which require spectrum below 1 GHz, may have an impact on the sharing possibilities;

e) that substantial progress has been made, with recently completed ITU-R studies of sharing between the non-GSO MSS below 1 GHz in the Earth-to-space direction and specific existing services, but studies on some important issues nevertheless remain to be completed;

f) that non-GSO MSS systems operating below 1 GHz have undergone advance publication by the Radiocommunication Bureau and that administrations may seek to implement further such systems;

g) that the use of some sharing techniques such as those referred to in *noting c)* results in non-GSO MSS systems which have significantly greater spectrum requirements in the Earth-to-space direction than in the space-to-Earth direction,

resolves

1 that further studies are urgently required on operational and technical means to facilitate sharing between the non-GSO MSS and other radiocommunication services having allocations and operating below 1 GHz;

2 that WRC-03 be invited to consider, on the basis of the results of the studies conducted within ITU-R and the studies referred to in *resolves* 1 above, additional allocations on a worldwide basis for the non-GSO MSS below 1 GHz;

3 that relevant entities and organizations be invited to participate in these sharing studies,

invites ITU-R

1 to study and develop Recommendations on, as a matter of urgency, the performance requirements, sharing criteria and technical and operational issues relating to sharing between existing and planned systems of allocated services and non-GSO MSS below 1 GHz;

2 to carry out studies, as a matter of urgency, in preparation for WRC-03, having regard to *noting c)*;

3 as a matter of urgency, to carry out studies in preparation for WRC-03 with respect to interference mitigation techniques, such as the dynamic channel activity assignment system described in Recommendation ITU-R M.1039, necessary to permit the continued development of all of the services to which the bands are allocated;

4 to bring the results of these studies to the attention of WRC-03 and the relevant preparatory meetings,

urges administrations

1 to participate actively in these studies, with the involvement of both terrestrial and satellite interests;

2 to submit to ITU-R reports on their technical studies and on their operational and frequency sharing experience with non-GSO MSS systems operating below 1 GHz,

encourages administrations

to consider the use of dynamic channel assignment techniques, such as those described in Recommendation ITU-R M.1039.

RESOLUTION 216 (Rev.WRC-2000)

Possible broadening of the secondary allocation to the mobile-satellite service (Earth-to-space) in the band 14-14.5 GHz to cover aeronautical applications

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the band 14-14.5 GHz was allocated to the land mobile-satellite service (Earth-to-space) on a secondary basis prior to WRC-97;

b) that WRC-97 replaced this by an allocation to the mobile-satellite service (Earth-to-space), except aeronautical mobile-satellite, on a secondary basis;

c) that the band 14-14.5 GHz is also allocated to the fixed-satellite (Earth-to-space), radionavigation, fixed and mobile, except aeronautical mobile, services;

d) that the services in *considering c)* need to be protected consistent with their allocation status;

e) that there is a demand for use on board aircraft of aeronautical mobile-satellite service capabilities in order to provide two-way communication and data transmission functions;

f) that such demand justifies the consideration of possible broadening of the allocation to include aeronautical applications on a secondary basis at a future competent conference;

g) that studies on the feasibility of such a broadening of the allocation must be completed before the aforementioned competent conference, with the participation of relevant entities and organizations;

h) that Recommendation **34 (WRC-95)** states that future world radiocommunication conferences, whenever possible, should allocate frequency bands to the most broadly defined services with a view to providing maximum flexibility in spectrum use,

resolves

that WRC-03 should examine the possibility of broadening the secondary allocation to the mobile-satellite service (Earth-to-space), except aeronautical mobile-satellite, in the 14-14.5 GHz band to include aeronautical use, if the ITU-R studies demonstrate that such a secondary service can be operated without causing interference to the primary services,

invites ITU-R

to complete, in time for WRC-03, the technical and operational studies on the feasibility of sharing of the band 14-14.5 GHz between the services referred to in *considering c)* above and the aeronautical mobile-satellite service, with the latter service on a secondary basis,

instructs the Director of the Radiocommunication Bureau

to invite relevant entities and organizations to participate in these studies.

RESOLUTION 221 (WRC-2000)

Use of high altitude platform stations providing IMT-2000 in the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3 and 1 885-1 980 MHz and 2 110-2 160 MHz in Region 2

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the bands 1 885-2 025 MHz and 2 110-2 200 MHz are identified in No. **S5.388** as intended for use on a worldwide basis for International Mobile Telecommunications-2000 (IMT-2000), including the bands 1 980-2 010 MHz and 2 170-2 200 MHz for the satellite component of IMT-2000;

b) that a high altitude platform station (HAPS) is defined in No. **S1.66A** as “a station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth”;

c) that HAPS may offer a new means of providing IMT-2000 services with minimal network infrastructure as they are capable of providing service to a large footprint together with a dense coverage;

d) that the use of HAPS as base stations within the terrestrial component of IMT-2000 is optional for administrations, and that such use should not have any priority over other terrestrial IMT-2000 use;

e) that, in accordance with No. **S5.388** and Resolution **212 (Rev.WRC-97)**, administrations may use the bands identified for IMT-2000, including the bands referred to in this Resolution, for stations of other primary services to which they are allocated;

f) that these bands are allocated to the fixed and mobile services on a co-primary basis;

g) that ITU-R has studied sharing and coordination between HAPS and other stations within IMT-2000, has considered compatibility of HAPS within IMT-2000 with some services having allocations in the adjacent bands, and has established Recommendation ITU-R M.1456;

h) that ITU-R did not address sharing and coordination between HAPS and some existing systems, particularly PCS (personal communications service), MMDS (multichannel multipoint distribution system) and systems in the fixed service, which are currently operating in some countries in the bands 1 885-2 025 MHz and 2 110-2 200 MHz;

i) that, in accordance with No. **S5.388A**, HAPS may be used as base stations within the terrestrial component of IMT-2000 in the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3 and 1 885-1 980 MHz and 2 110-2 160 MHz in Region 2; the use by IMT-2000 applications using HAPS as base stations does not preclude the use of these bands by any station in the services to which they are allocated and does not establish priority in the Radio Regulations,

recognizing

that the values in *resolves* 1 may not be appropriate for the protection of some stations operating in these bands in the fixed and mobile services,

resolves

1 that:

1.1 for the purpose of protecting certain stations operating within IMT-2000 in neighbouring countries from co-channel interference, a HAPS operating as a base station to provide IMT-2000 shall not exceed a provisional co-channel power flux-density (pfd) of -121.5 dB (W/(m^2 · MHz)) at the Earth's surface outside an administration's borders unless agreed otherwise by the administration of the affected neighbouring country;

1.2 a HAPS operating as a base station to provide IMT-2000, in order to protect fixed stations from interference, shall not exceed the following provisional values of out-of-band pfd at the Earth's surface in the bands 2 025-2 110 MHz:

– -165 dB(W/(m^2 · MHz)) for angles of arrival (θ) less than 5° above the horizontal plane;

– $-165 + 1.75\ (\theta - 5)$ dB(W/(m^2 · MHz)) for angles of arrival between 5° and 25° above the horizontal plane; and

– -130 dB(W/(m^2 · MHz)) for angles of arrival between 25° and 90° above the horizontal plane;

2 that, as of the end of WRC-03, such a HAPS shall operate only in accordance with such limits as are confirmed or, if appropriate, revised by WRC-03, irrespective of its date of bringing into use;

3 that administrations wishing to implement HAPS within a terrestrial IMT-2000 system shall comply with the following:

3.1 for the purpose of protecting certain stations operating within IMT-2000 in neighbouring countries from co-channel interference, administrations using HAPS as base stations within IMT-2000 shall use antennas that comply with the following antenna pattern:

$$G(\psi) = G_m - 3(\psi/\psi_b)^2 \quad \text{dBi} \quad \text{for} \quad 0° \le \psi \le \psi_1$$

$$G(\psi) = G_m + L_N \quad \text{dBi} \quad \text{for} \quad \psi_1 < \psi \le \psi_2$$

$$G(\psi) = X - 60 \log(\psi) \quad \text{dBi} \quad \text{for} \quad \psi_2 < \psi \le \psi_3$$

$$G(\psi) = L_F \quad \text{dBi} \quad \text{for} \quad \psi_3 < \psi \le 90°$$

where:

$G(\psi)$: gain at the angle ψ from the main beam direction (dBi)

G_m : maximum gain in the main lobe (dBi)

ψ_b : one-half of the 3 dB beamwidth in the plane considered (3 dB below G_m) (degrees)

L_N : near side-lobe level in dB relative to the peak gain required by the system design, and has a maximum value of –25 dB

L_F : far side-lobe level, G_m – 73 dBi

$$\psi_1 = \psi_b \sqrt{-L_N / 3} \quad \text{degrees}$$

$$\psi_2 = 3.745\ \psi_b \quad \text{degrees}$$

$$X = G_m + L_N + 60 \log(\psi_2) \quad \text{dBi}$$

$$\psi_3 = 10^{(X - L_F)/60} \quad \text{degrees}$$

The 3 dB beamwidth ($2\psi_b$) is again estimated by:

$$(\psi_b)^2 = 7\,442/(10^{0.1 G_m}) \quad \text{degrees}^2$$

where G_m is the peak aperture gain (dBi);

3.2 for the purpose of protecting mobile earth stations within the satellite component of IMT-2000 from interference, a HAPS operating as a base station to provide IMT-2000, shall not exceed an out-of-band pfd of –165 dB(W/(m^2 · 4 kHz)) at the Earth's surface in the bands 2 160-2 200 MHz in Region 2 and 2 170-2 200 MHz in Regions 1 and 3;

4 that administrations wishing to implement HAPS within a terrestrial IMT-2000 system shall, prior to their bringing into use, take into account in their bilateral coordination with affected neighbouring administrations the operation and growth of existing and planned systems in the fixed and mobile services having allocations on a primary basis;

5 that, for the purpose of protecting fixed service stations operating in neighbouring countries from co-channel interference, administrations wishing to implement HAPS within a terrestrial IMT-2000 system shall, pending the review by WRC-03 of the studies mentioned below, take full account of the relevant ITU-R Recommendations relating to protection values for fixed stations (see Recommendation ITU-R F.758),

invites ITU-R

1 to complete, as a matter of urgency, additional regulatory, operational and technical studies on sharing criteria for HAPS with other systems in the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3 and 1 885-1 980 MHz and 2 110-2 160 MHz in Region 2, and in adjacent bands, so as to allow revision of the values in *resolves* 1;

2 to develop appropriate regulatory and technical provisions to allow the coordination mentioned in *resolves* 4;

3 to report on the results of these studies in time for consideration by WRC-03.

RESOLUTION 222 (WRC-2000)

Use of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz by the mobile-satellite service

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that prior to WRC-97, the bands 1 530-1 544 MHz (space-to-Earth) and 1 626.5-1 645.5 MHz (Earth-to-space) were allocated to the maritime mobile-satellite service and the bands 1 545-1 555 MHz (space-to-Earth) and 1 646.5-1 656.5 MHz (Earth-to-space) were allocated on an exclusive basis to the aeronautical mobile-satellite (R) service (AMS(R)S) in most countries;

b) that WRC-97 allocated the bands 1 525-1 559 MHz (space-to-Earth) and 1 626.5-1 660.5 MHz (Earth-to-space) to the mobile-satellite service (MSS) to facilitate the assignment of spectrum to multiple MSS systems in a flexible and efficient manner;

c) that WRC-97 adopted No. **S5.353A** giving priority to accommodating spectrum requirements for and protecting from unacceptable interference distress, urgency and safety communications of the Global Maritime Distress and Safety System (GMDSS) in the bands 1 530-1 544 MHz and 1 626.5-1 645.5 MHz and No. **S5.357A** giving priority to accommodating spectrum requirements for and protecting from unacceptable interference the AMS(R)S providing transmission of messages with priority categories 1 to 6 in Article **S44** in the bands 1 545-1 555 MHz and 1 646.5-1 656.5 MHz,

further considering

a) that coordination between satellite networks is required on a bilateral basis in accordance with the Radio Regulations, and, in the bands 1 525-1 559 MHz (space-to-Earth) and 1 626.5-1 660.5 MHz (Earth-to-space), coordination is partially assisted by regional multilateral meetings;

b) that, in these bands, geostationary satellite system operators currently use a capacity-planning approach at multilateral coordination meetings, with the guidance and support of their administrations, to periodically coordinate access to the spectrum needed to accommodate their requirements;

c) that the GMDSS and AMS(R)S spectrum requirements are currently satisfied through the capacity-planning approach and that, in the bands to which Nos. **S5.353A** or **S5.357A** apply, this approach, and other methods such as intra- and inter-system prioritization, pre-emption and interoperability, may assist in accommodating the expected increase of spectrum requirements for GMDSS and AMS(R)S;

d) that the feasibility of prioritization, real-time pre-emptive access and the mechanism to transfer spectrum between different mobile-satellite systems that may or may not provide GMDSS and/or AMS(R)S has yet to be established,

recognizing

a) that priority access and immediate availability of spectrum for distress, urgency and safety communications of the GMDSS and AMS(R)S communications is of vital importance for the safety of life;

b) that the International Civil Aviation Organization (ICAO) has adopted Standards and Recommended Practices (SARPs) addressing satellite communications with aircraft in accordance with the Convention on International Civil Aviation;

c) that all air traffic communications as defined in Annex 10 to the Convention on International Civil Aviation fall within priority categories 1 to 6 of Article **S44**;

d) that Table S15-2 of Appendix **S15** identifies the bands 1 530-1 544 MHz (space-to-Earth) and 1 626.5-1 645.5 MHz (Earth-to-space) for distress and safety purposes in the maritime mobile-satellite service as well as for routine non-safety purposes,

resolves

1 that, in frequency coordination of MSSs in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz, administrations shall ensure that the spectrum needed for distress, urgency and safety communications of GMDSS, as elaborated in Articles **S32** and **S33**, in the bands where No. **S5.353A** applies, and for AMS(R)S communications within priority categories 1 to 6 of Article **S44** in the bands where No. **S5.357A** applies is accommodated;

2 that administrations shall ensure the use of the latest technical advances, which may include prioritization and real-time pre-emptive access between MSS systems, when necessary and where feasible, in order to achieve the most flexible and practical use of the generic allocations;

3 that administrations shall ensure that MSS operators carrying non-safety-related traffic yield capacity, as and when necessary, to accommodate the spectrum requirements for distress, urgency and safety communication of GMDSS communications, as elaborated in Articles **S32** and **S33**, and for AMS(R)S communications within priority categories 1 to 6 of Article **S44**; this could be achieved in advance through the coordination process in *resolves* 1, and, when necessary and where feasible, through prioritization and real-time pre-emptive access,

invites ITU-R

to complete studies to determine the feasibility and practicality of prioritization and real-time pre-emptive access between different networks of mobile-satellite systems as referred to in *resolves* 2 above, while taking into account the latest technical advances in order to maximize spectral efficiency,

invites

ICAO, the International Maritime Organization (IMO), the International Air Transport Association (IATA), administrations and other organizations concerned to participate in the studies identified in *invites ITU-R* above.

RESOLUTION 223 (WRC-2000)

Additional frequency bands identified for IMT-2000

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that International Mobile Telecommunications-2000 (IMT-2000) is the ITU vision of global mobile access and is scheduled to start service around the year 2000, subject to market and other considerations;

b) that IMT-2000 is an advanced mobile communication applications concept intended to provide telecommunication services on a worldwide scale regardless of location, network or terminal used;

c) that IMT-2000 will provide access to a wide range of telecommunication services supported by fixed telecommunication networks (e.g. PSTN/ISDN), and to other services which are specific to mobile users;

d) that the technical characteristics of IMT-2000 are specified in ITU-R and ITU-T Recommendations, including Recommendation ITU-R M.1457, which contains the detailed specifications of the radio interfaces of IMT-2000;

e) that the evolution of IMT-2000 is being studied within ITU-R;

f) that the review of IMT-2000 spectrum requirements at this Conference has concentrated on the bands below 3 GHz;

g) that at WARC-92, 230 MHz of spectrum was identified for IMT-2000 in the bands 1 885-2 025 MHz and 2 110-2 200 MHz, including the bands 1 980-2 010 MHz and 2 170-2 200 MHz for the satellite component of IMT-2000, in No. **S5.388** and under the provisions of Resolution **212 (Rev.WRC-97)**;

h) that since WARC-92 there has been a tremendous growth in mobile communications including an increasing demand for wideband multimedia capability;

i) that ITU-R studies forecasted that of the order of 160 MHz of spectrum, in addition to that already identified for IMT-2000 in No. **S5.388** and in addition to the spectrum used for first- and second-generation mobile systems in all three ITU Regions, will be needed in order to meet the projected requirements of IMT-2000 in those areas where the traffic is the highest by 2010;

j) that this Conference has identified additional frequency bands in No. **S5.384A** for IMT-2000 in order to meet the additional spectrum requirement projected by ITU-R;

k) that the bands identified for IMT-2000 are currently used by either first- or second-generation mobile systems or applications of other radiocommunication services;

l) that Recommendation ITU-R M.1308 addresses the evolution of existing mobile communication systems to IMT-2000;

m) that harmonized worldwide bands for IMT-2000 are desirable in order to achieve global roaming and the benefits of economies of scale;

n) that the bands 1 710-1 885 MHz and 2 500-2 690 MHz are allocated to a variety of services in accordance with the relevant provisions of the Radio Regulations;

o) that, for technical reasons, the existing applications in the bands identified for IMT-2000 require spectrum below 3 GHz;

p) that technological advancement and market demand will promote innovation and accelerate the delivery of advanced communication applications to consumers;

q) that changes in technology may lead to the further development of communication applications, including IMT-2000,

emphasizing

a) that flexibility must be afforded to administrations:

– to determine, at a national level, how much spectrum to make available for IMT-2000 from within the identified bands;

– to develop their own transition plans, if necessary, tailored to meet their specific deployment of existing systems;

– to have the ability for the identified bands to be used by all services having allocations in those bands;

– to determine the timing of availability and use of the bands identified for IMT-2000, in order to meet particular market demand and other national considerations;

b) that the particular needs of developing countries must be met;

c) that Recommendation ITU-R M.819 describes the objectives to be met by IMT-2000 in order to meet the needs of developing countries,

noting

a) Resolutions **224 (WRC-2000)** and **225 (WRC-2000)**, which also relate to IMT-2000;

b) that the sharing implications between services sharing the bands identified for IMT-2000 in No. **S5.384A** will need further study in ITU-R;

c) that studies regarding the availability of the bands 1 710-1 885 MHz and 2 500-2 690 MHz for IMT-2000 are being conducted in many countries, the results of which could have implications for the use of those bands in those countries;

d) that, due to differing requirements, not all administrations may need all of the IMT-2000 bands identified at this Conference, or, due to the usage by and investment in existing services, may not be able to implement IMT-2000 in all of those bands;

e) that the spectrum for IMT-2000 identified by this Conference may not completely satisfy the expected requirements of some administrations;

f) that currently operating second-generation mobile communication systems may evolve to IMT-2000 in their existing bands;

g) that services such as fixed, mobile (second-generation systems), space operations, space research and aeronautical mobile are in operation or planned in the band 1 710-1 885 MHz, or in portions of that band;

h) that services such as broadcasting-satellite, broadcasting-satellite (sound), mobile-satellite and fixed (including multipoint distribution/communication systems) are in operation or planned in the band 2 500-2 690 MHz, or in portions of that band;

i) that the identification of several bands for IMT-2000 allows administrations to choose the best band or parts of bands for their circumstances;

j) that ITU-R has identified additional work to address further developments in IMT-2000 and beyond;

k) that the IMT-2000 radio interfaces as defined in Recommendation ITU-R M.1457 are expected to evolve within the framework of ITU-R beyond those initially specified, to provide enhanced services and services beyond those envisaged in the initial implementation;

l) that the identification of a band for IMT-2000 does not establish priority in the Radio Regulations and does not preclude the use of the band for any application of the services to which they are allocated;

m) that the provisions of Nos. **S5.317A**, **S5.384A** and **S5.388** do not prevent administrations from having the choice to implement other technologies in the frequency bands identified for IMT-2000, based on national requirements,

recognizing

a) that some administrations are planning to use the band 2 300-2 400 MHz for IMT-2000;

b) that for some administrations the only way of implementing IMT-2000 would be spectrum refarming, requiring significant financial investment;

c) that spectrum for IMT-2000 is identified in Nos. **S5.317A**, **S5.384A** and **S5.388**, but this identification does not preclude the use for IMT-2000 of other bands allocated to the mobile service,

resolves

1 to invite administrations implementing IMT-2000 or planning to implement IMT-2000 to make available, based on market demand and other national considerations, additional bands or portions of the bands above 1 GHz identified in No. **S5.384A** for the terrestrial component of IMT-2000; due consideration should be given to the benefits of harmonized utilization of the spectrum for the terrestrial component of IMT-2000, taking into account the use and planned use of these bands by all services to which these bands are allocated;

2 to acknowledge that the differences in the texts of Nos. **S5.384A** and **S5.388** do not confer differences in regulatory status,

invites ITU-R

1 to study the implications of sharing of IMT-2000 with other applications and services in the bands 1 710-1 885 MHz and 2 500-2 690 MHz and the implementation, sharing and frequency arrangements of IMT-2000 in the bands 1 710-1 885 MHz and 2 500-2 690 MHz in accordance with Annex 1;

2 to develop harmonized frequency arrangements for operation of the terrestrial component of IMT-2000 in the spectrum mentioned in this Resolution, aiming to achieve compatibility with existing frequency arrangements used by the first- and second-generation systems;

3 to continue its studies on further enhancements of IMT-2000, including the provision of Internet Protocol (IP)-based applications that may require unbalanced radio resources between the mobile and base stations;

4 to provide guidance to ensure that IMT-2000 can meet the telecommunication needs of the developing countries and rural areas in the context of the studies referred to above;

5 to include these frequency arrangements and the results of these studies in one or more ITU-R Recommendations,

invites ITU-T

1 to complete its studies of signalling and communication protocols for IMT-2000;

2 to develop a common worldwide intersystem numbering plan and associated network capabilities that will facilitate worldwide roaming,

further invites ITU-R and ITU-T

to commence these studies forthwith,

instructs the Director of the Radiocommunication Bureau

to facilitate to the greatest extent possible the completion of these studies and to report the results of the studies before the next competent conference, or within three years, whichever is the earlier,

requests administrations and Sector Members

to submit the necessary contributions and to participate actively in the ITU-R studies.

ANNEX 1 TO RESOLUTION 223 (WRC-2000)

Request for studies by ITU-R

In response to Resolution **223 (WRC-2000)**, studies that address the following should be conducted:

1 sharing implications and possibilities for all services having allocations in the identified frequency bands;

2 harmonized frequency arrangements for the implementation of IMT-2000 in the bands mentioned in this Resolution that take into account the services currently using the bands or planning to use the bands and the required compatible frequency arrangements of second-generation systems using these bands, taking into account the need to facilitate the evolution of current mobile systems to IMT-2000;

3 means to facilitate global roaming across different regional band usage within the bands identified for IMT-2000;

4 spectrum demand predictions related to traffic density and timing;

5 planning tools for adaptation of mobile radiocommunication technologies, including IMT-2000, for the needs of developing countries;

6 maintaining a database of national studies and decisions on selection of spectrum for IMT-2000;

7 study of the provision of a fixed wireless access interface using IMT-2000 technologies.

RESOLUTION 224 (WRC-2000)

Frequency bands for the terrestrial component of IMT-2000 below 1 GHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that parts of the band 806-960 MHz are extensively used in the three Regions by first- and second-generation mobile systems;

b) that some administrations are planning to use part of the band 698-806 MHz for International Mobile Telecommunications-2000 (IMT-2000);

c) that, in some countries, the band 698-806 MHz is allocated to the mobile service on a primary basis;

d) that first- and second-generation mobile systems in the three Regions operate using various frequency arrangements;

e) that where cost considerations warrant the installation of fewer base stations, such as in sparsely populated areas, bands below 1 GHz are generally suitable for implementing mobile systems including IMT-2000;

f) Recommendation ITU-R M.819 which describes the objectives to be met by IMT-2000 to meet the needs of developing countries,

recognizing

that the evolution of first- and second-generation cellular-based mobile systems to IMT-2000 can be facilitated if they are permitted to use their current frequency bands,

emphasizing

a) that flexibility must be afforded to administrations:

– to determine, at a national level, how much spectrum to make available for IMT-2000 from within the identified bands;

– to develop their own transition plans, if necessary, tailored to meet their specific deployment of existing systems;

– to have the ability for the identified bands to be used by all services having allocations in those bands;

– to determine the timing of availability and use of the bands identified for IMT-2000, in order to meet particular market demand and other national considerations;

b) that the particular needs of developing countries must be met,

resolves

to request administrations which are implementing, or planning to implement IMT-2000, to consider the use of bands below 1 GHz and the possibility of evolution of first- and second-generation mobile systems to IMT-2000, in the frequency band identified in No. **S5.317A**, based on market demand and other national considerations,

invites ITU-R

to study compatibility between mobile systems with different technical characteristics and provide guidance on any impact on spectrum arrangements.

RESOLUTION 225 (WRC-2000)

Use of additional frequency bands for the satellite component of IMT-2000

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the bands 1 980-2 010 MHz and 2 170-2 200 MHz are identified for use by the satellite component of International Mobile Telecommunications-2000 (IMT-2000) through No. **S5.388** and Resolution **212 (Rev.WRC-97)**;

b) Resolutions **212 (Rev.WRC-97)**, **223 (WRC-2000)** and **224 (WRC-2000)** on the implementation of the terrestrial and satellite components of IMT-2000;

c) that the bands 1 525-1 544 MHz, 1 545-1 559 MHz, 1 610-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660.5 MHz, 2 483.5-2 500 MHz, 2 500-2 520 MHz and 2 670-2 690 MHz are allocated on a co-primary basis to the mobile-satellite service and other services in accordance with the Radio Regulations;

d) that distress, urgency and safety communications of the Global Maritime Distress and Safety System and the aeronautical mobile-satellite (R) service have priority over all other mobile-satellite service communications in accordance with Nos. **S5.353A** and **S5.357A**,

recognizing

a) that services such as broadcasting-satellite, broadcasting-satellite (sound), mobile-satellite, fixed (including point-to-multipoint distribution/communication systems) and mobile are in operation or planned in the band 2 500-2 690 MHz, or in portions of that band;

b) that other services such as the mobile service and radiodetermination-satellite service are in operation or planned, in accordance with the Table of Frequency Allocations, in the bands 1 525-1 559/1 626.5-1 660.5 MHz and 1 610-1 626.5/2 483.5-2 500 MHz, or in portions of those bands, and that those bands, or portions thereof, are intensively used in some countries by applications other than the IMT-2000 satellite component, and the sharing studies within ITU-R are not finished;

c) that studies of potential sharing and coordination between the satellite component of IMT-2000 and the terrestrial component of IMT-2000, mobile-satellite service applications and other high-density applications in other services such as point-to-multipoint communication/ distribution systems in the bands 2 500-2 520 MHz and 2 670-2 690 MHz bands are not finished;

d) that the bands 2 520-2 535 MHz and 2 655-2 670 MHz are allocated to the mobile-satellite, except aeronautical mobile-satellite, service for operation limited to within national boundaries pursuant to Nos. **S5.403** and **S5.420**;

e) Resolution ITU-R 47 on studies under way on satellite radio transmission technologies for IMT-2000,

resolves

1 that, in addition to the frequency bands indicated in *considering a)* and *resolves* 2, the frequency bands 1 525-1 544 MHz, 1 545-1 559 MHz, 1 610-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660.5 MHz and 2 483.5-2 500 MHz may be used by administrations wishing to implement the satellite component of IMT-2000, subject to the regulatory provisions related to the mobile-satellite service in these frequency bands;

2 that the bands 2 500-2 520 MHz and 2 670-2 690 MHz as identified for IMT-2000 in No. **S5.384A** and allocated to the mobile-satellite service may be used by administrations wishing to implement the satellite component of IMT-2000; however, depending on market developments, it may be possible in the longer term for bands 2 500-2 520 MHz and 2 670-2 690 MHz to be used by the terrestrial component of IMT-2000;

3 that this identification of frequency bands for the satellite component of IMT-2000 does not preclude the use of these bands by any applications of the services to which they are allocated and does not establish priority in the Radio Regulations,

invites ITU-R

1 to study the sharing and coordination issues in the above bands related to use of the mobile-satellite service allocations for the satellite component of IMT-2000 and the use of this spectrum by the other allocated services, including the radiodetermination-satellite service;

2 to report the results of these studies to a future world radiocommunication conference,

instructs the Director of the Radiocommunication Bureau

to facilitate to the greatest extent possible the completion of these studies.

RESOLUTION 226 (WRC-2000)

Sharing studies for, and possible additional allocations to, the mobile-satellite service (space-to-Earth) in the 1-3 GHz range, including consideration of the band 1 518-1 525 MHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has considered proposals for an allocation to the mobile-satellite service (MSS) (space-to-Earth) in Regions 1 and 3 in the frequency band 1 518-1 525 MHz;

b) that ITU-R has established that, so as to meet projected MSS requirements in the frequency range 1-3 GHz, spectrum of the order of 2 × 123 MHz will be required by 2005 and of the order of 2 × 145 MHz will be required by 2010;

c) that the frequency band 1 492-1 525 MHz is allocated to the MSS (space-to-Earth) in Region 2 on a primary basis, except in the United States of America;

d) that the frequency band 1 518-1 525 MHz is allocated to the fixed service on a primary basis in all three Regions, to the mobile service on a primary basis in Regions 2 and 3, and to the mobile, except aeronautical mobile, service on a primary basis in Region 1;

e) that in a number of countries in No. **S5.342**, the band 1 429-1 535 MHz is allocated to the aeronautical mobile service on a primary basis exclusively for the purposes of aeronautical telemetry within their national territories under the provisions of No. **S5.342**;

f) that, in Region 2, the use of the band 1 435-1 535 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service under the provisions of No. **S5.343**;

g) that, as an alternative allocation in the United States of America, the band 1 452-1 525 MHz is allocated to the fixed and mobile services on a primary basis (see also No. **S5.343**) under the provisions of No. **S5.344**;

h) that there has been further development of point-to-multipoint systems in the fixed service since the time of ITU-R studies that formed the basis for the power flux-density (pfd) values for use as coordination thresholds for the protection of fixed service systems in the band 1 492-1 525 MHz that are contained in Appendix **S5**;

i) that there is a need to review the pfd values in Appendix **S5** in order to ensure that they are adequate to protect these new point-to-multipoint systems operating in the fixed service;

j) that the proposed allocation to the MSS (space-to-Earth) is intended for satellite downlink operations, which, due to their potentially widespread emissions upon the Earth from either geostationary or non-geostationary systems, could have an impact on the terrestrial mobile service, including the aeronautical mobile service and aeronautical mobile telemetry systems, in all three Regions;

k) in response to Resolution **220 (WRC-97)**, ITU-R studies concluded that sharing between the MSS and the radionavigation-satellite service was not feasible in the band 1 559-1 610 MHz,

recognizing

a) that there remains an unsatisfied need for additional downlink MSS spectrum on a global basis, preferably in the vicinity of the existing 1.5 GHz allocations;

b) that Recommendation ITU-R F.1338, for an adjacent frequency band, includes an allowance for consideration of pfd values other than those specified therein for use as coordination thresholds for the fixed service;

c) that Recommendation ITU-R M.1459 contains criteria for the protection of aeronautical mobile telemetry with respect to geostationary satellites in the MSS;

d) that additional information on the characteristics of systems in both the MSS and aeronautical mobile telemetry would facilitate studies on sharing between these services,

noting

that Resolution **227 (WRC-2000)** addresses sharing studies for the possible additional allocations to the MSS (Earth-to-space) in the 1-3 GHz range, including consideration of the band 1 683-1 690 MHz,

resolves to invite ITU-R

1 to study, as a matter of urgency, sharing between the MSS and aeronautical mobile telemetry in all the Regions in the band 1 518-1 525 MHz, taking into account, *inter alia*, Recommendation ITU-R M.1459;

2 to review, as a matter of urgency, the pfd levels used as coordination thresholds for MSS (space-to-Earth) with respect to the protection of point-to-multipoint fixed-service systems in the band 1 518-1 525 MHz in Regions 1 and 3, taking into account the work already done in Recommendations ITU-R M.1141 and ITU-R M.1142 and the characteristics of fixed-service systems contained in Recommendations ITU-R F.755-2 and ITU-R F.758-1, and the sharing methodologies contained in Recommendations ITU-R F.758-1, ITU-R F.1107 and ITU-R F.1108;

3 in the event that the studies of the specific frequency bands referred to in this Resolution lead to an unsatisfactory conclusion, to carry out sharing studies in order to recommend alternative MSS (space-to-Earth) frequency bands in the 1-3 GHz range, but excluding the band 1 559-1 610 MHz, for consideration at WRC-03;

4 to bring the results of these studies to the attention of WRC-03,

further resolves

to recommend that WRC-03 consider making new allocations to the MSS (space-to-Earth), on a global basis, preferably in the vicinity of the existing allocation around 1.5 GHz,

urges administrations

to participate actively in these studies, with the involvement of terrestrial and satellite interests.

RESOLUTION 227 (WRC-2000)

Sharing studies for, and possible additional allocations to, the mobile-satellite service (Earth-to-space) in the 1-3 GHz range, including consideration of the band 1 683-1 690 MHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that ITU-R has established that, so as to meet projected mobile-satellite service (MSS) requirements in the frequency range 1-3 GHz, spectrum of the order of 2 × 123 MHz will be required by 2005 and of the order of 2 × 145 MHz will be required by 2010;

b) that, at this Conference, proposals have been made for worldwide allocation of the band 1 683-1 690 MHz to the MSS (Earth-to-space);

c) that the frequency band 1 675-1 710 MHz is allocated to the MSS (Earth-to-space) in Region 2 on a co-primary basis;

d) that the band 1 683-1 690 MHz is mainly used by the meteorological-satellite (MetSat) and meteorological aids (MetAids) services;

e) that, while there are only a limited number of main MetSat earth stations operating in this band in all three Regions, there are a large number of MetSat earth stations operating in Regions 2 and 3, and the locations of many of these stations are unknown;

f) that use of these stations in Regions 2 and 3 by government, commercial and private users for public safety and enhancement of national economies is on the increase;

g) that sharing between the MetSat service and MSS in the band 1 675-1 690 MHz is feasible if appropriate separation distances are maintained by means of coordination under No. **S9.11A**;

h) that sharing between the MetSat service and MSS may not be feasible in those countries where a large number of MetSat stations are deployed;

i) that Recommendation ITU-R SA.1158-2 indicates that additional studies are required in order to determine the criteria for coordination between MSS and the MetSat service for geostationary operational environment/stretched visual and infrared spin scan radiometer (GVAR/S-VISSR) stations operated in the band 1 683-1 690 MHz in Regions 2 and 3;

j) that sharing of the band 1 690-1 710 MHz between MSS and the MetSat service is not feasible;

k) that co-channel sharing between MSS and the MetAids service is not feasible;

l) that co-frequency sharing between MetAids and MetSat services is not feasible;

m) that the World Meteorological Organization (WMO) has identified future spectrum requirements for MetAids operations as 1 675-1 683 MHz in the band 1 675-1 700 MHz, but some administrations will continue to require spectrum in the range 1 683-1 690 MHz for MetAids operations;

n) that MSS operation should not constrain current and future development of the MetSat service, as specified in No. **S5.377**;

o) that new coordination parameters for MetSat earth stations have been adopted at this Conference which will require a review of assumptions made in earlier ITU-R studies,

recognizing

that there remains an unsatisfied need for additional uplink MSS spectrum on a global basis, preferably in the vicinity of the existing 1.6 GHz allocations,

noting

a) that no further study is required on sharing between the services identified under *considering* above and the MSS in the bands 1 675-1 683 MHz and 1 690-1 710 MHz;

b) that Resolution **226 (WRC-2000)** addresses sharing studies for possible additional allocations to MSS (space-to-Earth) in the 1-3 GHz range, including consideration of the band 1 518-1 525 MHz,

resolves to invite ITU-R

1 to complete, as a matter of urgency and in time for WRC-03, the technical and operational studies on the feasibility of sharing between MSS and the MetSat service, by determining appropriate separation distances between mobile earth stations and MetSat stations, including GVAR/S-VISSR stations, in the band 1 683-1 690 MHz, as stated in Recommendation ITU-R SA.1158-2;

2 to assess, with the participation of WMO, the current and future spectrum requirements of the MetAids service, taking into account improved characteristics, and of the MetSat service in the band 1 683-1 690 MHz, taking into account future developments;

3 in the event that the studies of the specific frequency band referred to in this Resolution lead to an unsatisfactory conclusion, to carry out sharing studies in order to recommend alternative MSS (Earth-to-space) frequency bands in the 1-3 GHz range, but excluding the band 1 559-1 610 MHz, for consideration at WRC-03;

4 to bring the results of these studies to the attention of WRC-03,

further resolves

to recommend that WRC-03 consider making new allocations to the MSS (Earth-to-space), on a global basis, preferably in the vicinity of the existing allocation around 1.6 GHz,

urges

administrations and interested parties such as WMO to participate actively in these studies by submitting contributions,

instructs the Secretary-General

to bring this Resolution to the attention of WMO.

RESOLUTION 228 (WRC-2000)

Studies to consider requirements for the future development of IMT-2000 and systems beyond IMT-2000 as defined by ITU-R

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that International Mobile Telecommunications-2000 (IMT-2000) is scheduled to start service around the year 2000, subject to market and other considerations;

b) that Question ITU-R 229/8 addresses the future development of IMT-2000 and systems beyond IMT-2000;

c) that the technical characteristics of IMT-2000 are specified in ITU-R and ITU-T Recommendations, including Recommendation ITU-R M.1457 which contains the detailed specifications of the radio interfaces of IMT-2000;

d) that telecommunication technologies evolve rapidly;

e) that adequate spectrum availability is a prerequisite for the technological and economic success of the future development of IMT-2000 and systems beyond IMT-2000;

f) that the demand for the provision of multimedia applications such as high-speed data, IP-packet and video by mobile communication systems will continue to increase;

g) that the future development of IMT-2000 and systems beyond IMT-2000 is foreseen to address the need for higher data rates than those currently planned for IMT-2000;

h) that, for global operation and economy of scale, it is desirable to agree on common technical, operational and spectrum-related parameters of systems;

i) that it is therefore timely to study technical, spectrum and regulatory issues pertinent to the future development of IMT-2000 and systems beyond IMT-2000,

recognizing

a) the time necessary to develop and agree on the technical, operational, spectrum and regulatory issues associated with the continuing enhancement of mobile services;

b) that service functionalities in fixed and mobile networks are increasingly converging;

c) that future mobile systems will require the adoption of more spectrum-efficient techniques;

d) the needs of developing countries for the implementation of advanced mobile communication technologies,

resolves

1 to invite ITU-R to continue studies on overall objectives, applications and technical and operational implementation, as necessary, for the future development of IMT-2000 and systems beyond IMT-2000;

2 to invite ITU-R to study the spectrum requirements and potential frequency ranges suitable for the future development of IMT-2000 and systems beyond IMT-2000, and in what time-frame such spectrum would be needed;

3 that the requirements for the future development of IMT-2000 and systems beyond IMT-2000 be reviewed by WRC-05/06, taking into consideration the results of ITU-R studies presented to WRC-03,

urges administrations

to participate actively in the studies by submitting contributions to ITU-R.

RESOLUTION 300 (Rev.WRC-2000)

Use and notification of the paired frequencies reserved for narrow-band direct-printing telegraphy and data transmission systems in the HF bands allocated on an exclusive basis to the maritime mobile service

(See Appendix **S17** (Part B, Section II))

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that certain sections of the HF bands allocated to the maritime mobile service have been reserved for narrow-band direct-printing telegraphy and data transmission systems for use on a paired frequency basis only;

b) that Appendix **S17** (Part B, Section II) contains a channelling arrangement in the maritime mobile HF bands for narrow-band direct-printing telegraphy and data systems (paired frequencies);

c) that WMARC-74 and WARC Mob-87 established a provisional procedure for the use and notification of paired frequencies for narrow-band direct-printing telegraphy and that the application of this procedure by administrations and by the Radiocommunication Bureau was satisfactory;

d) that WRC-95 and WRC-97 modified the relevant procedures for examination of the frequency assignments in the non-planned bands,

resolves

that paired frequencies in the HF bands reserved for narrow-band direct-printing telegraphy between coast stations and ship stations shall be used by these stations, notified to the Bureau and recorded in the Master International Frequency Register in accordance with the standard procedures of Article **S11** as from 3 June 2000,

instructs the Bureau

to review the frequency assignments referred to in this Resolution, which are currently recorded in the Master Register, and to modify the related findings so as to reflect the standard examination and recording procedures as stipulated in Article **S11**.

RESOLUTION 342 (Rev.WRC-2000)

New technologies to provide improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the agenda of this Conference included the consideration of the use of new technologies for the maritime mobile service in the band 156-174 MHz and the consequential revision of Appendix **S18**;

b) Recommendation **318 (Mob-87)**, particularly *noting b)* and *c)* thereof;

c) that Appendix **S18** identifies frequencies to be used for distress and safety communications on an international basis;

d) that the introduction of new technology in the maritime mobile service shall not disrupt distress and safety communications in the VHF band including those established by the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended;

e) that the date for full implementation of the global maritime distress and safety system (GMDSS) was 1 February 1999;

f) that ITU-R is conducting studies on improving efficiency in the use of this band, and that these studies are still ongoing;

g) that changes made in Appendix **S18** should not prejudice the future use of these frequencies or the capabilities of systems or new applications required for use by the maritime mobile service;

h) that the congestion on Appendix **S18** frequencies calls for the implementation of efficient new technologies;

i) that the use of new technology on maritime VHF frequencies will make it possible to better respond to the emerging demand for new services;

j) that ITU-R has approved Recommendation ITU-R M.1312 relating to a long-term solution for improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service;

k) that ITU-R has approved Recommendation ITU-R M.1371 relating to technical characteristics for a universal shipborne automatic identification system using time-division multiple access in the VHF maritime mobile band;

l) that there is a need to maintain some duplex channels for specific applications,

noting

a) that the global maritime market may not be of a sufficient size to warrant the development of a new system solely for the maritime service;

b) that digital systems have been successfully implemented in the land mobile service,

noting also

that this Conference has modified Appendix **S18**, including the addition of note *o)*, to permit the possible use on a voluntary basis of various channels or bands created by the conversion of some duplex channels to simplex channels, for the initial testing and the possible future introduction of new technologies,

resolves

1 that, in order to provide full worldwide interoperability of equipment on ships, there should be one technology, or more than one interoperable worldwide technology, implemented under Appendix **S18**;

2 that, as soon as the ITU-R studies are complete, a future competent conference should consider any necessary changes to Appendix **S18** to enable the use of new technologies by the maritime mobile service,

invites ITU-R

to finalize the following studies:

a) identify the future requirements of the maritime mobile service;

b) identify suitable technical characteristics of the system or interoperable systems to replace existing technology;

c) identify necessary modifications to the table of frequencies contained in Appendix **S18**;

d) recommend a transition plan for the introduction of new technologies;

e) recommend how new technologies can be introduced while ensuring compliance with the distress and safety requirements,

instructs the Secretary-General

to communicate this Resolution to the International Maritime Organization and the International Association of Lighthouse Authorities.

RESOLUTION 350 (WRC-2000)

Study on interference caused to the distress and safety frequencies 12 290 kHz and 16 420 kHz by routine calling

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the distress and safety frequencies 12 290 kHz and 16 420 kHz are the ship station transmitting frequencies of the maritime radiotelephony channels 1221 and 1621;

b) that, at the date of this Conference, some coast stations are still using channels 1221 and 1621 for calling purposes and have indicated a wish to continue calling on these channels in the future;

c) that this Conference decided that calling on channels 1221 and 1621 shall cease on 31 December 2003 at the latest;

d) that replacement channels may need to be made available for the coast stations mentioned under *considering b)*;

e) that there are differing opinions on whether calling on channels 1221 and 1621 causes significant interference to distress and safety communications;

f) that this issue can be resolved by analysing the results of an ITU-R study;

g) that this Conference has adopted additional measures that may significantly reduce this interference;

h) that the International Maritime Organization (IMO) and several Member States have requested that the distress and safety frequencies 12 290 kHz and 16 420 kHz be reserved solely for distress and safety communications;

i) that the full implementation of the cessation of calling on 31 December 2003 on the distress and safety frequencies 12 290 kHz and 16 420 kHz will allow this issue to be reconsidered by the next world radiocommunication conference,

resolves

1 to invite ITU-R to study the interference to the distress and safety frequencies 12 290 kHz and 16 420 kHz caused by routine calling on channels 1221 and 1621;

2 to instruct the Radiocommunication Bureau, in consultation with administrations, to organize monitoring programmes for the support of these studies;

3 to urge administrations to participate actively in these studies;

4 to invite ITU-R to complete these studies in time for consideration by WRC-03;

5 to invite WRC-03 to consider this issue,

instructs the Secretary-General

to communicate this Resolution to the IMO.

RESOLUTION 533 (Rev.WRC-2000)

Implementation of the decisions of WRC-2000 relating to processing of proposed networks submitted under Articles 4, 6 and 7 of Appendices S30 and S30A to the Radio Regulations

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference revised the Appendix **S30** Regions 1 and 3 Plan which, through decisions of WRC-2000, has been structured into a Regions 1 and 3 Plan and a Regions 1 and 3 List;[1]

b) that similarly, this Conference revised the 14.5-14.8 GHz and 17.3-18.1 GHz Appendix **S30A** Regions 1 and 3 feeder-link Plans and structured it into Regions 1 and 3 feeder-link Plans and Regions 1 and 3 feeder-link Lists[1];

c) that the R1/R3 downlink Plan and the initial R1/R3 downlink List (and the associated R1/R3 feeder-link Plans and initial R1/R3 feeder-link Lists) were analysed and were confirmed to be compatible with each other;

d) that compatibility must be ensured between the R1/R3 downlink Plan (and the associated R1/R3 feeder-link Plans) and:

– the other services in all three Regions having primary allocations in the bands used by the R1/R3 downlink and feeder-link Plans;

– the Region 2 Plan;

e) that this Conference has adopted new sharing criteria and associated calculation methods which are included in, or referenced in, the Annexes to Appendices **S30** and **S30A**;

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[1] Hereinafter within this Resolution the Appendix **S30** Regions 1 and 3 Plan is referred to as the “R1/R3 downlink Plan” and the Appendix **S30** Regions 1 and 3 List is referred as the “R1/R3 downlink List”. Similarly, the Appendix **S30A** Regions 1 and 3 feeder-link Plans are referred to as the “R1/R3 feeder-link Plans” and the Appendix **S30A** Regions 1and 3 feeder-link Lists are referred to as the “R1/R3 feeder-link Lists”.

f) that "existing"[2] systems and "Part B"[3] systems included in the R1/R3 downlink and feeder-link Plans and Lists as established by WRC-2000 have been determined to be compatible with the other services in the three Regions having primary allocations in the bands used by the R1/R3 downlink and feeder-link Plans, and with the Region 2 Plan;

g) that during WRC-2000 the R1/R3 downlink Plan (and the associated R1/R3 feeder-link Plans) were not analysed in order to identify any incompatibility with the other services in the three Regions having primary allocations in the bands used by the R1/R3 downlink and feeder-link Plans, and with the Region 2 Plan;

h) that since assignments in the initial R1/R3 downlink List (and the associated R1/R3 feeder-link Lists) have completed coordination with the other services in the three Regions having primary allocations in the bands used by the R1/R3 downlink and feeder-link Plans, and with the Region 2 Plan, using the compatibility criteria in force at the time of WRC-2000, there will be no additional compatibility requirements associated with entries in the initial R1/R3 downlink List or the R1/R3 feeder-link Lists;

i) that proposed additional assignments would only enter the evolving R1/R3 downlink List after they have satisfied all compatibility requirements with the R1/R3 downlink Plan, with the existing R1/R3 downlink List, with other Appendix **S30** Article 4 submissions with prior dates of receipt, with the other services in the three Regions having primary allocations in the bands used by the R1/R3 downlink and feeder-link Plans, and with the Region 2 Plan;

j) that proposed additional assignments would only enter the evolving R1/R3 feeder-link Lists after they have satisfied all compatibility requirements with the R1/R3 feeder-link Plans, with the existing R1/R3 feeder-link Lists, with other Appendix **S30A** Article 4 submissions with prior dates of receipt, with the other services in the three Regions with primary allocations in the same band, and with the Region 2 Plan,

recognizing

that the Radiocommunication Bureau needs clear instructions from this Conference on how to deal with the large number of Appendices **S30** and **S30A** Article 4 submissions that have either been processed or are currently being processed which might affect the R1/R3 downlink and feeder-link Plans and Lists, other Appendices **S30** and **S30A** Article 4 submissions with

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[2] Whenever the term "existing" is used in this Resolution, it refers to the notified assignments that are in conformity with Appendices **S30** and **S30A**, which have been brought into use and for which the date of bringing into use has been confirmed to the Bureau before 1700 h (Istanbul time) on 12 May 2000.

[3] Whenever the term "Part B" is used in this Resolution, it refers to the assignments for which the procedures of Article 4 of Appendices **S30** and **S30A** have been successfully completed and for which due diligence information has been provided (when required) before 1700 h (Istanbul time) on 12 May 2000, but which have not been brought into use and/or the date of bringing into use has not been confirmed to the Bureau.

prior dates of receipt, the other services in the three Regions having primary allocations in the bands used by the R1/R3 downlink and feeder-link Plans, and the Region 2 Plan,

resolves

1 that following WRC-2000 the Bureau shall compute the reference situations of the R1/R3 downlink Plan and the R1/R3 downlink List and the R1/R3 feeder-link Plans and R1/R3 feeder-link Lists as at 3 June 2000 and publish this information in a circular letter;

2 that as from 3 June 2000 the Bureau shall use the revised Appendices **S30** and **S30A** as adopted at this Conference in its examination of submissions received after the Conference;

3 that the Bureau shall review, in date of receipt order, all Special Sections already published[4] in order to determine the requirement for coordination with respect to the R1/R3 downlink Plan, the R1/R3 feeder-link Plans, the R1/R3 downlink List and the R1/R3 feeder-link Lists and with other Article 4 submissions which have dates of receipt prior to the date of the Special Section in question (APS30/E or APS30A/E), using the revised Appendices **S30** and **S30A** as adopted by this Conference;

3.1 within four months from the date of publication of the above-mentioned corrigenda, possibly affected administrations should provide comments to the Bureau and to the notifying administration and shall indicate any still valid coordination agreements;

3.2 the existing time period for bringing the modifications into use, i.e. five years plus a possible extension of three years, will continue to be counted as from the date of receipt of the modification by the Bureau of the complete Annex 2 information pertaining to the request for modification, but shall be extended by a period equal to the time between 3 June 2000 and the date of publication of the relevant corrigenda to the Special Section;

4 that as from the end of this Conference the Bureau shall process all as yet unpublished requests for modifications under Article 4 which were received prior to 3 June 2000, in the same date order of receipt by the Bureau of the complete information on the request for modification and, using the revised Appendices **S30** and **S30A** as adopted at this Conference, identify for each as yet unpublished request for modification the list of administrations whose agreement is required and publish this list of affected administrations;

4.1 within four months from the date of the above publication, possibly affected administrations should provide comments to the Bureau and to the notifying administration and shall indicate any still valid coordination agreements;

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[4] See also Notes 5*a)* and 6 in § 11.2 of Article 11 of Appendix **S30** and Notes 5 and 6 in § 9A.2 of Article 9A of Appendix **S30A** with respect to assignments in the Region 2 Plan.

4.2 the existing time period for bringing the modifications into use, i.e. five years plus a possible extension of three years, will continue to be counted as from the date of receipt of the modification by the Bureau of the complete Annex 2 information pertaining to the request for modification, but shall be extended by a period equal to the time between 3 June 2000 and the date of publication of the last relevant corrigenda to the Special Sections described in *resolves* 3;

5 that in examining the requirement for coordination of other services in all three Regions with the WRC-2000 R1/R3 downlink and feeder-link Plans and Lists in the cases described in *resolves* 3, the following methodology shall be applied in accordance with Resolution **53 (Rev.WRC-2000),** Article 11 of Appendix **S30** and Article 9A of Appendix **S30A** for:

– protection from fixed-satellite service assignments already published. The Bureau shall review all relevant Special Sections of the series (for example, APS30/C) previously published, and publish corrigenda where required;

– protection from fixed-satellite service assignments not yet processed. The Bureau shall determine the requirement for coordination and publish the request in its International Frequency Information Circular (BR IFIC). The administrations responsible for the fixed-satellite service assignments shall then initiate coordination with the affected assignments in the WRC-2000 R1/R3 downlink and feeder-link Plans and Lists;

– protection from terrestrial assignments already in process. The Bureau shall determine the requirement for coordination and publish the request in its BR IFIC. The administration responsible for the terrestrial assignments shall then initiate coordination with the affected assignments in the WRC-2000 R1/R3 downlink and feeder-link Plans and Lists.

RESOLUTION 539 (WRC-2000)

Use of the band 2 630-2 655 MHz in certain Region 3 countries by non-geostationary satellite systems in the broadcasting-satellite service (sound)

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the band 2 535-2 655 MHz is allocated under No. **S5.418** to the broadcasting-satellite service (sound) in certain Region 3 countries;

b) that the provisions of Resolution **528 (WARC-92)** currently limit the use of this band by systems in the broadcasting-satellite service (sound) to the upper 25 MHz of the band;

c) that, prior to WRC-2000, there were no coordination procedures applicable to non-geostationary (non-GSO) broadcasting-satellite (sound) systems in this band in relation to other non-GSO or GSO satellite networks;

d) that satellite technology has now advanced to the stage where non-GSO systems in the broadcasting-satellite service (sound) are technically and economically feasible when operated with high elevation angles;

e) that satellite systems in the broadcasting-satellite service as described in *considering d)* can be used for the delivery of high-quality, spectrally efficient broadcasting-satellite service (sound) to portable and mobile terminals;

f) that non-GSO systems in the broadcasting-satellite service (sound) in the band 2 630-2 655 MHz in Region 3 have been notified to ITU and are expected to be brought into use in the near future;

g) that, prior to WRC-2000, the protection of existing terrestrial services was addressed through the coordination procedures of No. **S9.11**;

h) that the provision cited in *considering g)* may be inadequate to ensure the future deployment of terrestrial services in this band,

resolves

1 that any broadcasting-satellite service (sound) system using non-geostationary orbits brought into operation in the band 2 630-2 655 MHz in Region 3 shall be operated such that the minimum elevation angle over the service area is not less than 40°, for the purposes of sharing with terrestrial services;

2 that, before an administration notifies to the Bureau or brings into use a frequency assignment for a broadcasting-satellite service (sound) system using non-GSO satellites in the band 2 630-2 655 MHz, for which complete Appendix **S4** coordination information, or notification information, has been received after 2 June 2000, it shall seek the agreement of any administration having a primary allocation to terrestrial services in the same frequency band on whose territory the power flux-density exceeds the following thresholds:

-128	$\text{dB}(\text{W}/(\text{m}^2 \cdot \text{MHz}))$	for	$0° \le \theta \le 5°$
$-128 + 0.75\,(\theta - 5)$	$\text{dB}(\text{W}/(\text{m}^2 \cdot \text{MHz}))$	for	$5° < \theta \le 25°$
-113	$\text{dB}(\text{W}/(\text{m}^2 \cdot \text{MHz}))$	for	$25° < \theta \le 90°$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees;[1]

3 that the elevation angle value in *resolves* 1 and the power flux-density threshold values in *resolves* 2 shall be applied provisionally until the end of WRC-03; any broadcasting-satellite service (sound) system using non-GSO satellites in the band 2 630-2 655 MHz, for which complete Appendix **S4** coordination information, or notification information, has been received after 2 June 2000, shall be subject to the elevation angle and power flux-density threshold values determined by this Conference unless Resolution **49 (Rev.WRC-2000)** information has been supplied for that system by the beginning of WRC-03;

4 that systems in the broadcasting-satellite service (sound) using non-GSO satellites shall be limited to national services unless agreement has been reached to include the territories of other administrations in the service area;

5 that, as of 3 June 2000, the Bureau and administrations shall apply the provisions of Nos. **S5.418A**, **S5.418B** and **S5.418C**, as well as No. **S5.418**, as revised by this Conference,

invites ITU-R

1 to conduct the necessary studies in time for WRC-03 to develop calculation methodologies and sharing criteria to be used by administrations in applying the provisions of Nos. **S5.418A**, **S5.418B** and **S5.418C**;

2 to conduct the necessary technical and regulatory studies in time for WRC-03 relating to frequency sharing between systems in the broadcasting-satellite service (sound) and terrestrial services in the band 2 535-2 655 MHz with a view to avoiding placing undue constraints on either service,

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[1] These values relate to the power flux-density and angles of arrival which would be obtained under free-space propagation conditions.

instructs the Radiocommunication Bureau

in its examination of requests for coordination for any broadcasting-satellite service (sound) system using non-GSO satellites in the 2 630-2 655 MHz band, for which complete Appendix **S4** coordination information, or notification information, has been received after 2 June 2000, to determine if the power flux-density thresholds given in *resolves* 2, and taking into account *resolves* 3, are exceeded on the territory of any administration other than the notifying administration and, if so, to inform both the notifying and the affected administrations.

RESOLUTION 540 (WRC-2000)

Application and study of the regulatory procedures and associated sharing criteria contained in Appendices S30 and S30A and in the associated provisions of Articles S9 and S11

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has adopted a revision of the Regions 1 and 3 broadcasting-satellite service (BSS) and associated feeder-link Plans contained in Appendices **S30** and **S30A**, respectively;

b) that this Conference has adopted revisions to the sharing criteria contained in Annex 1 to Appendix **S30** to identify whether terrestrial services may be affected by BSS;

c) that this Conference has suppressed the method that was contained in § 3 of Annex 4 to Appendix **S30A** and replaced it with the method contained in Appendix **S7**;

d) that this Conference has modified the criteria in § 1 of Annex 4 to Appendix **S30A** concerning sharing between non-planned transmitting space stations and planned receiving BSS feeder-link space stations;

e) that this Conference has revised the orbital position limitations on Region 1 BSS in § A 3) of Annex 7 to Appendix **S30** to allow more flexibility for new and modified assignments in the List of Region 1 BSS assignments, while continuing to guarantee access to Region 2 fixed-satellite service (FSS) in the orbital arc from 37.2° W to 10° E;

f) that the power flux-density (pfd) limits currently appearing in § 6 of Annex 1 to Appendix **S30** for BSS to protect FSS do not vary as a function of orbital separation between the FSS and BSS space stations, and therefore do not provide adequate protection to FSS networks at small orbital separations, and at large orbital separations overly constrain the implementation of BSS networks;

g) that the sharing criteria in Appendices **S30** and **S30A** should provide appropriate protection to the BSS, FSS and terrestrial services whilst not unduly constraining the services involved;

h) that, worldwide, in various sub-bands of the frequency range 11.7-12.7 GHz, FSS networks as well as BSS networks are in operation, and others will be operated in the near future and, consequently, difficulties may be experienced in modifying their characteristics;

i) that this Conference has also revised the regulatory procedures contained in Appendices **S30** and **S30A**, and the associated provisions in Articles **S9** and **S11** and associated Appendices,

recognizing

a) that there are differing geographic situations between the ITU Regions and that this may have an impact on the sharing criteria and therefore should be taken into account in any revision to the sharing criteria in the relevant Annexes of Appendices **S30** and **S30A**;

b) the need to protect existing and future terrestrial and space services and systems,

further noting

that the Bureau has been instructed by this Conference to analyse the newly established Regions 1 and 3 BSS and feeder-link Plans with respect to compatibility with other services having primary allocations in the Plan bands in all three Regions and with the Region 2 Plan (see Resolution **53 (Rev.WRC-2000)**),

resolves

1 that, until § 6 of Annex 1 to Appendix **S30** is modified by WRC-03, the pfd limits appearing in the Annex to this Resolution shall be applied in place of the -138 dB(W/(m$^2 \cdot 27$ MHz)) and -160 dB(W/(m$^2 \cdot 4$ kHz)) criteria appearing in the third paragraph of § 6 of Annex 1 to Appendix **S30**;

2 to instruct the Director of the Radiocommunication Bureau to apply this Resolution as of 3 June 2000,

invites ITU-R

to undertake, as a matter of urgency, additional studies and complete them by WRC-03 on:

1 the sharing criteria in Annexes 1, 3, 4 and 6 to Appendix **S30** and Annexes 1 and 4 to Appendix **S30A**, except the criteria referred to in *considering b)* and *c)*, taking into account *considering g)* and *h)* and *recognizing a)*;

2 the changes made by WRC-2000 to the regulatory procedures contained in:

a) Articles 4 and 5 to Appendices **S30** and **S30A** with a view to establishing a list of additional uses for Regions 1 and 3 and providing for its implementation, including the implications of § 4.1.18-4.1.20 on the assignments in conformity with the Plan;

b) Articles 6 and 7 to Appendices **S30** and **S30A**, including related modifications to Articles **S9** and **S11** and the associated Appendix **S5**,

with a view to ensuring consistency among these provisions, as appropriate, taking into account *considering i)*;

3 the limitations of § A 3) of Annex 7 to Appendix **S30** in the context of any changes to the sharing criteria studied by ITU-R,

instructs the Secretary-General

to bring this Resolution to the attention of the Council so as to include in the agenda of the next WRC consideration of the results of the ITU-R studies carried out pursuant to *invites ITU-R* above.

ANNEX TO RESOLUTION 540 (WRC-2000)

Power flux-density limits to be applied in place of –138 dB(W/(m^2 · 27 MHz)) and –160 dB(W/(m^2 · 4 kHz)) in the third paragraph of § 6 of Annex 1 to Appendix S30[1]

Instead of the uniform power flux-density (pfd) limits of –138 dB(W/(m^2 · 27 MHz)) and -160 dB(W/(m^2 · 4 kHz)), apply new pfd limits to protect FSS in all Regions from BSS in all Regions, as given below:

For interference caused by Regions 1 and 3 BSS to Region 2 FSS (space-to-Earth in the band 11.7-12.2 GHz):

-160 dB(W/(m^2 · 27 MHz))	for $0° \leq \theta < 0.054°$
$-137.46 + 17.74 \log \theta$ dB(W/(m^2 · 27 MHz))	for $0.054° \leq \theta < 3.67°$
$-141.56 + 25 \log \theta$ dB(W/(m^2 · 27 MHz))	for $3.67° \leq \theta < 11.54°$
-115 dB(W/(m^2 · 27 MHz))	for $11.54° \leq \theta$

where θ corresponds to the minimum geocentric angular separation between the interfering BSS and the interfered-with FSS space station.

[1] For those sharing situations not listed here, the provisions of Appendix **S30** and Appendix **S30A** apply.

For interference caused by Region 1 BSS to Region 3 FSS (space-to-Earth in the band 12.2-12.5 GHz):

-160 dB(W/(m^2 · 27 MHz))	for $0° \leq \theta < 0.054°$
$-137.46 + 17.74 \log \theta$ dB(W/(m^2 · 27 MHz))	for $0.054° \leq \theta < 3.67°$
$-141.56 + 25 \log \theta$ dB(W/(m^2 · 27 MHz))	for $3.67° \leq \theta < 16.69°$
-111 dB(W/(m^2 · 27 MHz))	for $16.69° \leq \theta$

where θ corresponds to the minimum geocentric angular separation between the interfering BSS and the interfered-with FSS space station.

For interference caused by Region 2 BSS to Regions 1 and 3 FSS (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):

-160 dB(W/(m^2 · 27 MHz))	for $0° \leq \theta < 0.054°$
$-137.46 + 17.74 \log \theta$ dB(W/(m^2 · 27 MHz))	for $0.054° \leq \theta < 3.67°$
$-141.56 + 25 \log \theta$ dB(W/(m^2 · 27 MHz))	for $3.67° \leq \theta < 11.54°$
-115 dB(W/(m^2 · 27 MHz))	for $11.54° \leq \theta$

where θ corresponds to the minimum geocentric angular separation between the interfering BSS and the interfered-with FSS space station.

It is understood that, in the implementation of these criteria, the Bureau should take into account the pertinent station-keeping accuracy of the BSS and FSS space stations as filed by the notifying administrations.

NOTE – In addition, the 0.25 dB allowed increase over the pfd resulting from the original Plan assignments of all Regions should be maintained.

RESOLUTION 541 (WRC-2000)

Implementation of WRC-2000 broadcasting-satellite service Plans and associated broadcasting-satellite service feeder-link Plans of Appendices S30 and S30A

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has adopted a Plan for the broadcasting-satellite service (BSS) in the bands 11.7-12.2 GHz in Region 3 and 11.7-12.5 GHz in Region 1, as well as a Plan for feeder-links for the BSS in the bands 14.5-14.8 GHz and 17.3-18.1 GHz in Regions 1 and 3, and has also revised the technical criteria and regulatory procedures of those Plans as contained in Appendices **S30** and **S30A**;

b) that this Conference has decided that the provisions of the Radio Regulations, as revised by it, shall provisionally apply as from 1 January 2002;

c) that there is a need to apply a single set of technical criteria and regulatory provisions for processing of Article 4 submissions, so as to avoid problems due to parallel sets of technical criteria or regulatory provisions;

d) that it is necessary to ensure the integrity of the Region 2 Plan and its associated provisions,

resolves

that the Regions 1 and 3 Plan, the List and their associated procedures, together with the annexes thereto, shall enter into force as of 3 June 2000,

instructs the Radiocommunication Bureau

to apply the following provisions as from 3 June 2000:

1 in respect of the notification of assignments under Article 5 of Appendices **S30** and **S30A** for Regions 1 and 3:

– for assignments which are contained in the List: once notified with the same characteristics, they will be examined with the same criteria and calculation methods used when they completed the procedure of Article 4;

– for those assignments contained in the Plan: the new criteria and calculation methods as adopted by WRC-2000 will be used;

2 in respect of the notification of assignments with the same characteristics under Article 5 of Appendices **S30** and **S30A** for Region 2 which have already completed the procedure of Article 4, the same criteria and calculation methods as used when they completed the procedure of Article 4 will be used;

3 in respect of the notification of assignments of all three Regions whose notified characteristics are different from those used for coordination, the new criteria and calculation methods as adopted by WRC-2000 will be used.

RESOLUTION 542 (WRC-2000)

Appendices S30 and S30A Regions 1 and 3 Plans and associated Lists of additional uses

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has adopted Plans for Regions 1 and 3 as contained in Annex 1 to this Resolution, to be included in the revised versions of Appendices **S30** and **S30A**;

b) that this Conference has adopted those additional uses which are compatible with the above Plans, as listed in Annex 2 to this Resolution, for inclusion in Lists to be annexed to the Master International Frequency Register (MIFR);

c) that it determined that the Regions 1 and 3 Plans and the Regions 1 and 3 Lists are compatible with each other,

recognizing

that the assignments contained in Annex 1 to this Resolution shall be included in the Plans contained in Article 11 of Appendix **S30** and Article 9A of Appendix **S30A**,

resolves

that the assignments contained in the Lists of additional uses contained in Annex 2 to this Resolution shall be annexed to the MIFR.

ANNEX 1*

PART I

REGIONS 1 AND 3 PLAN

PART II

REGIONS 1 AND 3 FEEDER-LINK PLANS

* *Note by the Secretariat:* The Plans referred to in this Annex have not been re-printed here as they have already been included in Articles 11 and 9A of Appendices **S30** and **S30A** respectively.

ANNEX 2

PART I

REGIONS 1 AND 3 LIST OF ADDITIONAL USES

Section 1 – Technical characteristics of the assignments in the Regions 1 and 3 List of additional uses

I. COLUMN HEADINGS OF THE LIST

Col. 1 *Notifying administration symbol*.

Col. 2 *Beam identification*.

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 *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. 5 *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. 6 *Space station transmitting antenna pattern code.*

The codes used for the antenna pattern of the transmitting space station (downlink) antenna are defined as follows:

MOD13FRTSS	Figure 13 in Annex 5 of Appendix **S30** (Recommendation ITU-R BO.1445)
R13TSS	Figure 9 and § 3.13.3 in Annex 5 of Appendix **S30**
R123FR	Figure 11 and § 3.13.3 in Annex 5 of Appendix **S30**

In cases where the "Space station transmitting 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 7. A particular shaped beam is identified by the combination of Column 1, Column 7 and Column 12. In such cases the maximum cross-polar gain is given under Column 8 in the "Cross-polar gain" field.

In cases where the "Space station transmitting antenna pattern code" field contains a code which starts with "CB_" characters, it is a composite beam. Any composite beam consists of two or more elliptical beams. Each composite beam is described in the special composite beam file having the same name plus a GXT extension (e.g. the description of the CB_COMP_BM1 composite beam is stored in the CB_COMP_BM1.GXT file).

Col. 7 *Space station transmitting antenna shaped (non-elliptical and non-composite) beam identification*.

Col. 8 *Maximum space station transmitting antenna co-polar and cross-polar (in the case of shaped beam) isotropic gain* (dBi).

Col. 9 *Earth station receiving antenna pattern code and maximum antenna co-polar gain* (dBi).

The codes used for receiving earth station (downlink) antenna patterns are defined as follows:

R13RES	Figure 7 and § 3.7.2 in Annex 5 of Appendix **S30**
MODRES	Figure 7*bis* and § 3.7.2 in Annex 5 of Appendix **S30** (Recommendation ITU-R BO.1213)

Col. 10 *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. 11 *Designation of emission*.

Col. 12 *Identity of the space station*.

Col. 13 *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 Appendix **S30** 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 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. 14 *Assignment status*.

The assignment status codes used for beams are defined as follows:

A	Assignment in the List, which has successfully completed coordination but has not been brought into use and/or the date of bringing into use has not been confirmed to the Bureau. § 4.1.3 of Article 4 (in terms of eight years lapsing period) of Appendix **S30** applies for this assignment. For this category of assignments, WRC-2000 protection ratios are applied (21 dB co-channel and 16 dB adjacent channel).
AE	Assignment in the List, which has been notified and brought into use and the date of bringing into use has been confirmed to the Bureau before 12 May 2000. § 4.1.3 of Article 4 (in terms of eight years lapsing period) of Appendix **S30** is not applied for this assignment. For this category of assignments, WRC-97 protection ratios are applied (24 dB co-channel and 16 dB adjacent channel) unless otherwise specified in the Remarks column.

Col. 15 *Remarks*.

II. TEXT FOR NOTES IN THE REMARKS COLUMN OF THE LIST

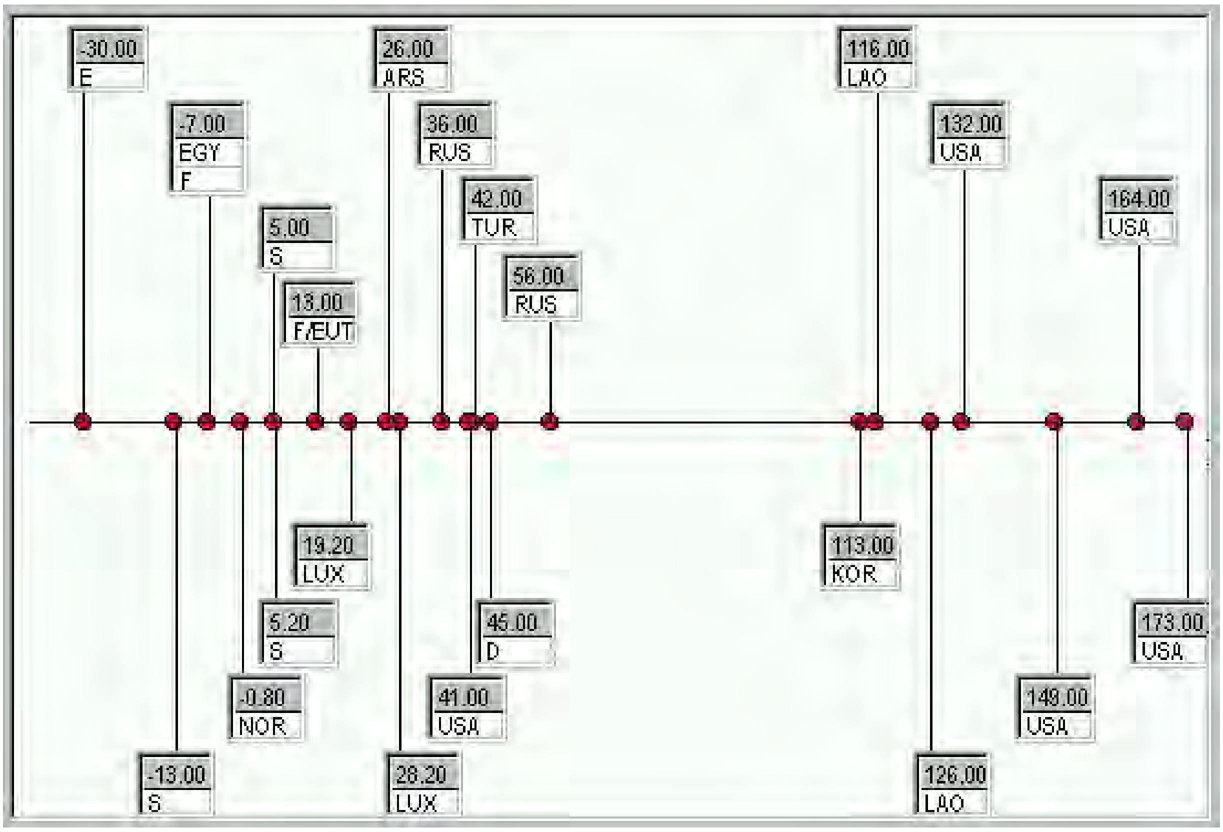
1 The Administrations of Egypt and France declared a bilateral temporary agreement with respect to the coordination of the satellite network NILESAT-1S for a specified period until 1 January 2002. The mentioned Administrations have also requested the Radiocommunication Bureau to group at 7° W for this period the corresponding beams of RADIOSAT-5 and NILESAT-1S.

2 The assignments of this network entered into the List based on the conditions under which they have successfully completed the procedure of Article 4 of Appendix **S30** (WRC-97). The characteristics of these assignments are being published in the corresponding Part B Special Section.

3 The Administration of Sweden accepted to apply for SIRIUS-2 and SIRIUS-3 networks the new protection ratios specified by the inter-conference representative group (IRG) (i.e. downlink co-channel: 21 dB; downlink upper and lower adjacent channels: 16 dB; feeder-link co-channel: 27 dB and feeder-link upper and lower adjacent channels: 22 dB), in order to ease the replanning process.

FIGURE 1

Allocation of orbital positions in the Regions 1 and 3 List of additional uses (position in degrees/administration symbols)



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Basic characteristics of the Regions 1 and 3 List of additional uses (sorted by administration)

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15
Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped Beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
ARS	REGBS111	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	38.70	LE	347.85	27M0F9WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS112	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	38.70	LE	77.85	27M0F9WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS113	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	38.70	LE	347.85	27M0G7WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS114	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	38.70	LE	77.85	27M0G7WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS115	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	38.70	LE	347.85	33M0F9WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS116	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	38.70	LE	77.85	33M0F9WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS117	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	38.70	LE	347.85	33M0G7WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS118	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	38.70	LE	77.85	33M0G7WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS119	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	347.85	27M0F9WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS120	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	77.85	27M0F9WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS121	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	347.85	27M0G7WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS122	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	77.85	27M0G7WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS123	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	347.85	33M0F9WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS124	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	77.85	33M0F9WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS125	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	347.85	33M0G7WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS126	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	77.85	33M0G7WW	ARABSAT-BSS1	13	AE	2
ARS	REGBS133	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	40.00	LE	347.85	27M0G7WW	ARABSAT-BSS1	13	A	2
ARS	REGBS134	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	40.00	LE	77.85	27M0G7WW	ARABSAT-BSS1	13	A	2
ARS	REGBS137	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	40.00	LE	347.85	33M0G7WW	ARABSAT-BSS1	13	A	2
ARS	REGBS138	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROI0001	40.00	LE	77.85	33M0G7WW	ARABSAT-BSS1	13	A	2
ARS	REGBS141	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	347.85	27M0G7WW	ARABSAT-BSS1	13	A	2
ARS	REGBS142	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	77.85	27M0G7WW	ARABSAT-BSS1	13	A	2
ARS	REGBS145	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	347.85	33M0G7WW	ARABSAT-BSS1	13	A	2
ARS	REGBS146	26.00	20.08	25.67					COP1	30.30	0.00	DBLTVROC0001	47.00	LE	77.85	33M0G7WW	ARABSAT-BSS1	13	A	2
D	ESTR1-DH	45.00	20.00	30.00					TR0	35.20	0.00	MODRES	38.00	LE	0.00	27M0G7W--	EUROPE*STAR-1B	20	A	2
D	ESTR1-DV	45.00	20.00	30.00					TR0	35.20	0.00	MODRES	38.00	LE	90.00	27M0G7W--	EUROPE*STAR-1B	20	A	2
D	ESTR3-DH	45.00	75.00	20.00					TR3	36.20	0.00	MODRES	38.00	LE	0.00	27M0G7W--	EUROPE*STAR-1B	20	A	2
D	ESTR3-DV	45.00	75.00	20.00					TR3	36.20	0.00	MODRES	38.00	LE	90.00	27M0G7W--	EUROPE*STAR-1B	20	A	2
E	HI27D3-1	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	35.50	CL		27M0G7W--	HISPASAT-3	1	AE	2
E	HI27D3-2	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	35.50	CL		27M0G7W--	HISPASAT-3	1	AE	2
E	HI27D3-3	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	35.50	CR		27M0G7W--	HISPASAT-3	1	AE	2
E	HI27D3A1	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	38.50	CL		27M0G7W--	HISPASAT-3	1	AE	2
E	HI27D3A2	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	38.50	CL		27M0G7W--	HISPASAT-3	1	AE	2
E	HI27D3A3	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	38.50	CR		27M0G7W--	HISPASAT-3	1	AE	2

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15
Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped Beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
E	HI27D3B1	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	41.50	CL		27M0G7W--	HISPASAT-3	1	AE	2
E	HI27D3B2	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	41.50	CL		27M0G7W--	HISPASAT-3	1	AE	2
E	HI27D3B3	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	41.50	CR		27M0G7W--	HISPASAT-3	1	AE	2
E	HI33D3-1	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	35.50	CL		33M0G7W--	HISPASAT-3	1	AE	2
E	HI33D3-2	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	35.50	CL		33M0G7W--	HISPASAT-3	1	AE	2
E	HI33D3-3	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	35.50	CR		33M0G7W--	HISPASAT-3	1	AE	2
E	HI33D3A1	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	38.50	CL		33M0G7W--	HISPASAT-3	1	AE	2
E	HI33D3A2	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	38.50	CL		33M0G7W--	HISPASAT-3	1	AE	2
E	HI33D3A3	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	38.50	CR		33M0G7W--	HISPASAT-3	1	AE	2
E	HI33D3B1	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	41.50	CL		33M0G7W--	HISPASAT-3	1	AE	2
E	HI33D3B2	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	41.50	CL		33M0G7W--	HISPASAT-3	1	AE	2
E	HI33D3B3	-30.00	-4.00	39.00					COP1	37.00	3.20	MODRES	41.50	CR		33M0G7W--	HISPASAT-3	1	AE	2
E	HISPAS2D	-30.00	-8.80	35.40					COP	36.90	0.00	MODRES	35.50	CL		27M0G9W--	HISPASAT-2	1	AE	2
E	HISPASA2	-30.00	-8.80	35.40	3.00	1.90	45.00	R13TSS		36.90		MODRES	35.50	CL		27M0F8W--	HISPASAT-2	1	AE	2
EGY	D33NI1S1	-7.00	16.20	23.40					COH	32.75	-4.75	MODRES	35.50	LE	0.00	33M0G7W--	NILESAT-1S	12	AE	1, 2
EGY	D33NI1S2	-7.00	16.20	23.40					COV	32.51	1.80	MODRES	35.50	LE	90.00	33M0G7W--	NILESAT-1S	12	AE	1, 2
F/EUT	E127ASCA	13.00	9.65	38.55					SHA	32.00	-1.00	MODRES	35.50	LE	93.50	27M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E127ASCB	13.00	9.65	38.55					SHA	32.00	-1.00	MODRES	35.50	LE	3.50	27M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E127ASWA	13.00	9.65	38.55					WIS	33.00	0.00	MODRES	35.50	LE	93.50	27M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E127ASWB	13.00	9.65	38.55					WIS	33.00	0.00	MODRES	35.50	LE	3.50	27M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E127ASZA	13.00	9.65	38.55					ZOS	36.00	3.00	MODRES	35.50	LE	93.50	27M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E127ASZB	13.00	9.65	38.55					ZOS	36.00	3.00	MODRES	35.50	LE	3.50	27M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E127DSCA	13.00	9.65	38.55					SHA	32.00	-1.00	MODRES	35.50	LE	93.50	27M0G7W--	EUTELSAT B-13E	8	AE	2
F/EUT	E127DSCB	13.00	9.65	38.55					SHA	32.00	-1.00	MODRES	35.50	LE	3.50	27M0G7W--	EUTELSAT B-13E	8	AE	2
F/EUT	E127DSWA	13.00	9.65	38.55					WIS	33.00	0.00	MODRES	35.50	LE	93.50	27M0G7W--	EUTELSAT B-13E	8	AE	2
F/EUT	E127DSWB	13.00	9.65	38.55					WIS	33.00	0.00	MODRES	35.50	LE	3.50	27M0G7W--	EUTELSAT B-13E	8	AE	2
F/EUT	E127DSZA	13.00	9.65	38.55					ZOS	36.00	3.00	MODRES	35.50	LE	93.50	27M0G7W--	EUTELSAT B-13E	8	AE	2
F/EUT	E127DSZB	13.00	9.65	38.55					ZOS	36.00	3.00	MODRES	35.50	LE	3.50	27M0G7W--	EUTELSAT B-13E	8	AE	2
F/EUT	E133ASCA	13.00	9.65	38.55					SHA	32.00	-1.00	MODRES	35.50	LE	93.50	33M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E133ASCB	13.00	9.65	38.55					SHA	32.00	-1.00	MODRES	35.50	LE	3.50	33M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E133ASWA	13.00	9.65	38.55					WIS	33.00	0.00	MODRES	35.50	LE	93.50	33M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E133ASWB	13.00	9.65	38.55					WIS	33.00	0.00	MODRES	35.50	LE	3.50	33M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E133ASZA	13.00	9.65	38.55					ZOS	36.00	3.00	MODRES	35.50	LE	93.50	33M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E133ASZB	13.00	9.65	38.55					ZOS	36.00	3.00	MODRES	35.50	LE	3.50	33M0F9W	EUTELSAT B-13E	8	AE	2
F/EUT	E133DSCA	13.00	9.65	38.55					SHA	32.00	-1.00	MODRES	35.50	LE	93.50	33M0G7W--	EUTELSAT B-13E	8	AE	2

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15
Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped Beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
F/EUT	E133DSCB	13.00	9.65	38.55					SHA	32.00	-1.00	MODRES	35.50	LE	3.50	33M0G7W--	EUTELSAT B-13E	8	AE	2
F/EUT	E133DSWA	13.00	9.65	38.55					WIS	33.00	0.00	MODRES	35.50	LE	93.50	33M0G7W--	EUTELSAT B-13E	8	AE	2
F/EUT	E133DSWB	13.00	9.65	38.55					WIS	33.00	0.00	MODRES	35.50	LE	3.50	33M0G7W--	EUTELSAT B-13E	8	AE	2
F/EUT	E133DSZA	13.00	9.65	38.55					ZOS	36.00	3.00	MODRES	35.50	LE	93.50	33M0G7W--	EUTELSAT B-13E	8	AE	2
F/EUT	E133DSZB	13.00	9.65	38.55					ZOS	36.00	3.00	MODRES	35.50	LE	3.50	33M0G7W--	EUTELSAT B-13E	8	AE	2
F	F5_27D11	-7.00	2.60	45.90					COP	41.80	13.80	MODRES	35.50	LE	90.00	27M0G9W--	RADIOSAT-5	12	A	1, 2
F	F5_27D12	-7.00	2.60	45.90					COP	41.80	13.80	MODRES	35.50	LE	0.00	27M0G9W--	RADIOSAT-5	12	A	1, 2
F	F5_27D13	-7.00	2.60	45.90					COP	41.80	13.80	MODRES	35.50	LE	90.00	27M0G9W--	RADIOSAT-5	12	A	1, 2
F	F5_27D14	-7.00	2.60	45.90					COP	41.80	13.80	MODRES	35.50	LE	0.00	27M0G9W--	RADIOSAT-5	12	A	1, 2
F	F5_27D15	-7.00	2.60	45.90					COP	41.80	13.80	MODRES	35.50	LE	0.00	27M0G9W--	RADIOSAT-5	21	A	2
F	F5_33D11	-7.00	2.60	45.90					COP	41.80	13.80	MODRES	35.50	LE	90.00	33M0G9W--	RADIOSAT-5	12	A	1, 2
F	F5_33D12	-7.00	2.60	45.90					COP	41.80	13.80	MODRES	35.50	LE	0.00	33M0G9W--	RADIOSAT-5	12	A	1, 2
F	F5_33D13	-7.00	2.60	45.90					COP	41.80	13.80	MODRES	35.50	LE	90.00	33M0G9W--	RADIOSAT-5	12	A	1, 2
F	F5_33D14	-7.00	2.60	45.90					COP	41.80	13.80	MODRES	35.50	LE	0.00	33M0G9W--	RADIOSAT-5	12	A	1, 2
F	F5_33D15	-7.00	2.60	45.90					COP	41.80	13.80	MODRES	35.50	LE	0.00	33M0G9W--	RADIOSAT-5	21	A	2
F	F93D2755	-7.00	2.60	45.90					OPT	41.80	13.80	MODRES	35.50	LE	90.00	27M0G9W--	RADIOSAT-5A	21	A	2
F	F93D2756	-7.00	2.60	45.90					OPT	41.80	13.80	MODRES	35.50	LE	0.00	27M0G9W--	RADIOSAT-5A	21	A	2
F	F93D2757	-7.00	2.60	45.90					OPT	41.80	13.80	MODRES	35.50	LE	90.00	27M0G9W--	RADIOSAT-5A	21	A	2
F	F93D3355	-7.00	2.60	45.90					OPT	41.80	13.80	MODRES	35.50	LE	90.00	33M0G9W--	RADIOSAT-5A	21	A	2
F	F93D3356	-7.00	2.60	45.90					OPT	41.80	13.80	MODRES	35.50	LE	0.00	33M0G9W--	RADIOSAT-5A	21	A	2
F	F93D3357	-7.00	2.60	45.90					OPT	41.80	13.80	MODRES	35.50	LE	90.00	33M0G9W--	RADIOSAT-5A	21	A	2
KOR	KO11202D	113.00	127.50	36.00	1.24	1.02	168.00	R13TSS		43.43		MODRES	35.50	CL		27M0GXX--	KOREASAT-2		AE	2
LAO	LST3CELD	116.00	104.67	13.82					3CC	39.90	3.80	MODRES	35.50	LE	90.00	33M0G7W--	LSTAR3B	23	A	2
LAO	LST3COLD	116.00	104.67	13.82					3CC	39.90	3.80	MODRES	35.50	LE	0.00	33M0G7W--	LSTAR3B	23	A	2
LAO	LST3EELD	116.00	123.30	10.60	1.90	1.40	140.00	R13TSS		40.50		MODRES	35.50	LE	90.00	33M0G7W--	LSTAR3B	25	A	2
LAO	LST3EOLD	116.00	123.30	10.60	1.90	1.40	140.00	R13TSS		40.50		MODRES	35.50	LE	0.00	33M0G7W--	LSTAR3B	25	A	2
LAO	LST3NEL1	116.00	115.00	22.79					3NC1	38.90	4.10	MODRES	41.30	LE	90.00	33M0G7W--	LSTAR3B	24	A	2
LAO	LST3NOL1	116.00	115.00	22.79					3NC1	38.90	4.10	MODRES	41.10	LE	0.00	33M0G7W--	LSTAR3B	24	A	2
LAO	LST3WELD	116.00	79.02	20.79					3WC1	39.00	5.10	MODRES	35.50	LE	90.00	33M0G7W--	LSTAR3B	22	A	2
LAO	LST3WOLD	116.00	79.02	20.79					3WC1	39.00	5.10	MODRES	35.50	LE	0.00	33M0G7W--	LSTAR3B	22	A	2
LAO	LST4CELD	126.00	103.72	13.97					4CC	39.90	3.80	MODRES	35.50	LE	90.00	33M0G7W--	LSTAR4B	27	A	2
LAO	LST4COLD	126.00	103.72	13.97					4CC	39.90	3.80	MODRES	35.50	LE	0.00	33M0G7W--	LSTAR4B	27	A	2
LAO	LST4EELD	126.00	123.30	10.60	1.90	1.40	140.00	R13TSS		40.50		MODRES	35.50	LE	90.00	33M0G7W--	LSTAR4B	29	A	2
LAO	LST4EOLD	126.00	123.30	10.60	1.90	1.40	140.00	R13TSS		40.50		MODRES	35.50	LE	0.00	33M0G7W--	LSTAR4B	29	A	2
LAO	LST4NELD	126.00	116.25	22.86					4NC1	37.80	4.20	MODRES	35.70	LE	90.00	33M0G7W--	LSTAR4B	28	A	2

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15
Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped Beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
LAO	LST4NOLD	126.00	116.25	22.86					4NC1	37.80	4.20	MODRES	35.70	LE	0.00	33M0G7W--	LSTAR4B	28	A	2
LAO	LST4WELD	126.00	77.73	20.27					4WC1	39.00	5.10	MODRES	35.50	LE	90.00	33M0G7W--	LSTAR4B	26	A	2
LAO	LST4WOLD	126.00	77.73	20.27					4WC1	39.00	5.10	MODRES	35.50	LE	0.00	33M0G7W--	LSTAR4B	26	A	2
LUX	D3128HI1	28.20	4.50	48.60					COM	35.00	0.00	DBLTVROI0001	33.50	LE	5.10	33M0G7W--	DBL-28.2E	9	AE	2
LUX	D3128HI4	28.20	4.50	48.60					COM	35.00	0.00	DBLTVROI0001	42.02	LE	5.10	33M0G7W--	DBL-28.2E	9	AE	2
LUX	D3128VI1	28.20	4.50	48.60					COM	35.00	0.00	DBLTVROI0001	33.50	LE	95.10	33M0G7W--	DBL-28.2E	9	AE	2
LUX	D3128VI4	28.20	4.50	48.60					COM	35.00	0.00	DBLTVROI0001	42.02	LE	95.10	33M0G7W--	DBL-28.2E	9	AE	2
LUX	D3228HI1	28.20	4.50	48.60					COM2	35.00	0.00	DBLTVROI0001	33.50	LE	5.10	33M0G7W--	DBL-28.2E	9	AE	2
LUX	D3228HI4	28.20	4.50	48.60					COM2	35.00	0.00	DBLTVROI0001	42.02	LE	5.10	33M0G7W--	DBL-28.2E	9	AE	2
LUX	D3228VI1	28.20	4.50	48.60					COM2	35.00	0.00	DBLTVROI0001	33.50	LE	95.10	33M0G7W--	DBL-28.2E	9	AE	2
LUX	D3228VI4	28.20	4.50	48.60					COM2	35.00	0.00	DBLTVROI0001	42.02	LE	95.10	33M0G7W--	DBL-28.2E	9	AE	2
LUX	D33THN13	19.20	4.62	48.52					THN1	38.82	0.00	DBLTVROI0001	28.50	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33THN14	19.20	4.62	48.52					THN1	38.82	0.00	DBLTVROI0001	32.00	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33THN1C	19.20	4.62	48.52					THN1	38.82	0.00	DBLTVROC0001	47.00	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33THN1I	19.20	4.62	48.52					THN1	38.82	0.00	DBLTVROI0001	34.50	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33THP13	19.20	4.62	48.52					THP1	38.27	0.00	DBLTVROI0001	28.50	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33THP14	19.20	4.62	48.52					THP1	38.27	0.00	DBLTVROI0001	32.00	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33THP1C	19.20	4.62	48.52					THP1	38.27	0.00	DBLTVROC0001	47.00	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33THP1I	19.20	4.62	48.52					THP1	38.27	0.00	DBLTVROI0001	34.50	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33THP23	19.20	4.62	48.52					THP2	38.27	0.00	DBLTVROI0001	28.50	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33THP24	19.20	4.62	48.52					THP2	38.27	0.00	DBLTVROI0001	32.00	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33THP2C	19.20	4.62	48.52					THP2	38.27	0.00	DBLTVROC0001	47.00	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33THP2I	19.20	4.62	48.52					THP2	38.27	0.00	DBLTVROI0001	34.50	LE	5.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVN13	19.20	4.62	48.52					TVN1	39.64	0.00	DBLTVROI0001	28.50	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVN14	19.20	4.62	48.52					TVN1	39.64	0.00	DBLTVROI0001	32.00	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVN1C	19.20	4.62	48.52					TVN1	39.64	0.00	DBLTVROC0001	47.00	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVN1I	19.20	4.62	48.52					TVN1	39.64	0.00	DBLTVROI0001	34.50	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVN23	19.20	4.62	48.52					TVN2	39.64	0.00	DBLTVROI0001	28.50	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVN24	19.20	4.62	48.52					TVN2	39.64	0.00	DBLTVROI0001	32.00	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVN2C	19.20	4.62	48.52					TVN2	39.64	0.00	DBLTVROC0001	47.00	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVN2I	19.20	4.62	48.52					TVN2	39.64	0.00	DBLTVROI0001	34.50	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVP13	19.20	4.62	48.52					TVP1	38.83	0.00	DBLTVROI0001	28.50	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVP14	19.20	4.62	48.52					TVP1	38.83	0.00	DBLTVROI0001	32.00	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVP1C	19.20	4.62	48.52					TVP1	38.83	0.00	DBLTVROC0001	47.00	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVP1I	19.20	4.62	48.52					TVP1	38.83	0.00	DBLTVROI0001	34.50	LE	95.10	33M0G7W--	DBL	7	AE	2

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15
Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped Beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
LUX	D33TVP23	19.20	4.62	48.52					TVP2	38.83	0.00	DBLTVROI0001	28.50	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVP24	19.20	4.62	48.52					TVP2	38.83	0.00	DBLTVROI0001	32.00	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVP2C	19.20	4.62	48.52					TVP2	38.83	0.00	DBLTVROC0001	47.00	LE	95.10	33M0G7W--	DBL	7	AE	2
LUX	D33TVP2I	19.20	4.62	48.52					TVP2	38.83	0.00	DBLTVROI0001	34.50	LE	95.10	33M0G7W--	DBL	7	AE	2
NOR	BIFROS21	-0.80	17.00	61.50					NO9	32.00	6.00	MODRES	35.50	CL		27M0FXF	BIFROST-2	6	AE	2
NOR	BIFROS22	-0.80	17.00	61.50					NO9	32.00	6.00	MODRES	35.50	CR		27M0FXF	BIFROST-2	6	AE	2
NOR	BIFROST	-0.80	15.00	61.00					NO4	40.00	0.00	MODRES	35.50	CR		27M0FXF	BIFROST	6	AE	2
RUS	RSTRBD11	36.00	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CL		27M0G7W	RST-1	5	A	2
RUS	RSTRBD12	36.00	38.00	53.00	2.20	2.20	0.00	R13TSS		37.70		MODRES	35.50	CR		27M0G7W	RST-1	5	A	2
RUS	RSTRBD21	56.00	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	35.50	CL		27M0G7W	RST-2	14	A	2
RUS	RSTRBD22	56.00	65.00	63.00	2.20	2.20	0.00	R123FR		37.70		MODRES	35.50	CR		27M0G7W	RST-2	14	A	2
S	S 13902	5.00	17.00	61.50	2.00	1.00	10.00	R13TSS		41.44		MODRES	38.43	CL		27M0F8W	TELE-X	4	AE	2
S	SI2ADN2A	5.00	18.30	57.30					NOR2	40.00	7.00	MODRES	35.50	LE	90.00	32M0F3F	SIRIUS-2	4	AE	2, 3
S	SI2ADN2D	5.00	18.30	57.30					NOR2	40.00	7.00	MODRES	35.50	LE	90.00	32M0G7W	SIRIUS-2	4	AE	2, 3
S	SI2ADS2A	5.00	12.50	46.00					STR2	34.00	1.90	MODRES	35.50	LE	0.00	32M0F3F	SIRIUS-2	4	AE	2, 3
S	SI2ADS2D	5.00	12.50	46.00					STR2	34.00	1.90	MODRES	35.50	LE	0.00	32M0G7W	SIRIUS-2	4	AE	2, 3
S	SI2ADS3A	5.00	12.50	46.00					STR3	34.00	1.90	MODRES	35.50	LE	0.00	32M0F3F	SIRIUS-2	4	AE	2, 3
S	SI2ADS3D	5.00	12.50	46.00					STR3	34.00	1.90	MODRES	35.50	LE	0.00	32M0G7W	SIRIUS-2	4	AE	2, 3
S	SI2DN1A	5.00	18.30	57.30					NOR1	40.00	7.00	MODRES	35.50	LE	90.00	32M0F3F	SIRIUS-2	4	AE	2, 3
S	SI2DN1D	5.00	18.30	57.30					NOR1	40.00	7.00	MODRES	35.50	LE	90.00	32M0G7W	SIRIUS-2	4	AE	2, 3
S	SI2DN2A	5.00	18.30	57.30					NOR2	40.00	7.00	MODRES	35.50	LE	90.00	32M0F3F	SIRIUS-2	4	AE	2, 3
S	SI2DN2D	5.00	18.30	57.30					NOR2	40.00	7.00	MODRES	35.50	LE	90.00	32M0G7W	SIRIUS-2	4	AE	2, 3
S	SI2DN3A	5.00	18.30	57.30					NOR3	40.00	7.00	MODRES	35.50	LE	90.00	32M0F3F	SIRIUS-2	4	AE	2, 3
S	SI2DN3D	5.00	18.30	57.30					NOR3	40.00	7.00	MODRES	35.50	LE	90.00	32M0G7W	SIRIUS-2	4	AE	2, 3
S	SI2DS1A	5.00	12.50	46.00					STR1	34.00	1.90	MODRES	35.50	LE	0.00	32M0F3F	SIRIUS-2	4	AE	2, 3
S	SI2DS1D	5.00	12.50	46.00					STR1	34.00	1.90	MODRES	35.50	LE	0.00	32M0G7W	SIRIUS-2	4	AE	2, 3
S	SI2DS2A	5.00	12.50	46.00					STR2	34.00	1.90	MODRES	35.50	LE	0.00	32M0F3F	SIRIUS-2	4	AE	2, 3
S	SI2DS2D	5.00	12.50	46.00					STR2	34.00	1.90	MODRES	35.50	LE	0.00	32M0G7W	SIRIUS-2	4	AE	2, 3
S	SI2DS3A	5.00	12.50	46.00					STR3	34.00	1.90	MODRES	35.50	LE	0.00	32M0F3F	SIRIUS-2	4	AE	2, 3
S	SI2DS3D	5.00	12.50	46.00					STR3	34.00	1.90	MODRES	35.50	LE	0.00	32M0G7W	SIRIUS-2	4	AE	2, 3
S	SI3NHA	5.20	18.30	57.30					NORA	40.00	0.00	MODRES	35.50	LE	0.00	32M0F3F	SIRIUS-3	4	AE	2, 3
S	SI3NHAMD	5.20	18.30	57.30					NORB	40.00	0.00	MODRES	35.50	LE	0.00	32M0F3F	SIRIUS-3	4	AE	2, 3
S	SI3NHD	5.20	18.30	57.30					NORA	40.00	0.00	MODRES	35.50	LE	0.00	32M0G7W	SIRIUS-3	4	AE	2, 3
S	SI3NHDMD	5.20	18.30	57.30					NORB	40.00	0.00	MODRES	35.50	LE	0.00	32M0G7W	SIRIUS-3	4	AE	2, 3
S	SI3NVA	5.20	18.30	57.30					NORB	40.00	0.00	MODRES	35.50	LE	90.00	32M0F3F	SIRIUS-3	4	AE	2, 3

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15
Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped Beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
S	SI3NVD	5.20	18.30	57.30					NORB	40.00	0.00	MODRES	35.50	LE	90.00	32M0G7W	SIRIUS-3	4	AE	2, 3
S	SIRIUS01	5.20	14.00	63.00	1.30	0.70	142.00	R13TSS		42.50		MODRES	38.43	CR		27M0F8W	SIRIUS	4	AE	2
S	SIRIUS02	5.20	14.00	63.00	1.30	0.70	142.00	R13TSS		42.50		MODRES	38.43	CR		27M0F8W	SIRIUS	4	AE	2
S	SIRIUSW1	-13.00	15.00	60.00	1.30	0.70	142.00	R13TSS		42.50		MODRES	35.50	CR		27M0F9WWW	SIRIUS-W		AE	2
TUR	TKBSSEED	42.00	45.67	40.24	7.08	1.42	6.00	R123FR		40.00		MODRES	41.00	LE	85.70	33M0G7W	TURKSAT-BSS	36	A	2
TUR	TKBSSWSD	42.00	12.82	46.90					EUR	44.00	0.00	MODRES	36.00	LE	155.30	33M0G7W	TURKSAT-BSS	36	A	2
USA	US29H51D	41.00	24.45	-29.38					AX1	36.49	0.00	MODRES	35.50	CL		27M0G7W--	USASAT29H	15	A	2
USA	US29H52D	41.00	24.45	-29.38					AX1	36.49	0.00	MODRES	35.50	CR		27M0G7W--	USASAT29H	15	A	2
USA	US29M11D	149.00	103.95	14.13	1.49	1.25	107.50	R123FR		41.60		MODRES	46.00	CL		27M0G7W--	USASAT29M	16	A	2
USA	US29M12D	149.00	103.95	14.13	1.49	1.25	107.50	R123FR		41.60		MODRES	46.00	CR		27M0G7W--	USASAT29M	16	A	2
USA	US29M21D	149.00	101.73	-0.03	2.30	0.43	117.50	R123FR		44.40		MODRES	41.00	CR		27M0G7W--	USASAT29M	16	A	2
USA	US29M22D	149.00	101.73	-0.03	2.30	0.43	117.50	R123FR		44.40		MODRES	41.00	CL		27M0G7W--	USASAT29M	16	A	2
USA	US29M23D	149.00	117.40	-7.68	3.15	0.85	172.50	R123FR		40.10		MODRES	40.00	CR		27M0G7W--	USASAT29M	16	A	2
USA	US29M24D	149.00	117.40	-7.68	3.15	0.85	172.50	R123FR		40.10		MODRES	40.00	CL		27M0G7W--	USASAT29M	16	A	2
USA	US29M25D	149.00	117.62	0.21	2.49	2.13	125.00	R123FR		37.10		MODRES	37.00	CR		27M0G7W--	USASAT29M	16	A	2
USA	US29M26D	149.00	117.62	0.21	2.49	2.13	125.00	R123FR		37.10		MODRES	37.00	CL		27M0G7W--	USASAT29M	16	A	2
USA	US29M31D	149.00	121.76	11.71	3.08	1.57	79.71	R123FR		37.60		MODRES	35.50	CR		27M0G7W--	USASAT29M	16	A	2
USA	US29M32D	149.00	121.76	11.71	3.08	1.57	79.71	R123FR		37.60		MODRES	35.50	CL		27M0G7W--	USASAT29M	16	A	2
USA	US29N11D	164.00	133.60	36.02					AX4	42.89	0.00	MODRES	35.50	CR		27M0G7W--	USASAT29N	17	A	2
USA	US29N12D	164.00	133.60	36.02					AX4	42.89	0.00	MODRES	35.50	CL		27M0G7W--	USASAT29N	17	A	2
USA	US29O11D	173.00	130.74	-22.08	3.67	2.63	108.78	R123FR		34.60		MODRES	35.50	CL		27M0G7W--	USASAT29O	18	A	2
USA	US29O12D	173.00	130.74	-22.08	3.67	2.63	108.78	R123FR		34.60		MODRES	35.50	CR		27M0G7W--	USASAT29O	18	A	2
USA	US29O21D	173.00	144.38	-27.81	4.74	2.38	116.58	R123FR		33.90		MODRES	35.50	CR		27M0G7W--	USASAT29O	18	A	2
USA	US29O22D	173.00	144.38	-27.81	4.74	2.38	116.58	R123FR		33.90		MODRES	35.50	CL		27M0G7W--	USASAT29O	18	A	2
USA	US29O31D	173.00	172.83	-39.31	2.18	1.10	43.86	R123FR		40.60		MODRES	35.50	CL		27M0G7W--	USASAT29O	18	A	2
USA	US29O32D	173.00	172.83	-39.31	2.18	1.10	43.86	R123FR		40.60		MODRES	35.50	CR		27M0G7W--	USASAT29O	18	A	2
USA	US29O41D	173.00	149.58	-6.59	2.71	1.90	159.23	R123FR		37.30		MODRES	35.50	CL		27M0G7W--	USASAT29O	18	A	2
USA	US29O42D	173.00	149.58	-6.59	2.71	1.90	159.23	R123FR		37.30		MODRES	35.50	CR		27M0G7W--	USASAT29O	18	A	2
USA	US29R11D	132.00	108.66	33.45					AX3	35.00	0.00	MODRES	48.00	CR		27M0G7W--	USASAT29R	19	A	2
USA	US29R12D	132.00	108.66	33.45					AX3	35.00	0.00	MODRES	48.00	CL		27M0G7W--	USASAT29R	19	A	2

Section 2 – Equivalent isotropic radiated power of the assignments in the Regions 1 and 3 List of additional uses

COLUMN HEADINGS

Col. 1 *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. 2 *Notifying administration symbol*.

Col. 3 *Beam identification*.

Col. 4 *Polarization* (CL – circular left, CR – circular right, LE – linear referenced to the equatorial plane).

Col. 5 *Channel number*.

Equivalent isotropic radiated power (dBW) in the direction of maximum radiation of assignments in the Regions 1 and 3 List of additional uses (sorted by orbital position)

1	2	3	4	5 (Channel number)																																							
Orbital position	Admin. symbol	Beam identification	Polarization type	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	29	30	31	32	33	34	35	36	37	38	39	40
-30.00	E	HI27D3-1	CL	56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0																					
-30.00	E	HI27D3-2	CL																					56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		54.5		56.0	
-30.00	E	HI27D3-3	CR		56.0		55.7		56.0		56.0		56.0		56.0		55.5		56.0		55.7		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0
-30.00	E	HI27D3A1	CL	56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0																					
-30.00	E	HI27D3A2	CL																					56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		54.5		56.0	
-30.00	E	HI27D3A3	CR		56.0		55.7		56.0		56.0		56.0		56.0		55.5		56.0		55.7		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0
-30.00	E	HI27D3B1	CL	56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0																					
-30.00	E	HI27D3B2	CL																					56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		54.5		56.0	
-30.00	E	HI27D3B3	CR		56.0		55.7		56.0		56.0		56.0		56.0		55.5		56.0		55.7		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0
-30.00	E	HI33D3-1	CL	56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0																					
-30.00	E	HI33D3-2	CL																					56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		54.5		56.0	
-30.00	E	HI33D3-3	CR		56.0		55.7		56.0		56.0		56.0		56.0		55.5		56.0		55.7		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0
-30.00	E	HI33D3A1	CL	56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0																					
-30.00	E	HI33D3A2	CL																					56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		54.5		56.0	
-30.00	E	HI33D3A3	CR		56.0		55.7		56.0		56.0		56.0		56.0		55.5		56.0		55.7		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0
-30.00	E	HI33D3B1	CL	56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0																					
-30.00	E	HI33D3B2	CL																					56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		54.5		56.0	
-30.00	E	HI33D3B3	CR		56.0		55.7		56.0		56.0		56.0		56.0		55.5		56.0		55.7		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0
-30.00	E	HISPAS2D	CL	58.5		58.5		58.5		58.5		58.5		58.5		58.5		58.5		58.5		58.5																					
-30.00	E	HISPASA2	CL	59.0		59.0		59.0		59.0		59.0		59.0		59.0		59.0		59.0		59.0																					
-13.00	S	SIRIUSW1	CR				52.9				52.9				52.9				52.9				52.9																				
-7.00	EGY	D33NI1S1	LE			52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0																					
-7.00	EGY	D33NI1S2	LE		51.7		51.7		51.7		51.7		51.7		51.7		51.7		51.7		51.7																						
-7.00	F	F5_27D11	LE	56.0				56.0				56.0				56.0				56.0																							
-7.00	F	F5_27D12	LE		56.0				56.0				56.0				56.0				56.0																						
-7.00	F	F5_27D13	LE			56.0				56.0				56.0				56.0				56.0																					
-7.00	F	F5_27D14	LE				56.0				56.0				56.0				56.0				56.0																				
-7.00	F	F5_27D15	LE																									56.0				56.0				56.0				56.0				56.0
-7.00	F	F5_33D11	LE	56.0				56.0				56.0				56.0				56.0																							
-7.00	F	F5_33D12	LE		56.0				56.0				56.0				56.0				56.0																						
-7.00	F	F5_33D13	LE			56.0				56.0				56.0				56.0				56.0																					
-7.00	F	F5_33D14	LE				56.0				56.0				56.0				56.0				56.0																				
-7.00	F	F5_33D15	LE																									56.0				56.0				56.0				56.0				56.0
-7.00	F	F93D2755	LE																					56.0				56.0				56.0				56.0				56.0			

1	2	3	4	5 (Channel number)																																							
Orbital position	Admin. symbol	Beam identifi-cation	Polari-zation type	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	29	30	31	32	33	34	35	36	37	38	39	40
-7.00	F	F93D2756	LE																						56.0				56.0				56.0				56.0				56.0		
-7.00	F	F93D2757	LE																							56.0				56.0				56.0				56.0				56.0	
-7.00	F	F93D3355	LE																					56.0				56.0				56.0				56.0				56.0			
-7.00	F	F93D3356	LE																						56.0				56.0				56.0				56.0				56.0		
-7.00	F	F93D3357	LE																							56.0				56.0				56.0				56.0				56.0	
-0.80	NOR	BIFROS21	CL																							54.5				54.5				54.5				54.5				54.5	
-0.80	NOR	BIFROS22	CR		54.5				54.5				54.5				54.5				54.5						54.5				54.5				54.5				54.5				54.5
-0.80	NOR	BIFROST	CR				55.0				55.0				55.0				55.0				55.0																				
5.00	S	S 13902	CL																																								63.2
5.00	S	SI2ADN2A	LE																				57.0																				
5.00	S	SI2ADN2D	LE																				57.0																				
5.00	S	SI2ADS2A	LE																			52.0																					
5.00	S	SI2ADS2D	LE																			52.0																					
5.00	S	SI2ADS3A	LE			52.0																		52.0																			
5.00	S	SI2ADS3D	LE			52.0																		52.0																			
5.00	S	SI2DN1A	LE		57.0				57.0				57.0																														
5.00	S	SI2DN1D	LE		57.0				57.0				57.0																														
5.00	S	SI2DN2A	LE																								57.0						57.0		57.0						57.0		57.0
5.00	S	SI2DN2D	LE																								57.0						57.0		57.0						57.0		57.0
5.00	S	SI2DN3A	LE																												57.0						57.0		57.0				
5.00	S	SI2DN3D	LE																												57.0						57.0		57.0				
5.00	S	SI2DS1A	LE																											52.0								52.0					
5.00	S	SI2DS1D	LE																											52.0								52.0					
5.00	S	SI2DS2A	LE																													52.0		52.0		52.0				52.0		52.0	
5.00	S	SI2DS2D	LE																													52.0		52.0		52.0				52.0		52.0	
5.00	S	SI2DS3A	LE	51.5																						52.0		52.0															
5.00	S	SI2DS3D	LE	52.0																						52.0		52.0															
5.20	S	SI3NHA	LE					57.0		57.0		57.0		57.0																													
5.20	S	SI3NHAMD	LE													57.0		57.0		57.0																							
5.20	S	SI3NHD	LE					57.0		57.0		57.0		57.0																													
5.20	S	SI3NHDMD	LE													57.0		57.0		57.0																							
5.20	S	SI3NVA	LE				57.0				57.0				57.0		57.0		57.0		57.0																						
5.20	S	SI3NVD	LE				57.0				57.0				57.0		57.0		57.0		57.0																						
5.20	S	SIRIUS01	CR				59.5				59.5																																
5.20	S	SIRIUS02	CR												58.0				58.0				58.0																				
13.00	F/EUT	E127ASCA	LE	51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5	
13.00	F/EUT	E127ASCB	LE		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5

1	2	3	4	5 (Channel number)																																							
Orbital position	Admin. symbol	Beam identifi-cation	Polari-zation type	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	29	30	31	32	33	34	35	36	37	38	39	40
13.00	F/EUT	E127ASWA	LE	51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4	
13.00	F/EUT	E127ASWB	LE		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4
13.00	F/EUT	E127ASZA	LE	51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4	
13.00	F/EUT	E127ASZB	LE		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4
13.00	F/EUT	E127DSCA	LE	55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		53.5		55.5		53.5		55.5		53.5		55.5		53.5		55.5		53.5	
13.00	F/EUT	E127DSCB	LE		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5
13.00	F/EUT	E127DSWA	LE	52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0	
13.00	F/EUT	E127DSWB	LE		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0
13.00	F/EUT	E127DSZA	LE	55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		53.5		55.0		53.5		55.0		53.5		55.0		53.5		55.0		53.5	
13.00	F/EUT	E127DSZB	LE		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5
13.00	F/EUT	E133ASCA	LE	51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5	
13.00	F/EUT	E133ASCB	LE		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5		51.5
13.00	F/EUT	E133ASWA	LE	51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4	
13.00	F/EUT	E133ASWB	LE		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4
13.00	F/EUT	E133ASZA	LE	51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4	
13.00	F/EUT	E133ASZB	LE		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4		51.4
13.00	F/EUT	E133DSCA	LE	55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		53.5		55.5		53.5		55.5		53.5		55.5		53.5		55.5		53.5	
13.00	F/EUT	E133DSCB	LE		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		55.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5
13.00	F/EUT	E133DSWA	LE	52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0	
13.00	F/EUT	E133DSWB	LE		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0
13.00	F/EUT	E133DSZA	LE	55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		53.5		55.0		53.5		55.0		53.5		55.0		53.5		55.0		53.5	
13.00	F/EUT	E133DSZB	LE		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5		53.5
19.20	LUX	D33THN13	LE	53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8			
19.20	LUX	D33THN14	LE	53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8			
19.20	LUX	D33THN1C	LE	53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8			
19.20	LUX	D33THN1I	LE	53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8				53.8			
19.20	LUX	D33THP13	LE			53.3				53.3				53.3				53.3				53.3																					
19.20	LUX	D33THP14	LE			53.3				53.3				53.3				53.3				53.3																					
19.20	LUX	D33THP1C	LE			53.3				53.3				53.3				53.3				53.3																					
19.20	LUX	D33THP1I	LE			53.3				53.3				53.3				53.3				53.3																					
19.20	LUX	D33THP23	LE																							49.3				49.3				49.3				49.3				49.3	
19.20	LUX	D33THP24	LE																							49.3				49.3				49.3				49.3				49.3	
19.20	LUX	D33THP2C	LE																							49.3				49.3				49.3				49.3				49.3	
19.20	LUX	D33THP2I	LE																							49.3				49.3				49.3				49.3				49.3	
19.20	LUX	D33TVN13	LE		54.5				54.5				54.5				54.5				54.5																						
19.20	LUX	D33TVN14	LE		54.5				54.5				54.5				54.5				54.5																						
19.20	LUX	D33TVN1C	LE		54.5				54.5				54.5				54.5				54.5																						

1	2	3	4	5 (Channel number)																																							
Orbital position	**Admin. symbol**	**Beam identifi-cation**	**Polari-zation type**	**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**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
19.20	LUX	D33TVN1I	LE		54.5				54.5				54.5				54.5				54.5																						
19.20	LUX	D33TVN23	LE																						50.5				50.5				50.5				50.5				50.5		
19.20	LUX	D33TVN24	LE																						50.5				50.5				50.5				50.5				50.5		
19.20	LUX	D33TVN2C	LE																						50.5				50.5				50.5				50.5				50.5		
19.20	LUX	D33TVN2I	LE																						50.5				50.5				50.5				50.5				50.5		
19.20	LUX	D33TVP13	LE				53.7				53.7				53.7				53.7				53.7																				
19.20	LUX	D33TVP14	LE				53.7				53.7				53.7				53.7				53.7																				
19.20	LUX	D33TVP1C	LE				53.7				53.7				53.7				53.7				53.7																				
19.20	LUX	D33TVP1I	LE				53.7				53.7				53.7				53.7				53.7																				
19.20	LUX	D33TVP23	LE																								49.7				49.7				49.7				49.7				49.7
19.20	LUX	D33TVP24	LE																								49.7				49.7				49.7				49.7				49.7
19.20	LUX	D33TVP2C	LE																								49.7				49.7				49.7				49.7				49.7
19.20	LUX	D33TVP2I	LE																								49.7				49.7				49.7				49.7				49.7
26.00	ARS	REGBS111	LE	50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																					
26.00	ARS	REGBS112	LE		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																				
26.00	ARS	REGBS113	LE	50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																					
26.00	ARS	REGBS114	LE		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																				
26.00	ARS	REGBS115	LE	50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																					
26.00	ARS	REGBS116	LE		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																				
26.00	ARS	REGBS117	LE	50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																					
26.00	ARS	REGBS118	LE		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																				
26.00	ARS	REGBS119	LE	50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																					
26.00	ARS	REGBS120	LE		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																				
26.00	ARS	REGBS121	LE	50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																					
26.00	ARS	REGBS122	LE		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																				
26.00	ARS	REGBS123	LE	50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																					
26.00	ARS	REGBS124	LE		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																				
26.00	ARS	REGBS125	LE	50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																					
26.00	ARS	REGBS126	LE		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																				
26.00	ARS	REGBS133	LE																					50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0	
26.00	ARS	REGBS134	LE																						50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0
26.00	ARS	REGBS137	LE																					50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0	
26.00	ARS	REGBS138	LE																						50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0
26.00	ARS	REGBS141	LE																					50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0	
26.00	ARS	REGBS142	LE																						50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0
26.00	ARS	REGBS145	LE																					50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0	
26.00	ARS	REGBS146	LE																						50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0

1	2	3	4	5 (Channel number)																																							
Orbital position	**Admin. symbol**	**Beam identifi-cation**	**Polari-zation type**	**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**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
28.20	LUX	D3128HI1	LE	55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																	
28.20	LUX	D3128HI4	LE	55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																	
28.20	LUX	D3128VI1	LE		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																		
28.20	LUX	D3128VI4	LE		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																		
28.20	LUX	D3228HI1	LE																									55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0	
28.20	LUX	D3228HI4	LE																									55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0	
28.20	LUX	D3228VI1	LE																								55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0
28.20	LUX	D3228VI4	LE																								55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0
36.00	RUS	RSTRBD11	CL																									53.0				53.0				53.0				53.0			
36.00	RUS	RSTRBD12	CR																										53.0				53.0				53.0				53.0		
41.00	USA	US29H51D	CL	55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0	
41.00	USA	US29H52D	CR		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0
42.00	TUR	TKBSSEED	LE		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0
42.00	TUR	TKBSSWSD	LE	54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0		54.0	
45.00	D	ESTR1-DH	LE		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0
45.00	D	ESTR1-DV	LE	52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0	
45.00	D	ESTR3-DH	LE		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0																		
45.00	D	ESTR3-DV	LE	52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0		52.0																	
56.00	RUS	RSTRBD21	CL																											55.0				55.0				55.0				55.0	
56.00	RUS	RSTRBD22	CR																												55.0				55.0				55.0				55.0
113.00	KOR	KO11202D	CL		51.4		51.4		51.4		51.4		51.9		51.9																												
116.00	LAO	LST3CELD	LE		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9																
116.00	LAO	LST3COLD	LE	57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9																	
116.00	LAO	LST3EELD	LE		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0																
116.00	LAO	LST3EOLD	LE	56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0																	
116.00	LAO	LST3NEL1	LE		49.4		48.7		48.9		52.4		52.4		50.4		55.8		55.8		55.8		55.8		55.8		55.8																
116.00	LAO	LST3NOL1	LE	50.4		48.9		48.9		49.9		52.4		50.4		50.4		55.8		55.8		55.8		55.8		55.8																	
116.00	LAO	LST3WELD	LE		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0																
116.00	LAO	LST3WOLD	LE	57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0																	
126.00	LAO	LST4CELD	LE		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9																
126.00	LAO	LST4COLD	LE	57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9		57.9																	
126.00	LAO	LST4EELD	LE		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0																
126.00	LAO	LST4EOLD	LE	56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0		56.0																	
126.00	LAO	LST4NELD	LE		54.3		54.3		54.3		54.3		54.3		54.3		54.3		55.1		55.1		55.1		55.1		55.1																
126.00	LAO	LST4NOLD	LE	54.3		54.3		54.3		54.3		54.3		54.3		54.3		55.1		55.1		55.1		55.1		55.1																	
126.00	LAO	LST4WELD	LE		55.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0																
126.00	LAO	LST4WOLD	LE	57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0		57.0																	

1	2	3	4	5 (Channel number)																																							
Orbital position	Admin. symbol	Beam identifi-cation	Polari-zation type	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	29	30	31	32	33	34	35	36	37	38	39	40
132.00	USA	US29R11D	CR	42.0		42.0		42.0		42.0		42.0		42.0		42.0		42.0		42.0		42.0		42.0		42.0																	
132.00	USA	US29R12D	CL		42.0		42.0		42.0		42.0		42.0		42.0		42.0		42.0		42.0		42.0		42.0		42.0																
149.00	USA	US29M11D	CL		44.0		44.0		44.0		44.0		44.0		44.0		44.0		44.0		44.0		44.0		44.0		44.0																
149.00	USA	US29M12D	CR	44.0		44.0		44.0		44.0		44.0		44.0		44.0		44.0		44.0		44.0		44.0		44.0																	
149.00	USA	US29M21D	CR		49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0																
149.00	USA	US29M22D	CL	49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0		49.0																	
149.00	USA	US29M23D	CR		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																
149.00	USA	US29M24D	CL	50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0																	
149.00	USA	US29M25D	CR		53.0		53.0		53.0		53.0		53.0		53.0		53.0		53.0		53.0		53.0		53.0		53.0																
149.00	USA	US29M26D	CL	53.0		53.0		53.0		53.0		53.0		53.0		53.0		53.0		53.0		53.0		53.0		53.0																	
149.00	USA	US29M31D	CR		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																
149.00	USA	US29M32D	CL	55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																	
164.00	USA	US29N11D	CR		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																
164.00	USA	US29N12D	CL	55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																	
173.00	USA	US29O11D	CL		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																
173.00	USA	US29O12D	CR	55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																	
173.00	USA	US29O21D	CR		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																
173.00	USA	US29O22D	CL	55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																	
173.00	USA	US29O31D	CL	55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																	
173.00	USA	US29O32D	CR		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																
173.00	USA	US29O41D	CL		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																
173.00	USA	US29O42D	CR	55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0		55.0																	

Section 3 – Equivalent protection margins of the assignments in the Regions 1 and 3 List of additional uses

COLUMN HEADINGS

Col. 1 *Notifying administration symbol.*

Col. 2 *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. 3 *Beam identification*.

Col. 4 *Indication of minimum or maximum equivalent protection margin (EPM) for a given assignment derived from the set of values for all test points belonging to the given beam* (min – indicates that the minimum EPM value is shown in this row; max – indicates that the maximum EPM value is shown in this row).

Col. 5 *Channel number*.

Maximum and minimum EPM (dB) of the assignments in the Regions 1 and 3 List of additional uses (sorted by administration)

1	2	3	4	5 (Channel number)																																							
Admin. symbol	**Orbital position**	**Beam Identificat.**	**EPM**	**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**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
ARS	26.00	REGBS111	max	18.5		18.2		18.2		18.2		18.1		18.1		18.1		18.1		18.0		18.0																					
ARS	26.00	REGBS111	min	-7.6		-7.8		-7.8		-7.8		-7.8		-7.8		-7.9		-7.9		-7.9		-7.9																					
ARS	26.00	REGBS112	max		19.1		19.0		19.0		19.0		18.9		18.9		18.8		18.8		18.8		18.9																				
ARS	26.00	REGBS112	min		-6.8		-6.9		-7.0		-7.1		-7.2		-7.3		-7.4		-7.5		-7.5		-7.5																				
ARS	26.00	REGBS113	max	18.5		18.2		18.2		18.2		18.1		18.1		18.1		18.1		18.0		18.0																					
ARS	26.00	REGBS113	min	-7.6		-7.8		-7.8		-7.8		-7.8		-7.8		-7.9		-7.9		-7.9		-7.9																					
ARS	26.00	REGBS114	max		19.1		19.0		19.0		19.0		18.9		18.9		18.8		18.8		18.8		18.9																				
ARS	26.00	REGBS114	min		-6.8		-6.9		-7.0		-7.1		-7.2		-7.3		-7.4		-7.5		-7.5		-7.5																				
ARS	26.00	REGBS115	max	18.0		17.7		17.7		17.7		17.7		17.6		17.6		17.6		17.6		17.5																					
ARS	26.00	REGBS115	min	-7.9		-8.1		-8.1		-8.1		-8.1		-8.1		-8.1		-8.2		-8.2		-8.2																					
ARS	26.00	REGBS116	max		18.0		18.0		18.0		18.0		18.0		17.9		17.9		17.9		17.8		18.0																				
ARS	26.00	REGBS116	min		-7.7		-7.7		-7.7		-7.7		-7.8		-7.9		-8.0		-8.0		-8.1		-8.2																				
ARS	26.00	REGBS117	max	18.0		17.7		17.7		17.7		17.7		17.6		17.6		17.6		17.6		17.5																					
ARS	26.00	REGBS117	min	-7.9		-8.1		-8.1		-8.1		-8.1		-8.1		-8.1		-8.2		-8.2		-8.2																					
ARS	26.00	REGBS118	max		18.0		18.0		18.0		18.0		18.0		17.9		17.9		17.9		17.8		18.0																				
ARS	26.00	REGBS118	min		-7.7		-7.7		-7.7		-7.7		-7.8		-7.9		-8.0		-8.0		-8.1		-8.2																				
ARS	26.00	REGBS119	max	25.4		25.1		25.1		25.1		25.0		25.0		25.0		24.9		24.9		24.9																					
ARS	26.00	REGBS119	min	-0.7		-0.9		-0.9		-0.9		-0.9		-0.9		-1.0		-1.0		-1.0		-1.0																					
ARS	26.00	REGBS120	max		25.9		25.9		25.8		25.8		25.8		25.7		25.7		25.6		25.6		25.8																				
ARS	26.00	REGBS120	min		0.0		-0.1		-0.2		-0.3		-0.3		-0.4		-0.5		-0.6		-0.6		-0.6																				
ARS	26.00	REGBS121	max	25.4		25.1		25.1		25.1		25.0		25.0		25.0		24.9		24.9		24.9																					
ARS	26.00	REGBS121	min	-0.7		-0.9		-0.9		-0.9		-0.9		-0.9		-1.0		-1.0		-1.0		-1.0																					
ARS	26.00	REGBS122	max		25.9		25.9		25.8		25.8		25.8		25.7		25.7		25.6		25.6		25.8																				
ARS	26.00	REGBS122	min		0.0		-0.1		-0.2		-0.3		-0.3		-0.4		-0.5		-0.6		-0.6		-0.6																				
ARS	26.00	REGBS123	max	24.9		24.6		24.6		24.6		24.6		24.5		24.5		24.5		24.4		24.4																					
ARS	26.00	REGBS123	min	-1.0		-1.2		-1.2		-1.2		-1.2		-1.2		-1.2		-1.2		-1.2		-1.3																					
ARS	26.00	REGBS124	max		24.9		24.9		24.9		24.9		24.8		24.8		24.8		24.7		24.7		24.8																				
ARS	26.00	REGBS124	min		-0.9		-0.9		-0.9		-1.0		-1.0		-1.1		-1.1		-1.2		-1.3		-1.3																				
ARS	26.00	REGBS125	max	24.9		24.6		24.6		24.6		24.6		24.5		24.5		24.5		24.4		24.4																					
ARS	26.00	REGBS125	min	-1.0		-1.2		-1.2		-1.2		-1.2		-1.2		-1.2		-1.2		-1.2		-1.3																					
ARS	26.00	REGBS126	max		24.9		24.9		24.9		24.9		24.8		24.8		24.8		24.7		24.7		24.8																				
ARS	26.00	REGBS126	min		-0.9		-0.9		-0.9		-1.0		-1.0		-1.1		-1.1		-1.2		-1.3		-1.3																				
ARS	26.00	REGBS133	max																					22.0		21.7		21.9		22.0		21.9		22.0		21.9		21.9		21.9		21.9	
ARS	26.00	REGBS133	min																					-5.2		-5.8		-5.7		-5.7		-5.7		-5.7		-5.7		-5.7		-5.7		-5.7	
ARS	26.00	REGBS134	max																						21.9		21.9		22.0		22.0		22.0		22.0		22.0		21.8		22.0		22.5
ARS	26.00	REGBS134	min																						-5.7		-5.6		-5.6		-5.6		-5.6		-5.6		-5.6		-5.6		-5.6		-4.7
ARS	26.00	REGBS137	max																					21.3		21.0		21.2		21.2		21.2		21.2		21.2		21.2		21.2		21.3	
ARS	26.00	REGBS137	min																					-5.7		-6.4		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-6.2	
ARS	26.00	REGBS138	max																						21.1		21.1		21.2		21.2		21.2		21.3		21.3		21.1		21.3		22.0
ARS	26.00	REGBS138	min																						-6.3		-6.3		-6.3		-6.3		-6.3		-6.2		-6.2		-6.2		-6.2		-5.2
ARS	26.00	REGBS141	max																					28.0		27.8		28.0		28.0		28.0		28.0		28.0		27.9		27.9		28.0	

1	2	3	4	5 (Channel number)																																							
Admin. symbol	Orbital position	Beam Identificat.	EPM	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	29	30	31	32	33	34	35	36	37	38	39	40
ARS	26.00	REGBS141	min																					0.9		0.3		0.4		0.4		0.4		0.4		0.4		0.4		0.4		0.4	
ARS	26.00	REGBS142	max																						27.9		28.0		28.0		28.0		28.0		28.0		28.0		27.8		28.1		28.5
ARS	26.00	REGBS142	min																						0.4		0.4		0.4		0.4		0.4		0.4		0.4		0.4		0.5		1.3
ARS	26.00	REGBS145	max																					27.4		27.1		27.2		27.2		27.2		27.3		27.3		27.2		27.2		27.3	
ARS	26.00	REGBS145	min																					0.4		-0.3		-0.3		-0.3		-0.3		-0.3		-0.2		-0.2		-0.2		-0.2	
ARS	26.00	REGBS146	max																						27.1		27.2		27.2		27.2		27.3		27.3		27.3		27.1		27.4		28.1
ARS	26.00	REGBS146	min																						-0.3		-0.3		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		0.9
D	45.00	ESTR1-DH	max		10.5		10.5		10.5		10.5		10.5		10.5		10.5		10.5		10.5		12.4		16.5		17.1		17.5		17.5		17.5		17.5		17.5		17.5		17.5		17.9
D	45.00	ESTR1-DH	min		-10.9		-10.9		-10.9		-10.9		-10.9		-10.9		-10.9		-10.9		-10.9		-10.6		-6.7		-6.7		-6.7		-6.7		-6.7		-6.7		-6.7		-6.7		-6.7		-4.9
D	45.00	ESTR1-DV	max	9.4		8.9		8.9		8.9		8.9		8.9		8.9		8.9		8.9		8.9		16.4		18.6		19.5		19.6		19.7		19.6		19.7		19.6		19.7		19.6	
D	45.00	ESTR1-DV	min	-7.6		-9.5		-9.5		-9.5		-9.5		-9.5		-9.5		-9.5		-9.5		-9.5		-7.0		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3	
D	45.00	ESTR3-DH	max		8.9		8.9		8.9		8.9		8.9		8.9		8.9		8.9		8.9		10.2		7.8																		
D	45.00	ESTR3-DH	min		-10.2		-10.2		-10.2		-10.2		-10.2		-10.2		-10.2		-10.2		-10.2		-9.7		-8.1																		
D	45.00	ESTR3-DV	max	8.0		7.7		7.7		7.7		7.7		7.7		7.7		7.7		7.7		7.7		11.0		9.7																	
D	45.00	ESTR3-DV	min	-8.4		-10.1		-10.1		-10.1		-10.1		-10.1		-10.1		-10.1		-10.1		-10.1		-8.2		-8.3																	
E	-30.00	HI27D3-1	max	7.9		7.8		7.8		7.8		7.8		7.8		7.8		7.8		7.8		7.8																					
E	-30.00	HI27D3-1	min	-3.1		-3.4		-3.4		-3.4		-3.4		-3.4		-3.4		-3.4		-3.4		-3.4																					
E	-30.00	HI27D3-2	max																					6.8		6.4		6.4		6.4		6.4		6.4		6.4		6.4		4.9		6.4	
E	-30.00	HI27D3-2	min																					-3.2		-4.7		-4.7		-4.7		-4.7		-4.7		-5.0		-4.7		-6.5		-4.7	
E	-30.00	HI27D3-3	max		1.4		1.1		1.4		1.4		1.4		1.4		0.9		1.4		1.1		4.3		12.0		12.0		12.0		12.3		12.2		12.1		12.1		12.2		12.3		12.6
E	-30.00	HI27D3-3	min		-4.4		-4.7		-4.4		-4.4		-4.4		-4.4		-4.9		-4.4		-4.7		-3.4		-0.9		-0.9		-0.9		-0.8		-0.8		-2.0		-2.0		-2.0		-2.0		0.7
E	-30.00	HI27D3A1	max	-0.4		-2.6		-2.6		-2.6		-2.6		-2.6		-2.6		-2.6		-2.6		-2.6																					
E	-30.00	HI27D3A1	min	-8.3		-8.4		-8.4		-8.4		-8.4		-8.4		-8.4		-8.4		-8.4		-8.4																					
E	-30.00	HI27D3A2	max																					2.8		3.1		3.1		3.1		1.8		3.0		1.8		3.0		1.6		3.1	
E	-30.00	HI27D3A2	min																					-6.2		-7.6		-7.6		-7.6		-7.6		-7.6		-7.6		-7.6		-9.1		-7.6	
E	-30.00	HI27D3A3	max		-4.3		-4.6		-4.3		-4.3		-4.3		-4.3		-4.8		-4.3		-4.6		-5.2		6.9		6.9		6.9		3.4		3.3		3.3		3.3		7.8		8.0		8.1
E	-30.00	HI27D3A3	min		-9.9		-10.2		-9.9		-9.9		-9.9		-9.9		-10.4		-9.9		-10.2		-9.8		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-4.0
E	-30.00	HI27D3B1	max	-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6																					
E	-30.00	HI27D3B1	min	-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6																					
E	-30.00	HI27D3B2	max																					-6.1		-9.1		-9.1		-9.1		-9.1		-9.1		-9.4		-9.1		-10.9		-9.1	
E	-30.00	HI27D3B2	min																					-6.1		-9.1		-9.1		-9.1		-9.1		-9.1		-9.4		-9.1		-10.9		-9.1	
E	-30.00	HI27D3B3	max		-8.9		-9.2		-8.9		-8.9		-8.9		-8.9		-9.4		-8.9		-9.2		-6.0		-1.8		-1.8		-1.8		-1.8		-1.8		-4.0		-4.0		-4.0		-4.0		-1.8
E	-30.00	HI27D3B3	min		-8.9		-9.2		-8.9		-8.9		-8.9		-8.9		-9.4		-8.9		-9.2		-6.0		-1.8		-1.8		-1.8		-1.8		-1.8		-4.0		-4.0		-4.0		-4.0		-1.8
E	-30.00	HI33D3-1	max	7.9		7.7		7.7		7.7		7.7		7.7		7.7		7.7		7.7		7.7																					
E	-30.00	HI33D3-1	min	-3.2		-3.7		-3.7		-3.7		-3.7		-3.7		-3.7		-3.7		-3.7		-3.7																					
E	-30.00	HI33D3-2	max																					5.5		5.1		5.1		5.1		5.1		5.0		5.1		5.0		3.6		5.1	
E	-30.00	HI33D3-2	min																					-4.5		-6.0		-6.0		-6.0		-6.0		-6.0		-6.3		-6.0		-7.7		-6.0	
E	-30.00	HI33D3-3	max		0.0		-0.3		0.0		0.0		0.0		0.0		-0.5		0.0		-0.3		2.9		11.8		11.8		11.8		12.1		11.9		11.9		11.9		11.9		12.2		12.5
E	-30.00	HI33D3-3	min		-5.1		-5.4		-5.1		-5.1		-5.1		-5.1		-5.6		-5.1		-5.4		-3.9		-1.7		-1.7		-1.7		-1.7		-1.7		-3.0		-3.1		-3.0		-3.0		0.1
E	-30.00	HI33D3A1	max	-1.4		-3.3		-3.3		-3.3		-3.3		-3.3		-3.3		-3.3		-3.3		-3.3																					
E	-30.00	HI33D3A1	min	-8.3		-8.5		-8.5		-8.5		-8.5		-8.5		-8.5		-8.5		-8.5		-8.5																					
E	-30.00	HI33D3A2	max																					1.4		1.7		1.7		1.7		0.8		1.7		0.8		1.7		0.3		1.8	
E	-30.00	HI33D3A2	min																					-7.3		-8.8		-8.8		-8.8		-8.8		-8.8		-8.8		-8.8		-10.3		-8.8	

1	2	3	4	5 (Channel number)																																							
Admin. symbol	Orbital position	Beam Identificat.	EPM	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	29	30	31	32	33	34	35	36	37	38	39	40
E	-30.00	HI33D3A3	max		-5.5		-5.8		-5.5		-5.5		-5.5		-5.5		-6.0		-5.5		-5.8		-6.4		6.8		6.8		6.8		2.4		2.3		2.3		2.3		7.6		7.9		8.1
E	-30.00	HI33D3A3	min		-10.0		-10.3		-10.0		-10.0		-10.0		-10.0		-10.5		-10.0		-10.3		-9.9		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-5.0
E	-30.00	HI33D3B1	max	-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6																					
E	-30.00	HI33D3B1	min	-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6		-0.6																					
E	-30.00	HI33D3B2	max																					-7.5		-10.5		-10.5		-10.5		-10.5		-10.5		-10.7		-10.5		-12.2		-10.5	
E	-30.00	HI33D3B2	min																					-7.5		-10.5		-10.5		-10.5		-10.5		-10.5		-10.7		-10.5		-12.2		-10.5	
E	-30.00	HI33D3B3	max		-10.3		-10.6		-10.3		-10.3		-10.3		-10.3		-10.8		-10.3		-10.6		-7.4		-1.8		-1.8		-1.8		-1.8		-1.8		-4.7		-4.7		-4.7		-4.7		-1.8
E	-30.00	HI33D3B3	min		-10.3		-10.6		-10.3		-10.3		-10.3		-10.3		-10.8		-10.3		-10.6		-7.4		-1.8		-1.8		-1.8		-1.8		-1.8		-4.7		-4.7		-4.7		-4.7		-1.8
E	-30.00	HISPAS2D	max	13.0		12.9		12.9		12.9		12.9		12.9		12.9		12.9		12.9		12.9																					
E	-30.00	HISPAS2D	min	3.1		0.4		0.4		0.4		0.4		0.4		0.4		0.4		0.4		0.4																					
E	-30.00	HISPASA2	max	12.9		12.8		12.8		12.8		12.8		12.8		12.8		12.8		12.8		12.8																					
E	-30.00	HISPASA2	min	2.5		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2																					
EGY	-7.00	D33NI1S1	max			13.4		13.4		13.4		13.4		13.4		13.4		13.4		13.4		13.4																					
EGY	-7.00	D33NI1S1	min			3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3																					
EGY	-7.00	D33NI1S2	max		12.3		12.6		12.3		12.6		12.4		12.6		12.4		12.6		12.4																						
EGY	-7.00	D33NI1S2	min		2.6		2.6		2.6		2.6		2.6		2.7		2.6		2.7		2.6																						
F	-7.00	F5_27D11	max	21.0				19.6				19.7				20.2				20.2																							
F	-7.00	F5_27D11	min	1.9				1.8				1.9				6.2				6.2																							
F	-7.00	F5_27D12	max		17.1				17.1				17.2				17.4				17.3																						
F	-7.00	F5_27D12	min		2.5				2.5				2.7				2.7				2.6																						
F	-7.00	F5_27D13	max			19.6				19.6				19.6				20.1				20.1																					
F	-7.00	F5_27D13	min			1.8				1.8				1.8				5.9				5.9																					
F	-7.00	F5_27D14	max				18.8				18.8				18.9				19.1				6.2																				
F	-7.00	F5_27D14	min				4.3				4.3				6.4				8.5				4.0																				
F	-7.00	F5_27D15	max																								4.3				4.3				4.3				4.3				5.2
F	-7.00	F5_27D15	min																								-0.5				-0.5				-0.5				-0.5				0.0
F	-7.00	F5_33D11	max	19.8				18.3				18.3				18.8				18.7																							
F	-7.00	F5_33D11	min	1.8				1.7				1.8				4.9				4.8																							
F	-7.00	F5_33D12	max		16.9				16.9				17.0				17.2				17.2																						
F	-7.00	F5_33D12	min		2.0				2.0				2.1				2.4				2.3																						
F	-7.00	F5_33D13	max			18.2				18.2				18.3				18.7				18.7																					
F	-7.00	F5_33D13	min			1.6				1.6				1.7				4.6				4.5																					
F	-7.00	F5_33D14	max				18.6				18.6				18.7				18.9				5.0																				
F	-7.00	F5_33D14	min				2.9				2.9				5.1				7.6				2.9																				
F	-7.00	F5_33D15	max																								3.7				3.7				3.7				3.7				4.8
F	-7.00	F5_33D15	min																								-0.9				-0.8				-0.8				-0.8				-0.2
F	-7.00	F93D2755	max																					3.0				4.2				4.2				4.2				4.2			
F	-7.00	F93D2755	min																					0.3				0.4				0.4				0.4				0.4			
F	-7.00	F93D2756	max																						4.1				4.3				4.3				4.3				4.3		
F	-7.00	F93D2756	min																						-1.6				-0.5				-0.5				-0.5				-0.5		
F	-7.00	F93D2757	max																							4.1				4.1				4.1				4.1				4.1	
F	-7.00	F93D2757	min																							-0.1				0.2				0.2				0.2				0.2	
F	-7.00	F93D3355	max																					2.3				3.7				3.7				3.7				3.7			

1	2	3	4	5 (Channel number)																																							
Admin. symbol	**Orbital position**	**Beam Identificat.**	**EPM**	**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**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
F	-7.00	F93D3355	min																					-0.5				-0.5				-0.4				-0.4				-0.4			
F	-7.00	F93D3356	max																						3.5				3.7				3.7				3.7				3.7		
F	-7.00	F93D3356	min																						-1.8				-0.8				-0.8				-0.8				-0.8		
F	-7.00	F93D3357	max																							3.5				3.6				3.6				3.6				3.6	
F	-7.00	F93D3357	min																							-1.0				-0.5				-0.5				-0.5				-0.5	
F/EUT	13.00	E127ASCA	max	12.2		11.6		12.2		12.2		12.2		12.2		12.2		12.2		12.2		11.6		7.7		7.6		7.6		7.6		7.6		7.6		7.6		7.6		7.6		7.6	
F/EUT	13.00	E127ASCA	min	0.6		-0.2		-0.4		-0.2		-0.4		-0.2		-0.4		-0.3		-0.4		-0.2		-0.8		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1	
F/EUT	13.00	E127ASCB	max		10.5		11.5		12.7		12.8		12.7		12.8		12.8		12.8		11.5		9.3		8.0		8.0		8.0		8.0		8.0		8.0		8.0		8.0		8.0		9.9
F/EUT	13.00	E127ASCB	min		0.0		-1.1		-0.7		-1.8		-0.7		-1.4		-0.8		-1.4		-0.1		-0.3		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3		-5.3
F/EUT	13.00	E127ASWA	max	6.5		5.4		6.3		5.8		6.2		5.8		6.1		5.8		6.0		5.4		4.2		4.7		4.4		4.8		4.3		4.6		4.3		4.8		4.3		4.6	
F/EUT	13.00	E127ASWA	min	0.4		-0.2		-0.6		-0.4		-0.6		-0.5		-0.7		-0.5		-0.7		-0.3		-0.8		-1.8		-1.9		-1.8		-2.2		-2.1		-1.9		-1.8		-1.9		-2.0	
F/EUT	13.00	E127ASWB	max		5.4		6.1		7.0		7.0		7.0		7.0		7.0		7.0		6.1		5.4		3.4		3.3		3.4		3.3		3.3		3.4		3.2		3.4		3.2		5.7
F/EUT	13.00	E127ASWB	min		0.4		-3.1		-0.9		-3.7		-0.9		-2.9		-0.9		-2.9		-0.2		-2.1		-4.0		-4.0		-4.0		-4.0		-4.3		-4.0		-4.0		-4.0		-4.0		-5.4
F/EUT	13.00	E127ASZA	max	5.3		5.0		5.4		5.5		5.4		5.5		5.4		5.4		5.4		4.9		1.2		1.7		1.3		1.6		0.9		1.2		1.3		1.6		1.3		1.2	
F/EUT	13.00	E127ASZA	min	1.0		-0.2		-1.0		-1.1		-1.1		-1.1		-1.5		-1.5		-1.5		-0.8		-1.2		-2.0		-2.0		-2.0		-2.8		-2.8		-2.4		-2.3		-2.4		-2.6	
F/EUT	13.00	E127ASZB	max		4.0		4.9		6.0		6.0		6.0		6.0		6.0		6.0		4.9		4.0		0.6		-0.2		0.5		-0.2		-1.3		-0.1		-0.3		-0.1		-0.4		-0.7
F/EUT	13.00	E127ASZB	min		0.5		-3.3		-1.9		-4.1		-1.9		-3.4		-2.1		-3.5		-1.0		-2.3		-4.1		-4.1		-4.1		-4.1		-4.6		-4.1		-4.1		-4.1		-4.1		-5.8
F/EUT	13.00	E127DSCA	max	16.2		15.6		16.2		16.2		16.2		16.2		16.2		16.2		16.2		15.6		11.7		9.6		11.6		9.6		11.6		9.6		11.6		9.6		11.6		9.6	
F/EUT	13.00	E127DSCA	min	4.6		3.8		3.6		3.8		3.6		3.8		3.6		3.7		3.6		3.8		3.2		-0.1		1.9		-0.1		1.9		-0.1		1.9		-0.1		1.9		-0.1	
F/EUT	13.00	E127DSCB	max		14.5		15.5		16.7		16.8		16.7		16.8		16.8		16.8		15.5		13.3		10.0		10.0		10.0		10.0		10.0		10.0		10.0		10.0		10.0		11.9
F/EUT	13.00	E127DSCB	min		4.0		2.9		3.3		2.2		3.3		2.6		3.3		2.6		3.9		3.7		-2.3		-2.3		-2.3		-2.3		-2.3		-2.3		-2.3		-2.3		-2.3		-3.3
F/EUT	13.00	E127DSWA	max	7.1		6.0		6.9		6.4		6.8		6.4		6.7		6.4		6.6		6.0		4.8		5.3		5.0		5.4		4.9		5.2		4.9		5.4		4.9		5.2	
F/EUT	13.00	E127DSWA	min	1.0		0.4		0.0		0.2		0.0		0.1		-0.1		0.1		-0.1		0.3		-0.2		-1.2		-1.3		-1.2		-1.6		-1.5		-1.3		-1.2		-1.3		-1.4	
F/EUT	13.00	E127DSWB	max		6.0		6.7		7.6		7.6		7.6		7.6		7.6		7.6		6.7		6.0		4.0		3.9		4.0		3.9		3.9		4.0		3.8		4.0		3.8		6.3
F/EUT	13.00	E127DSWB	min		1.0		-2.5		-0.3		-3.1		-0.3		-2.3		-0.3		-2.3		0.4		-1.5		-3.4		-3.4		-3.4		-3.4		-3.7		-3.4		-3.4		-3.4		-3.4		-4.8
F/EUT	13.00	E127DSZA	max	8.9		8.6		9.0		9.1		9.0		9.1		9.0		9.0		9.0		8.5		4.8		3.8		4.9		3.7		4.5		3.3		4.9		3.7		4.9		3.3	
F/EUT	13.00	E127DSZA	min	4.6		3.4		2.6		2.6		2.6		2.5		2.2		2.1		2.1		2.8		2.4		0.1		1.6		0.1		0.8		-0.7		1.2		-0.2		1.2		-0.5	
F/EUT	13.00	E127DSZB	max		7.6		8.5		9.6		9.6		9.6		9.6		9.6		9.6		8.5		7.6		2.7		1.9		2.6		1.9		0.8		2.0		1.8		2.0		1.7		1.4
F/EUT	13.00	E127DSZB	min		4.1		0.3		1.7		-0.5		1.7		0.2		1.5		0.2		2.6		1.3		-2.0		-2.0		-2.0		-2.0		-2.5		-2.0		-2.0		-2.0		-2.0		-3.7
F/EUT	13.00	E133ASCA	max	11.9		11.2		11.8		11.8		11.8		11.8		11.8		11.8		11.8		11.2		7.5		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.3	
F/EUT	13.00	E133ASCA	min	-0.3		-1.5		-1.8		-1.8		-1.8		-1.8		-1.9		-1.9		-1.9		-1.6		-1.8		-3.3		-3.4		-3.3		-3.4		-3.3		-3.4		-3.3		-3.3		-3.6	
F/EUT	13.00	E133ASCB	max		9.0		10.2		12.0		12.0		12.0		12.0		12.0		12.0		10.2		7.8		6.6		6.6		6.6		6.6		6.6		6.6		6.6		6.6		6.6		8.8
F/EUT	13.00	E133ASCB	min		-1.0		-2.3		-2.4		-3.2		-2.4		-2.9		-2.5		-2.9		-1.5		-1.5		-4.6		-4.6		-4.6		-4.6		-4.6		-4.5		-4.6		-4.5		-4.6		-5.3
F/EUT	13.00	E133ASWA	max	5.9		5.2		5.6		5.5		5.5		5.5		5.5		5.5		5.5		5.2		3.7		4.2		3.9		4.2		3.9		4.0		3.9		4.3		3.9		4.0	
F/EUT	13.00	E133ASWA	min	-0.3		-1.7		-2.0		-1.9		-2.0		-2.0		-2.1		-2.0		-2.1		-1.8		-1.9		-3.1		-3.1		-3.1		-3.4		-3.3		-3.1		-3.1		-3.1		-3.9	
F/EUT	13.00	E133ASWB	max		3.9		4.8		6.0		6.0		6.0		6.0		6.0		6.0		4.8		3.9		2.1		1.6		2.1		1.6		1.6		1.7		1.6		1.7		1.5		4.2
F/EUT	13.00	E133ASWB	min		-0.8		-3.8		-2.6		-4.6		-2.6		-4.0		-2.6		-4.0		-1.6		-2.7		-4.3		-4.3		-4.3		-4.3		-4.6		-4.3		-4.3		-4.3		-4.3		-5.5
F/EUT	13.00	E133ASZA	max	5.0		4.6		5.0		5.0		5.0		5.0		5.0		5.0		5.0		4.5		0.4		0.7		0.4		0.7		-0.1		0.2		0.4		0.7		0.4		-0.1	
F/EUT	13.00	E133ASZA	min	0.3		-2.3		-2.8		-2.8		-2.8		-2.8		-3.3		-3.3		-3.3		-2.8		-2.3		-3.2		-3.2		-3.2		-4.0		-3.9		-3.9		-3.8		-3.9		-4.6	
F/EUT	13.00	E133ASZB	max		2.5		3.5		5.0		5.0		5.0		5.0		5.0		5.0		3.5		2.4		-0.4		-1.0		-0.5		-1.0		-2.2		-1.0		-1.1		-0.9		-1.1		-1.2
F/EUT	13.00	E133ASZB	min		-0.9		-4.1		-3.7		-5.3		-3.7		-4.8		-3.8		-4.8		-2.5		-2.9		-4.4		-4.4		-4.4		-4.4		-4.9		-4.4		-4.5		-4.4		-4.5		-5.9
F/EUT	13.00	E133DSCA	max	15.9		15.2		15.8		15.8		15.8		15.8		15.8		15.8		15.8		15.2		11.5		9.4		11.4		9.4		11.4		9.4		11.4		9.4		11.4		9.3	
F/EUT	13.00	E133DSCA	min	3.7		2.5		2.2		2.2		2.2		2.2		2.1		2.1		2.1		2.5		2.2		-1.3		0.7		-1.3		0.7		-1.3		0.7		-1.3		0.7		-1.6	

1	2	3	4	5 (Channel number)																																							
Admin. symbol	**Orbital position**	**Beam Identificat.**	**EPM**	**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**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
F/EUT	13.00	E133DSCB	max		13.0		14.2		16.0		16.0		16.0		16.0		16.0		16.0		14.2		11.8		8.6		8.6		8.6		8.6		8.6		8.6		8.6		8.6		8.6		10.8
F/EUT	13.00	E133DSCB	min		3.0		1.7		1.6		0.8		1.6		1.1		1.5		1.1		2.5		2.5		-2.6		-2.6		-2.6		-2.6		-2.6		-2.5		-2.6		-2.5		-2.6		-3.3
F/EUT	13.00	E133DSWA	max	6.5		5.8		6.2		6.1		6.1		6.1		6.1		6.1		6.1		5.8		4.3		4.8		4.5		4.8		4.5		4.6		4.5		4.9		4.5		4.6	
F/EUT	13.00	E133DSWA	min	0.3		-1.1		-1.4		-1.3		-1.4		-1.4		-1.5		-1.4		-1.5		-1.2		-1.3		-2.5		-2.5		-2.5		-2.8		-2.7		-2.5		-2.5		-2.5		-3.3	
F/EUT	13.00	E133DSWB	max		4.5		5.4		6.6		6.6		6.6		6.6		6.6		6.6		5.4		4.5		2.7		2.2		2.7		2.2		2.2		2.3		2.2		2.3		2.1		4.8
F/EUT	13.00	E133DSWB	min		-0.2		-3.2		-2.0		-4.0		-2.0		-3.4		-2.0		-3.4		-1.0		-2.1		-3.7		-3.7		-3.7		-3.7		-4.0		-3.7		-3.7		-3.7		-3.7		-4.9
F/EUT	13.00	E133DSZA	max	8.6		8.2		8.6		8.6		8.6		8.6		8.6		8.6		8.6		8.1		4.0		2.8		4.0		2.8		3.5		2.3		4.0		2.8		4.0		2.1	
F/EUT	13.00	E133DSZA	min	3.9		1.3		0.8		0.8		0.8		0.8		0.3		0.3		0.3		0.8		1.3		-1.1		0.4		-1.1		-0.4		-1.8		-0.3		-1.7		-0.3		-2.5	
F/EUT	13.00	E133DSZB	max		6.1		7.1		8.6		8.6		8.6		8.6		8.6		8.6		7.1		6.0		1.7		1.1		1.6		1.1		-0.1		1.1		1.0		1.2		1.0		0.9
F/EUT	13.00	E133DSZB	min		2.7		-0.5		-0.1		-1.7		-0.1		-1.2		-0.2		-1.2		1.1		0.7		-2.3		-2.3		-2.3		-2.3		-2.8		-2.3		-2.4		-2.3		-2.4		-3.8
KOR	113.00	KO11202D	max		-21.6		-21.6		-21.6		-21.7		-21.2		-21.2																												
KOR	113.00	KO11202D	min		-22.4		-22.4		-22.4		-22.5		-22.0		-22.0																												
LAO	116.00	LST3CELD	max		2.4		2.4		2.4		2.2		2.2		2.3		3.6		3.6		3.6		3.6		3.6		3.7																
LAO	116.00	LST3CELD	min		-3.2		-3.2		-3.2		-3.4		-3.4		-3.3		-1.9		-1.9		-1.9		-1.9		-1.9		-1.7																
LAO	116.00	LST3COLD	max	5.1		3.2		3.2		3.1		2.9		3.1		3.8		4.0		4.0		4.0		4.0		4.0																	
LAO	116.00	LST3COLD	min	-0.9		-2.5		-2.5		-2.5		-2.7		-2.6		-1.9		-1.6		-1.6		-1.6		-1.6		-1.6																	
LAO	116.00	LST3EELD	max		1.2		1.2		1.2		1.1		1.1		1.1		6.2		6.2		6.3		6.3		6.3		6.7																
LAO	116.00	LST3EELD	min		-2.6		-2.6		-2.6		-2.8		-2.8		-2.7		1.2		1.3		1.5		1.5		1.5		1.8																
LAO	116.00	LST3EOLD	max	4.7		2.3		2.3		2.3		2.2		2.2		3.9		6.4		6.7		6.7		6.7		6.7																	
LAO	116.00	LST3EOLD	min	0.6		-1.6		-1.6		-1.7		-1.9		-1.8		-0.2		1.2		1.8		1.8		1.8		1.8																	
LAO	116.00	LST3NEL1	max		-9.8		-10.5		-10.3		-6.8		-6.8		-8.8		-1.2		-1.2		-1.2		-1.2		-1.2		-0.9																
LAO	116.00	LST3NEL1	min		-31.7		-32.4		-32.2		-28.8		-28.8		-30.8		-17.9		-17.9		-17.9		-17.9		-17.9		-17.8																
LAO	116.00	LST3NOL1	max	-7.1		-9.7		-9.7		-8.8		-6.3		-8.3		-7.5		-1.2		-1.2		-1.2		-1.2		-1.2																	
LAO	116.00	LST3NOL1	min	-26.3		-30.8		-30.8		-29.8		-27.4		-29.4		-27.2		-16.9		-16.9		-16.9		-16.9		-16.9																	
LAO	116.00	LST3WELD	max		5.6		5.7		5.7		5.2		5.2		5.5		6.2		6.2		6.2		6.2		6.2		6.3																
LAO	116.00	LST3WELD	min		-1.8		-1.7		-1.7		-2.0		-2.0		-1.8		-0.9		-0.9		-0.9		-0.9		-0.9		-0.8																
LAO	116.00	LST3WOLD	max	7.3		6.3		6.3		6.2		5.8		6.1		6.9		6.2		6.2		6.2		6.2		6.2																	
LAO	116.00	LST3WOLD	min	-0.5		-1.2		-1.2		-1.3		-1.5		-1.3		-0.7		-0.8		-0.8		-0.8		-0.8		-0.8																	
LAO	126.00	LST4CELD	max		3.5		3.2		3.2		3.2		3.2		3.2		3.2		3.0		3.0		3.0		3.0		3.1																
LAO	126.00	LST4CELD	min		-3.6		-3.8		-3.8		-3.8		-3.8		-3.8		-3.8		-3.8		-3.8		-3.8		-3.8		-3.7																
LAO	126.00	LST4COLD	max	4.1		3.2		3.2		3.2		3.2		3.2		3.2		3.0		3.0		3.0		3.0		3.0																	
LAO	126.00	LST4COLD	min	-2.0		-3.3		-3.3		-3.3		-3.3		-3.3		-3.3		-3.4		-3.4		-3.4		-3.4		-3.4																	
LAO	126.00	LST4EELD	max		8.3		8.0		8.0		8.0		8.0		8.0		8.0		7.8		7.8		7.8		7.8		8.3																
LAO	126.00	LST4EELD	min		4.4		4.3		4.3		4.3		4.3		4.3		4.2		3.9		3.9		3.9		3.9		4.1																
LAO	126.00	LST4EOLD	max	8.6		8.1		8.0		8.0		8.0		8.0		8.0		7.8		7.8		7.8		7.8		7.8																	
LAO	126.00	LST4EOLD	min	4.5		4.3		4.2		4.2		4.2		4.2		4.2		3.9		3.9		3.9		3.9		3.9																	
LAO	126.00	LST4NELD	max		2.1		2.0		2.0		2.0		2.0		2.0		2.0		2.8		2.8		2.8		2.8		3.2																
LAO	126.00	LST4NELD	min		-8.5		-8.6		-8.6		-8.6		-8.6		-8.6		-8.6		-7.8		-7.8		-7.8		-7.8		-7.6																
LAO	126.00	LST4NOLD	max	2.4		2.0		2.0		2.0		2.0		2.0		2.0		2.8		2.8		2.8		2.8		2.8																	
LAO	126.00	LST4NOLD	min	-8.5		-8.6		-8.6		-8.6		-8.6		-8.6		-8.6		-7.8		-7.8		-7.8		-7.8		-7.8																	
LAO	126.00	LST4WELD	max		4.4		6.4		6.4		6.4		6.4		6.4		6.4		6.1		6.1		6.1		6.1		6.3																
LAO	126.00	LST4WELD	min		-4.7		-2.7		-2.7		-2.7		-2.7		-2.7		-2.7		-2.9		-2.9		-2.9		-2.9		-2.8																
LAO	126.00	LST4WOLD	max	6.5		6.4		6.4		6.4		6.4		6.4		6.4		6.1		6.1		6.1		6.1		6.1																	

1	2	3	4	5 (Channel number)																																							
Admin. symbol	**Orbital position**	**Beam Identificat.**	**EPM**	**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**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
LAO	126.00	LST4WOLD	min	-2.7		-2.8		-2.8		-2.8		-2.8		-2.8		-2.8		-2.9		-2.9		-2.9		-2.9		-2.9																	
LUX	19.20	D33THN13	max	-6.2				-9.3				-9.3				-9.4				-9.4				-8.6				-8.3				-8.4				-8.6				-8.6			
LUX	19.20	D33THN13	min	-24.8				-27.4				-27.5				-27.6				-27.7				-24.3				-23.8				-23.8				-23.8				-23.8			
LUX	19.20	D33THN14	max	-3.4				-6.0				-6.0				-6.1				-6.1				-5.6				-5.3				-5.4				-5.6				-5.6			
LUX	19.20	D33THN14	min	-16.6				-19.2				-19.3				-19.4				-19.5				-17.3				-17.6				-17.6				-17.6				-17.6			
LUX	19.20	D33THN1C	max	10.3				8.2				8.2				8.1				8.1				8.4				8.8				8.7				8.6				8.5			
LUX	19.20	D33THN1C	min	-2.3				-4.7				-4.8				-4.9				-5.0				-2.3				-1.4				-1.4				-1.5				-1.5			
LUX	19.20	D33THN1I	max	-1.8				-4.1				-4.1				-4.2				-4.2				-3.8				-3.5				-3.5				-3.7				-3.7			
LUX	19.20	D33THN1I	min	-13.2				-15.6				-15.7				-15.8				-15.9				-13.4				-12.4				-12.5				-12.5				-12.5			
LUX	19.20	D33THP13	max			-9.5				-9.5				-9.5				-9.6				-9.5																					
LUX	19.20	D33THP13	min			-28.1				-28.2				-28.3				-28.4				-28.5																					
LUX	19.20	D33THP14	max			-5.8				-5.8				-5.8				-5.9				-5.9																					
LUX	19.20	D33THP14	min			-19.9				-20.0				-20.1				-20.2				-20.2																					
LUX	19.20	D33THP1C	max			8.3				8.3				8.3				8.2				8.2																					
LUX	19.20	D33THP1C	min			-5.4				-5.5				-5.6				-5.7				-5.8																					
LUX	19.20	D33THP1I	max			-3.9				-3.9				-3.9				-4.0				-4.0																					
LUX	19.20	D33THP1I	min			-16.3				-16.4				-16.5				-16.6				-16.7																					
LUX	19.20	D33THP23	max																							-12.3				-12.2				-12.5				-12.6				-12.6	
LUX	19.20	D33THP23	min																							-28.6				-28.5				-28.5				-28.5				-28.5	
LUX	19.20	D33THP24	max																							-8.7				-8.6				-8.8				-8.9				-8.8	
LUX	19.20	D33THP24	min																							-22.5				-22.2				-22.3				-22.3				-22.2	
LUX	19.20	D33THP2C	max																							5.6				5.7				5.5				5.4				5.5	
LUX	19.20	D33THP2C	min																							-6.3				-5.8				-5.9				-5.9				-5.9	
LUX	19.20	D33THP2I	max																							-6.7				-6.6				-6.8				-6.9				-6.8	
LUX	19.20	D33THP2I	min																							-17.4				-16.8				-16.9				-16.9				-16.9	
LUX	19.20	D33TVN13	max		-10.2				-8.7				-8.7				-8.7				-8.7																						
LUX	19.20	D33TVN13	min		-24.5				-24.4				-24.5				-24.6				-24.6																						
LUX	19.20	D33TVN14	max		-6.7				-5.6				-5.6				-5.7				-5.7																						
LUX	19.20	D33TVN14	min		-17.2				-16.8				-16.9				-17.0				-17.0																						
LUX	19.20	D33TVN1C	max		7.9				8.8				8.8				8.7				8.7																						
LUX	19.20	D33TVN1C	min		-2.7				-2.4				-2.5				-2.6				-2.7																						
LUX	19.20	D33TVN1I	max		-4.6				-3.6				-3.6				-3.7				-3.7																						
LUX	19.20	D33TVN1I	min		-14.1				-13.7				-13.7				-13.8				-13.9																						
LUX	19.20	D33TVN23	max																						-12.1				-12.2				-12.4				-12.5				-12.3		
LUX	19.20	D33TVN23	min																						-27.7				-27.5				-27.6				-27.6				-27.4		
LUX	19.20	D33TVN24	max																						-9.1				-9.1				-9.3				-9.3				-9.2		
LUX	19.20	D33TVN24	min																						-21.8				-21.3				-21.3				-21.4				-21.2		
LUX	19.20	D33TVN2C	max																						5.4				5.4				5.3				5.2				5.3		
LUX	19.20	D33TVN2C	min																						-5.7				-5.1				-5.2				-5.2				-5.0		
LUX	19.20	D33TVN2I	max																						-7.0				-7.1				-7.2				-7.2				-7.1		
LUX	19.20	D33TVN2I	min																						-17.0				-16.2				-16.3				-16.3				-16.1		
LUX	19.20	D33TVP13	max				-8.8				-8.8				-8.8				-8.8				-8.6																				
LUX	19.20	D33TVP13	min				-24.7				-24.8				-24.9				-25.0				-24.3																				

1	2	3	4	5 (Channel number)																																							
Admin. symbol	Orbital position	Beam Identificat.	EPM	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	29	30	31	32	33	34	35	36	37	38	39	40
LUX	19.20	D33TVP14	max				-5.9				-5.9				-5.9				-5.9				-5.7																				
LUX	19.20	D33TVP14	min				-17.1				-17.2				-17.3				-17.4				-16.8																				
LUX	19.20	D33TVP1C	max				8.5				8.5				8.5				8.4				8.5																				
LUX	19.20	D33TVP1C	min				-2.8				-2.8				-2.9				-3.0				-2.5																				
LUX	19.20	D33TVP1I	max				-3.9				-3.9				-3.9				-4.0				-3.9																				
LUX	19.20	D33TVP1I	min				-14.0				-14.1				-14.2				-14.2				-13.8																				
LUX	19.20	D33TVP23	max																								-12.2				-12.1				-12.1				-12.3				-9.7
LUX	19.20	D33TVP23	min																								-27.9				-27.9				-27.9				-29.5				-29.1
LUX	19.20	D33TVP24	max																								-9.1				-9.0				-9.0				-9.1				-6.9
LUX	19.20	D33TVP24	min																								-21.8				-21.7				-21.7				-23.1				-22.6
LUX	19.20	D33TVP2C	max																								5.3				5.4				5.4				5.4				7.3
LUX	19.20	D33TVP2C	min																								-5.6				-5.5				-5.5				-6.8				-6.2
LUX	19.20	D33TVP2I	max																								-7.1				-7.0				-7.0				-7.0				-5.1
LUX	19.20	D33TVP2I	min																								-16.8				-16.6				-16.6				-17.7				-16.9
LUX	28.20	D3128HI1	max	4.9		3.8		3.8		3.7		3.7		3.7		3.6		3.6		3.6		3.6		4.4		8.0																	
LUX	28.20	D3128HI1	min	-21.4		-22.2		-22.1		-22.1		-22.1		-22.0		-22.0		-22.1		-22.1		-22.1		-22.0		-21.8																	
LUX	28.20	D3128HI4	max	11.4		11.0		10.9		10.8		10.8		10.7		10.6		10.6		10.5		10.5		12.6		13.8																	
LUX	28.20	D3128HI4	min	-5.0		-6.4		-6.4		-6.4		-6.4		-6.3		-6.4		-6.4		-6.4		-6.5		-6.2		-5.8																	
LUX	28.20	D3128VI1	max		3.6		3.9		4.0		3.9		4.0		3.9		4.0		3.9		4.0		4.1		6.6																		
LUX	28.20	D3128VI1	min		-22.5		-22.2		-22.1		-22.1		-22.0		-22.0		-22.0		-22.1		-22.1		-22.1		-21.8																		
LUX	28.20	D3128VI4	max		11.2		11.1		11.2		11.1		11.2		11.1		11.2		11.1		11.2		12.1		12.7																		
LUX	28.20	D3128VI4	min		-7.2		-6.4		-6.4		-6.4		-6.3		-6.3		-6.3		-6.4		-6.4		-6.3		-5.9																		
LUX	28.20	D3228HI1	max																									4.4		6.6		4.3		6.6		4.3		6.3		4.1		6.3	
LUX	28.20	D3228HI1	min																									-21.8		-21.8		-21.8		-21.8		-21.8		-21.8		-21.7		-21.6	
LUX	28.20	D3228HI4	max																									11.6		12.9		11.6		12.9		11.6		12.8		11.5		12.8	
LUX	28.20	D3228HI4	min																									-5.8		-5.8		-5.8		-5.8		-5.8		-5.8		-5.8		-5.7	
LUX	28.20	D3228VI1	max																								5.7		5.3		5.4		5.3		5.4		5.2		5.1		5.2		7.4
LUX	28.20	D3228VI1	min																								-21.8		-21.8		-21.8		-21.8		-21.8		-21.8		-21.8		-21.7		-21.2
LUX	28.20	D3228VI4	max																								12.0		11.8		12.0		11.8		12.0		11.8		11.9		11.9		13.2
LUX	28.20	D3228VI4	min																								-5.9		-5.9		-5.9		-5.9		-5.9		-5.9		-5.8		-5.8		-4.9
NOR	-0.80	BIFROS21	max																							0.2				0.4				-1.5				0.2				-1.4	
NOR	-0.80	BIFROS21	min																							-31.4				-31.2				-33.2				-31.6				-33.0	
NOR	-0.80	BIFROS22	max		1.2				1.2				1.2				2.9				3.1						3.5				3.3				3.1				3.3				1.5
NOR	-0.80	BIFROS22	min		-28.8				-28.8				-28.8				-29.0				-28.4						-28.1				-28.1				-28.1				-28.1				-29.6
NOR	-0.80	BIFROST	max				-1.5				-1.5				-0.2				0.4				1.2																				
NOR	-0.80	BIFROST	min				-11.0				-11.0				-10.1				-9.1				-8.5																				
RUS	36.00	RSTRBD11	max																									8.9				9.3				9.3				9.3			
RUS	36.00	RSTRBD11	min																									-0.8				-0.6				-0.6				-0.6			
RUS	36.00	RSTRBD12	max																										7.6				7.6				7.6				7.6		
RUS	36.00	RSTRBD12	min																										-1.3				-1.3				-1.3				-1.3		
RUS	56.00	RSTRBD21	max																											28.5				28.5				28.5				28.5	
RUS	56.00	RSTRBD21	min																											11.6				11.6				11.6				11.6	
RUS	56.00	RSTRBD22	max																												26.6				26.6				26.6				27.8

1	2	3	4	5 (Channel number)																																							
Admin. symbol	Orbital position	Beam Identificat.	EPM	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	29	30	31	32	33	34	35	36	37	38	39	40
RUS	56.00	RSTRBD22	min																												3.5				3.5				3.5				3.6
S	-13.00	SIRIUSW1	max				0.7				0.7				0.7				0.7				1.3																				
S	-13.00	SIRIUSW1	min				-5.5				-5.5				-5.5				-5.5				-5.4																				
S	5.00	S 13902	max																																								16.9
S	5.00	S 13902	min																																								11.7
S	5.00	SI2ADN2A	max																				5.5																				
S	5.00	SI2ADN2A	min																				-0.4																				
S	5.00	SI2ADN2D	max																				7.8																				
S	5.00	SI2ADN2D	min																				1.6																				
S	5.00	SI2ADS2A	max																			1.7																					
S	5.00	SI2ADS2A	min																			-3.5																					
S	5.00	SI2ADS2D	max																			4.3																					
S	5.00	SI2ADS2D	min																			-0.5																					
S	5.00	SI2ADS3A	max			1.7																		0.8																			
S	5.00	SI2ADS3A	min			-3.5																		-3.5																			
S	5.00	SI2ADS3D	max			4.2																		3.1																			
S	5.00	SI2ADS3D	min			-0.6																		-0.9																			
S	5.00	SI2DN1A	max		3.7				3.7				3.7																												
S	5.00	SI2DN1A	min		-35.4				-35.4				-35.4																												
S	5.00	SI2DN1D	max		5.5				5.5				5.5																												
S	5.00	SI2DN1D	min		-32.8				-32.8				-32.8																												
S	5.00	SI2DN2A	max																								2.3						6.9		6.8						6.9		9.7
S	5.00	SI2DN2A	min																								-1.9						-0.5		-1.9						-0.5		-1.0
S	5.00	SI2DN2D	max																								5.0						9.1		9.0						9.1		11.4
S	5.00	SI2DN2D	min																								-1.2						1.6		-1.2						1.6		-0.6
S	5.00	SI2DN3A	max																												2.3						6.9		6.8				
S	5.00	SI2DN3A	min																												-1.9						-0.5		-1.9				
S	5.00	SI2DN3D	max																												5.0						9.1		9.0				
S	5.00	SI2DN3D	min																												-1.2						1.6		-1.2				
S	5.00	SI2DS1A	max																											1.7								1.7					
S	5.00	SI2DS1A	min																											-4.1								-4.0					
S	5.00	SI2DS1D	max																											3.3								3.3					
S	5.00	SI2DS1D	min																											-2.8								-2.8					
S	5.00	SI2DS2A	max																													1.5		1.7		1.5				1.5		1.7	
S	5.00	SI2DS2A	min																													-4.0		-4.0		-4.0				-4.0		-4.0	
S	5.00	SI2DS2D	max																													3.3		3.3		3.3				3.3		3.3	
S	5.00	SI2DS2D	min																													-1.5		-2.1		-1.5				-1.5		-2.1	
S	5.00	SI2DS3A	max	3.4																						1.7		1.5															
S	5.00	SI2DS3A	min	-3.2																						-4.6		-4.0															
S	5.00	SI2DS3D	max	6.5																						3.3		3.3															
S	5.00	SI2DS3D	min	0.3																						-2.8		-1.5															
S	5.20	SI3NHA	max					4.1		4.1		4.1		4.1																													
S	5.20	SI3NHA	min					-35.7		-35.7		-35.7		-35.7																													

1	2	3	4	5 (Channel number)																																							
Admin. symbol	**Orbital position**	**Beam Identificat.**	**EPM**	**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**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
S	5.20	SI3NHAMD	max													4.1		4.1		4.1																							
S	5.20	SI3NHAMD	min													-1.4		-1.4		-1.4																							
S	5.20	SI3NHD	max					6.2		6.2		6.2		6.2																													
S	5.20	SI3NHD	min					-32.9		-32.9		-32.9		-32.9																													
S	5.20	SI3NHDMD	max													6.2		6.2		6.2																							
S	5.20	SI3NHDMD	min													0.6		0.6		0.6																							
S	5.20	SI3NVA	max				4.5				4.5				4.5		3.6		4.5		3.6																						
S	5.20	SI3NVA	min				-0.8				-0.8				-0.8		-2.1		-0.8		-2.1																						
S	5.20	SI3NVD	max				6.9				6.9				6.9		5.7		6.9		5.7																						
S	5.20	SI3NVD	min				1.3				1.3				1.3		-0.6		1.3		-0.6																						
S	5.20	SIRIUS01	max				10.7				10.7																																
S	5.20	SIRIUS01	min				6.0				6.0																																
S	5.20	SIRIUS02	max												9.2				9.2				9.0																				
S	5.20	SIRIUS02	min												4.5				4.5				4.0																				
TUR	42.00	TKBSSEED	max		10.6		10.6		10.6		10.6		10.6		10.6		10.6		10.6		10.6		11.4		10.3		5.2		4.2		4.0		4.2		4.0		4.2		4.0		4.2		4.5
TUR	42.00	TKBSSEED	min		3.4		3.4		3.4		3.4		3.4		3.4		3.4		3.4		3.4		3.7		1.1		-3.8		-2.0		-2.0		-2.0		-2.0		-2.0		-2.0		-2.0		-2.0
TUR	42.00	TKBSSWSD	max	-0.8		-2.5		-2.5		-2.5		-2.5		-2.5		-2.5		-2.5		-2.5		-2.5		0.9		3.2		2.9		2.4		2.7		2.4		2.7		2.4		2.7		2.4	
TUR	42.00	TKBSSWSD	min	-4.4		-5.8		-5.8		-5.8		-5.8		-5.8		-5.8		-5.8		-5.8		-5.8		-5.2		-5.2		-5.2		-5.2		-5.2		-5.2		-5.2		-5.2		-5.2		-5.2	
USA	41.00	US29H51D	max	12.7		11.8		11.8		11.8		11.8		11.8		11.8		11.8		11.8		11.8		11.8		11.9		12.1		12.2		12.2		12.2		12.2		12.2		12.2		12.2	
USA	41.00	US29H51D	min	11.9		11.0		11.0		11.0		11.0		11.0		11.0		11.0		11.0		11.0		10.9		11.0		11.2		11.3		11.3		11.3		11.3		11.3		11.3		11.3	
USA	41.00	US29H52D	max		11.3		11.3		11.3		11.3		11.3		11.3		11.3		11.3		11.3		11.3		6.1		6.2		6.3		6.3		6.3		6.3		6.3		6.3		6.3		6.6
USA	41.00	US29H52D	min		10.5		10.5		10.5		10.5		10.5		10.5		10.5		10.5		10.5		10.5		5.3		5.4		5.5		5.5		5.5		5.5		5.5		5.5		5.5		5.8
USA	132.00	US29R11D	max	7.4		6.9		6.9		6.9		6.9		6.9		6.9		6.9		6.9		6.9		6.9		6.9																			
USA	132.00	US29R11D	min	-6.0		-9.0		-9.0		-9.0		-9.0		-9.0		-9.0		-9.0		-9.0		-9.0		-9.0		-9.0																			
USA	132.00	US29R12D	max		2.5		2.5		2.5		2.5		2.5		2.5		2.5		2.5		2.5		2.5		2.5		5.3																
USA	132.00	US29R12D	min		-8.9		-8.9		-8.9		-8.9		-8.9		-8.9		-8.9		-8.9		-8.9		-8.9		-8.9		-6.0																
USA	149.00	US29M11D	max		18.1		16.2		18.1		16.2		18.1		18.3		21.9		18.3		21.9		18.3		21.9		18.5																
USA	149.00	US29M11D	min		13.0		12.2		13.0		12.2		13.0		16.5		19.2		16.5		19.2		16.5		19.2		16.7																
USA	149.00	US29M12D	max	7.6		17.1		7.6		17.1		7.6		17.1		20.4		17.1		20.4		17.1		20.4		17.1																	
USA	149.00	US29M12D	min	1.0		14.7		1.0		14.7		1.0		14.7		16.8		14.7		16.8		14.7		16.8		14.7																	
USA	149.00	US29M21D	max		7.6		7.6		7.6		7.6		7.6		20.8		21.8		20.8		21.8		20.8		21.8		20.9																
USA	149.00	US29M21D	min		0.6		0.7		0.6		0.7		0.6		11.4		11.5		11.4		11.5		11.4		11.5		11.4																
USA	149.00	US29M22D	max	10.1		20.1		9.9		20.1		9.9		20.1		22.0		20.1		22.0		20.1		22.0		20.1																	
USA	149.00	US29M22D	min	3.5		12.9		3.5		12.9		3.5		12.9		19.9		12.9		19.9		12.9		19.9		12.9																	
USA	149.00	US29M23D	max		2.6		2.6		2.6		2.6		2.6		13.3		13.4		13.3		13.4		13.3		13.4		13.3																
USA	149.00	US29M23D	min		-2.7		-3.4		-2.7		-3.4		-2.7		1.7		4.6		1.7		4.6		1.7		4.6		1.7																
USA	149.00	US29M24D	max	5.5		15.2		5.5		15.2		5.5		15.2		23.7		15.2		23.7		15.2		23.7		15.2																	
USA	149.00	US29M24D	min	0.7		1.0		-1.6		1.0		-1.6		1.0		2.1		1.0		2.1		1.0		2.1		1.0																	
USA	149.00	US29M25D	max		5.6		5.6		5.6		5.6		5.6		18.4		19.4		18.4		19.4		18.4		19.4		18.5																
USA	149.00	US29M25D	min		-0.5		-0.9		-0.5		-0.9		-0.5		6.2		8.9		6.2		8.9		6.2		8.9		6.2																
USA	149.00	US29M26D	max	3.9		18.6		3.8		18.6		3.8		18.6		21.3		18.6		21.3		18.6		21.3		18.6																	
USA	149.00	US29M26D	min	-2.0		5.7		-2.2		5.7		-2.2		5.7		11.3		5.7		11.3		5.7		11.3		5.7																	
USA	149.00	US29M31D	max		10.3		9.9		10.3		9.9		10.3		15.3		17.1		15.3		17.1		15.3		17.1		15.9																

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1	2	3	4	5 (Channel number)																																							
Admin. symbol	Orbital position	Beam Identificat.	EPM	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	29	30	31	32	33	34	35	36	37	38	39	40
USA	149.00	US29M31D	min		1.2		1.2		1.2		1.2		1.2		12.1		13.0		12.1		13.0		12.1		13.0		13.3																
USA	149.00	US29M32D	max	10.2		17.2		9.8		17.2		9.8		17.2		18.9		17.2		18.9		17.2		18.9		17.2																	
USA	149.00	US29M32D	min	0.6		14.6		0.6		14.6		0.6		14.6		16.6		14.6		16.6		14.6		16.6		14.6																	
USA	164.00	US29N11D	max		8.8		8.4		8.8		8.4		8.8		8.4		8.8		15.3		8.8		15.3		8.8		19.7																
USA	164.00	US29N11D	min		7.8		7.9		7.8		7.9		7.8		7.9		7.8		14.3		7.8		14.3		7.8		18.7																
USA	164.00	US29N12D	max	8.2		5.8		5.3		5.8		5.3		5.8		5.3		9.0		8.2		9.0		8.2		9.0																	
USA	164.00	US29N12D	min	7.5		5.0		4.5		5.0		4.5		5.0		4.5		8.5		7.5		8.5		7.5		8.5																	
USA	173.00	US29O11D	max		19.6		5.3		19.6		5.3		19.6		5.3		19.6		19.8		19.6		19.8		19.6		21.3																
USA	173.00	US29O11D	min		4.9		3.3		4.9		3.3		4.9		3.3		4.9		17.4		4.9		17.4		4.9		19.7																
USA	173.00	US29O12D	max	21.4		16.8		16.7		16.8		16.7		16.8		16.7		20.8		20.7		20.8		20.7		20.8																	
USA	173.00	US29O12D	min	8.8		10.2		8.1		10.2		8.1		10.2		8.1		11.3		8.7		11.3		8.7		11.3																	
USA	173.00	US29O21D	max		15.0		12.9		15.0		12.9		15.0		12.9		15.0		20.7		15.0		20.7		15.0		22.5																
USA	173.00	US29O21D	min		8.2		7.5		8.2		7.5		8.2		7.5		8.2		8.7		8.2		8.7		8.2		9.5																
USA	173.00	US29O22D	max	16.5		9.1		10.0		9.1		10.0		9.1		10.0		15.9		16.2		15.9		16.2		15.9																	
USA	173.00	US29O22D	min	8.8		7.0		6.8		7.0		6.8		7.0		6.8		9.7		8.7		9.7		8.7		9.7																	
USA	173.00	US29O31D	max	19.6		16.1		16.1		16.1		16.1		16.1		16.1		18.4		18.4		18.4		18.4		18.4																	
USA	173.00	US29O31D	min	17.7		13.7		13.7		13.7		13.7		13.7		13.7		16.4		16.4		16.4		16.4		16.4																	
USA	173.00	US29O32D	max		11.1		10.7		11.1		10.7		11.1		10.7		11.1		11.1		11.1		11.1		11.1		11.1																
USA	173.00	US29O32D	min		10.0		9.6		10.0		9.6		10.0		9.6		10.0		10.0		10.0		10.0		10.0		10.1																
USA	173.00	US29O41D	max		17.4		12.8		17.4		12.8		17.4		12.8		17.4		18.1		17.4		18.1		17.4		20.0																
USA	173.00	US29O41D	min		10.6		6.6		10.6		6.6		10.6		6.6		10.6		14.3		10.6		14.3		10.6		16.8																
USA	173.00	US29O42D	max	19.6		17.4		17.4		17.4		17.4		17.4		17.4		18.7		18.7		18.7		18.7		18.7																	
USA	173.00	US29O42D	min	15.2		14.6		14.6		14.6		14.6		14.6		14.6		14.9		14.9		14.9		14.9		14.9																	

PART II

REGIONS 1 AND 3 FEEDER-LINK LISTS OF ADDITIONAL USES

Section 1 – Technical characteristics of the assignments in the Regions 1 and 3 feeder-link Lists of additional uses

I. COLUMN HEADINGS OF THE LISTS

Col. 1 *Notifying administration symbol*.

Col. 2 *Beam identification*.

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 *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. 5 *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.

Col. 6 S*pace station receiving antenna pattern code*.

The codes used for the antenna pattern of the receiving space station (feeder link) antenna are defined as follows:

R13RSS	Figure B (curves A, B and C) and § 3.7.3 in Annex 3 of Appendix **S30A**
R123FR	Figure C and § 3.7.3 in Annex 3 of Appendix **S30A**
MODRSS	Figure B (curves A′, B′ and C) and § 3.7.3 in Annex 3 of Appendix **S30** (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 7. A particular shaped beam is identified by the combination of column 1, column 7 and column 12. In such cases the maximum cross-polar gain is given under column 8 in the “cross-polar gain” field.

In cases where the “space station receiving antenna pattern code” field contains a code which starts with “CB_” characters, it is a composite beam. Any composite beam consists of two or more elliptical beams. Each composite beam is described in the special composite beam file having the same name plus a GXT extension (e.g. the description of the CB_COMP_BM1 composite beam is stored in the CB_COMP_BM1.GXT file).

Col. 7 *Space station receiving antenna shaped (non-elliptical, non-composite) beam identification.*

Col. 8 *Maximum space station receiving antenna co-polar and cross-polar (in the case of shaped beam) isotropic gain* (dBi).

Col. 9 *Earth station transmitting antenna pattern code and maximum gain* (dBi).

The codes used for transmitting earth station (feeder-link) antenna patterns are defined as follows:

R13TES	Figure A (Curves A and B) and § 3.5.3 in Annex 3 of Appendix **S30A**
MODTES	Figure A (Curves A′ and B′) and § 3.5.3 in Annex 3 of Appendix **S30A** (Recommendation ITU-R BO.1295)

Col. 10 *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. 11 *Designation of emission*.

Col. 12 *Identity of the space station*.

Col. 13 *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 Appendix **30A** 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 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. 14 *Assignment status*.

The assignment status codes used for beams are defined as follows:

A	Assignment in the List, which has successfully completed coordination but has not been brought into use and/or the date of bringing into use has not been confirmed to the Bureau. § 4.1.3 of Article 4 (in terms of eight years lapsing period) of Appendix **S30A** applies for this assignment. For this category of assignments, WRC-2000 protection ratios are applied (27 dB co-channel and 22 dB adjacent channel).
AE	Assignment in the List, which has been notified and brought into use and the date of bringing into use has been confirmed to the Bureau before 12 May 2000. § 4.1.3 of Article 4 (in terms of eight years lapsing period) of Appendix **S30A** is not applied for this assignment. For this category of assignments, WRC-97 protection ratios are applied (30 dB co-channel and 22 dB adjacent channel).

Col. 15 *Remarks*.

II. TEXT FOR NOTES IN THE REMARKS COLUMN OF THE LISTS

1 The Administrations of Egypt and France declared a bilateral temporary agreement with respect to the coordination of the satellite networks NILESAT-1S and RADIOSAT-5A for a specified period until 1 January 2002. The mentioned Administrations have also requested the Radiocommunication Bureau to group at 7° W for this period the corresponding beams of RADIOSAT-5, RADIOSAT-5A and NILESAT-1S.

2 The Administration of Luxembourg declared to undertake on a case-by-case basis to coordinate any transmitting earth station with the Administrations of Norway, the United Kingdom and Poland in accordance with the relevant provisions in the Radio Regulations, in the case that their territory is inside the coordination area of the feeder-link station of the DBL (19.2° E) network.

3 The Swedish Administration declared to undertake to coordinate any earth station with the Administration of Finland in accordance with the relevant provisions in the Radio Regulations, in the case that Finland is inside the coordination area of the feeder-link station of the SIRIUS-2 network.

4 The German Administration declared that, for the upper band (17.7-18.1 GHz), it will undertake all necessary measures not to put any feeder-link earth stations at any point within the service areas of the EUROPE*STAR-1B feeder-links, the coordination contour of which covers the territory of the Administrations of Algeria, Vatican, United Arab Emirates, Ethiopia, Iran (Islamic Republic of), Iraq, Israel, Italy, Libya, Morocco, Mauritania, Oman, Syria, Czech Rep., Sudan, Switzerland, Tunisia and Yugoslavia.

5 The Turkish Administration declared that the TURKSAT-BSS satellite network will use only specific earth stations, for the time being located at the 11 test-points submitted in the corresponding Part B request. The use of any additional earth station not located at any of these 11 test-points would be subject to a coordination process with the concerned administrations in accordance with the Radio Regulations. The Administration of Turkey further declared that it will undertake all necessary measures not to put any feeder-link earth station at any point within the service area of its TURKSAT-BSS feeder link, the coordination contour of which covers the territory of the Administrations of Bulgaria, Iran (Islamic Republic of) and Italy.

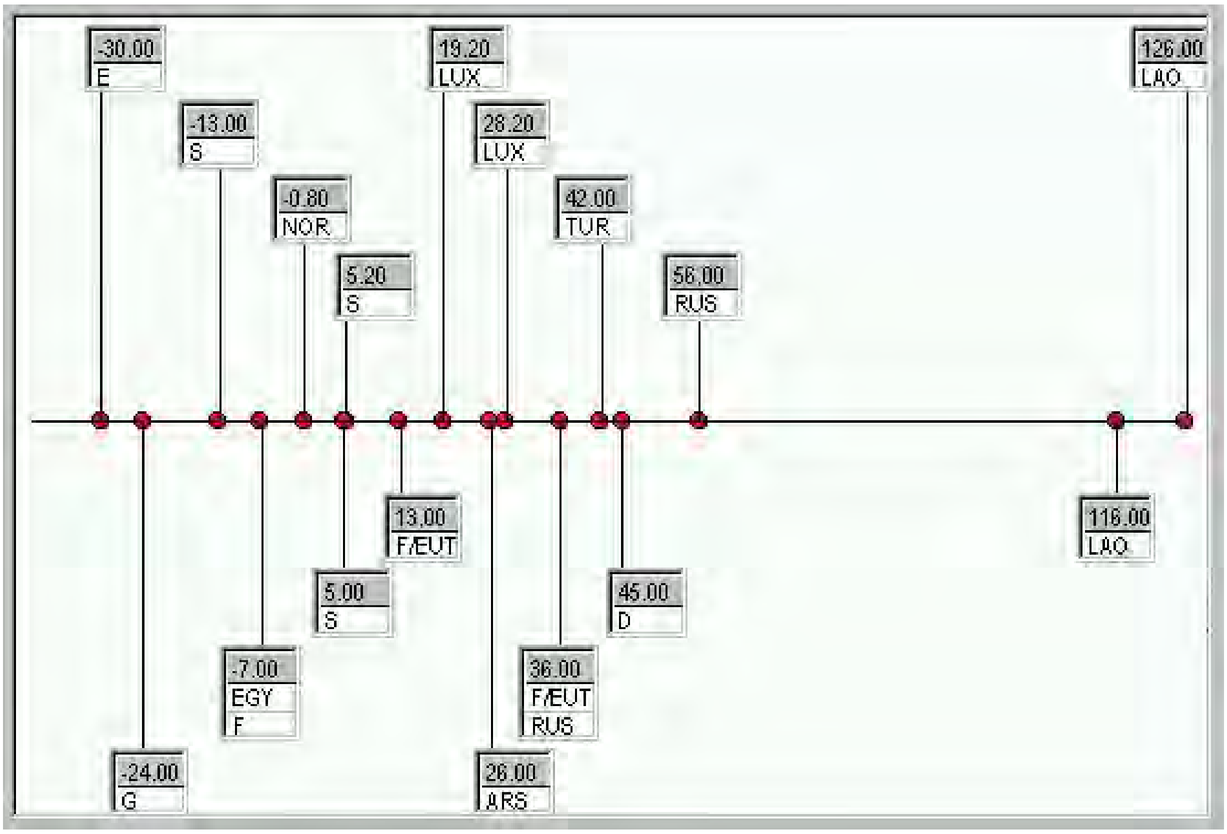
6 EUTELSAT declared that the EUTELSAT B-36E satellite network is using specific feeder-link earth stations not located in the region of the service area that is subject to the coordination with the terrestrial services located in the territory of Egypt. The use of any additional feeder-link earth station, operating in the frequency band that is subject to the coordination with the terrestrial services located in the territory of Egypt, should be subject to a coordination process with the Administration of Egypt.

7 The assignments of this network entered into the List based on the conditions under which they have successfully completed the procedure of Article 4 of Appendix **S30A** (WRC-97). The characteristics of these assignments are being published in the corresponding Part B Special Section.

8 The Administration of Sweden accepted to apply for SIRIUS-2 and SIRIUS-3 networks the new protection ratios specified by the IRG (i.e. downlink co-channel: 21 dB, downlink upper and lower adjacent channels: 16 dB; feeder-link co-channel: 27 dB and feeder-link upper and lower adjacent channels: 22 dB) in order to ease the replanning process.

FIGURE 2

Allocation of orbital positions in the Regions 1 and 3 feeder-link List of additional uses (17 GHz)
(position in degrees/administration symbols)



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Basic characteristics of the Regions 1 and 3 feeder-link List of additional uses (14 GHz)

1	2	3	4		5			6	7	8		9		10		11	12	13	14	15
Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
KOR	KO11202D	113.00	127.50	36.00	1.24	1.02	168.00	MODRSS		43.40		MODTES	57.30	CL		27M0GXX--	KOREASAT-2		AE	7

Basic characteristics of the Regions 1 and 3 feeder-link List of additional uses (17 GHz) (sorted by administration)

Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
ARS	REGBSU11	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	77.85	27M0F9WW	ARABSAT-BSS1	13	AE	7
ARS	REGBSU12	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	347.85	27M0F9WW	ARABSAT-BSS1	13	AE	7
ARS	REGBSU13	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	77.85	27M0G7WW	ARABSAT-BSS1	13	AE	7
ARS	REGBSU14	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	347.85	27M0G7WW	ARABSAT-BSS1	13	AE	7
ARS	REGBSU15	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	77.85	33M0F9WW	ARABSAT-BSS1	13	AE	7
ARS	REGBSU16	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	347.85	33M0F9WW	ARABSAT-BSS1	13	AE	7
ARS	REGBSU17	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	77.85	33M0G7WW	ARABSAT-BSS1	13	AE	7
ARS	REGBSU18	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	347.85	33M0G7WW	ARABSAT-BSS1	13	AE	7
ARS	REGBSX13	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	77.85	27M0G7WW	ARABSAT-BSS1	13	A	7
ARS	REGBSX14	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	347.85	27M0G7WW	ARABSAT-BSS1	13	A	7
ARS	REGBSX17	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	77.85	33M0G7WW	ARABSAT-BSS1	13	A	7
ARS	REGBSX18	26.00	20.08	25.67					COP	30.30	-4.70	MODTES	57.00	LE	347.85	33M0G7WW	ARABSAT-BSS1	13	A	7
D	ESTR1-DH	45.00	20.00	30.00					TR1	35.20	0.00	MODTES	60.00	LE	0.00	27M0G7W--	EUROPE*STAR-1B	20	A	4, 7
D	ESTR1-DV	45.00	20.00	30.00					TR1	35.20	0.00	MODTES	60.00	LE	90.00	27M0G7W--	EUROPE*STAR-1B	20	A	4, 7
D	ESTR3-DH	45.00	75.00	20.00					TR3	36.20	0.00	MODTES	60.00	LE	0.00	27M0G7W--	EUROPE*STAR-1B	20	A	4, 7
D	ESTR3-DV	45.00	75.00	20.00					TR3	36.20	0.00	MODTES	60.00	LE	90.00	27M0G7W--	EUROPE*STAR-1B	20	A	4, 7
E	HISPASA2	-30.00	-8.80	35.40	3.00	1.90	45.00	MODRSS		36.90		MODTES	57.00	CR		27M0F8W	HISPASAT-2		AE	7
EGY	D33NI1S1	-7.00	16.20	23.40					COV	30.32	-1.25	MODTES	57.20	LE	90.00	33M0G7W--	NILESAT-1S	12	AE	1, 7
EGY	D33NI1S2	-7.00	16.20	23.40					COH	30.33	-1.07	MODTES	57.20	LE	0.00	33M0G7W--	NILESAT-1S	12	AE	1, 7

Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
F/EUT	E1327AS1	13.00	18.00	44.00					RB	30.10	-4.90	MODTES	57.00	LE	93.50	27M0F9W	EUTELSAT B-13E	8	AE	7
F/EUT	E1327AS2	13.00	18.00	44.00					RB	30.10	-4.90	MODTES	57.00	LE	3.50	27M0F9W	EUTELSAT B-13E	8	AE	7
F/EUT	E1327DS1	13.00	18.00	44.00					RB	30.10	-4.90	MODTES	57.00	LE	93.50	27M0G7W--	EUTELSAT B-13E	8	AE	7
F/EUT	E1327DS2	13.00	18.00	44.00					RB	30.10	-4.90	MODTES	57.00	LE	3.50	27M0G7W--	EUTELSAT B-13E	8	AE	7
F/EUT	E1333AS1	13.00	18.00	44.00					RB	30.10	-4.90	MODTES	57.00	LE	93.50	33M0F9W	EUTELSAT B-13E	8	AE	7
F/EUT	E1333AS2	13.00	18.00	44.00					RB	30.10	-4.90	MODTES	57.00	LE	3.50	33M0F9W	EUTELSAT B-13E	8	AE	7
F/EUT	E1333DS1	13.00	18.00	44.00					RB	30.10	-4.90	MODTES	57.00	LE	93.50	33M0G7W--	EUTELSAT B-13E	8	AE	7
F/EUT	E1333DS2	13.00	18.00	44.00					RB	30.10	-4.90	MODTES	57.00	LE	3.50	33M0G7W--	EUTELSAT B-13E	8	AE	7
F/EUT	E3FA3EL1	36.00	33.50	38.50	8.00	4.80	3.50	MODRSS		30.00		MODTES	57.00	LE	3.50	33M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA3EL2	36.00	33.50	38.50	8.00	4.80	3.50	MODRSS		30.00		MODTES	57.00	LE	93.50	33M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA3EL3	36.00	33.50	38.50					SPO	38.00	3.00	MODTES	57.00	LE	3.50	33M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA3EL4	36.00	33.50	38.50					SPO	38.00	3.00	MODTES	57.00	LE	93.50	33M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA3ST1	36.00	9.65	38.55					COR	35.50	0.50	MODTES	57.00	LE	3.50	33M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA3ST2	36.00	9.65	38.55					COR	35.50	0.50	MODTES	57.00	LE	93.50	33M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA3ST3	36.00	9.65	38.55					AFU	35.50	0.50	MODTES	57.00	LE	3.50	33M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA3ST4	36.00	9.65	38.55					AFU	35.50	0.50	MODTES	57.00	LE	93.50	33M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA7EL1	36.00	33.50	38.50	8.00	4.80	3.50	MODRSS		30.00		MODTES	57.00	LE	3.50	27M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA7EL2	36.00	33.50	38.50	8.00	4.80	3.50	MODRSS		30.00		MODTES	57.00	LE	93.50	27M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA7EL3	36.00	33.50	38.50					SPO	38.00	3.00	MODTES	57.00	LE	3.50	27M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA7EL4	36.00	33.50	38.50					SPO	38.00	3.00	MODTES	57.00	LE	93.50	27M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA7ST1	36.00	9.65	38.55					COR	35.50	0.50	MODTES	57.00	LE	3.50	27M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA7ST2	36.00	9.65	38.55					COR	35.50	0.50	MODTES	57.00	LE	93.50	27M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA7ST3	36.00	9.65	38.55					AFU	35.50	0.50	MODTES	57.00	LE	3.50	27M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FA7ST4	36.00	9.65	38.55					AFU	35.50	0.50	MODTES	57.00	LE	93.50	27M0F9W	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD3EL1	36.00	33.50	38.50	8.00	4.80	3.50	MODRSS		30.00		MODTES	57.00	LE	3.50	33M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD3EL2	36.00	33.50	38.50	8.00	4.80	3.50	MODRSS		30.00		MODTES	57.00	LE	93.50	33M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD3EL3	36.00	33.50	38.50					SPO	38.00	3.00	MODTES	57.00	LE	3.50	33M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD3EL4	36.00	33.50	38.50					SPO	38.00	3.00	MODTES	57.00	LE	93.50	33M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD3ST1	36.00	9.65	38.55					COR	35.50	0.50	MODTES	57.00	LE	3.50	33M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD3ST2	36.00	9.65	38.55					COR	35.50	0.50	MODTES	57.00	LE	93.50	33M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD3ST3	36.00	9.65	38.55					AFU	35.50	0.50	MODTES	57.00	LE	3.50	33M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD3ST4	36.00	9.65	38.55					AFU	35.50	0.50	MODTES	57.00	LE	93.50	33M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD7EL1	36.00	33.50	38.50	8.00	4.80	3.50	MODRSS		30.00		MODTES	57.00	LE	3.50	27M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD7EL2	36.00	33.50	38.50	8.00	4.80	3.50	MODRSS		30.00		MODTES	57.00	LE	93.50	27M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD7EL3	36.00	33.50	38.50					SPO	38.00	3.00	MODTES	57.00	LE	3.50	27M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD7EL4	36.00	33.50	38.50					SPO	38.00	3.00	MODTES	57.00	LE	93.50	27M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD7ST1	36.00	9.65	38.55					COR	35.50	0.50	MODTES	57.00	LE	3.50	27M0G7W--	EUTELSAT B-36E	50	AE	6, 7

Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
F/EUT	E3FD7ST2	36.00	9.65	38.55					COR	35.50	0.50	MODTES	57.00	LE	93.50	27M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD7ST3	36.00	9.65	38.55					AFU	35.50	0.50	MODTES	57.00	LE	3.50	27M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F/EUT	E3FD7ST4	36.00	9.65	38.55					AFU	35.50	0.50	MODTES	57.00	LE	93.50	27M0G7W--	EUTELSAT B-36E	50	AE	6, 7
F	F5_27D16	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	0.00	27M0G9W--	RADIOSAT-5	21	A	7
F	F5_27D17	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	90.00	27M0G9W--	RADIOSAT-5	12	A	1, 7
F	F5_27D18	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	90.00	27M0G9W--	RADIOSAT-5	21	A	7
F	F5_27D19	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	0.00	27M0G9W--	RADIOSAT-5	21	A	7
F	F5_27D20	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	90.00	27M0G9W--	RADIOSAT-5	21	A	7
F	F5_33D16	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	0.00	33M0G9W--	RADIOSAT-5	21	A	7
F	F5_33D17	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	90.00	33M0G9W--	RADIOSAT-5	12	A	1, 7
F	F5_33D18	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	90.00	33M0G9W--	RADIOSAT-5	21	A	7
F	F5_33D19	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	0.00	33M0G9W--	RADIOSAT-5	21	A	7
F	F5_33D20	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	90.00	33M0G9W--	RADIOSAT-5	21	A	7
F	F93D2751	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	0.00	27M0G9W--	RADIOSAT-5A	12	A	1, 7
F	F93D2753	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	0.00	27M0G9W--	RADIOSAT-5A	12	A	1, 7
F	F93D2754	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	90.00	27M0G9W--	RADIOSAT-5A	12	A	1, 7
F	F93D3351	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	0.00	33M0G9W--	RADIOSAT-5A	12	A	1, 7
F	F93D3353	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	0.00	33M0G9W--	RADIOSAT-5A	12	A	1, 7
F	F93D3354	-7.00	3.88	48.20	0.70	0.70	0.00	MODRSS		41.00		MODTES	61.00	LE	90.00	33M0G9W--	RADIOSAT-5A	12	A	1, 7
G	GE6HD001	-24.00	12.95	48.40					FD8	40.00	5.00	R2TES	60.50	LE	0.00	32M0G7W--	GE-SATCOM E1	51	A	7
G	GE6HD002	-24.00	12.95	48.40					FD8	40.00	5.00	R2TES	55.80	LE	0.00	32M0G7W--	GE-SATCOM E1	51	A	7
G	GE6VD001	-24.00	12.95	48.40					FD8	40.00	5.00	R2TES	60.50	LE	90.00	32M0G7W--	GE-SATCOM E1	51	A	7
G	GE6VD002	-24.00	12.95	48.40					FD8	40.00	5.00	R2TES	55.80	LE	90.00	32M0G7W--	GE-SATCOM E1	51	A	7
LAO	LST3CEL1	116.00	102.90	7.64					3CC	41.23	5.83	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR3B	23	A	7
LAO	LST3CEL2	116.00	102.90	7.64					3CC	41.23	5.83	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR3B	23	A	7
LAO	LST3COL1	116.00	102.90	7.64					3CC	41.23	5.83	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR3B	23	A	7
LAO	LST3COL2	116.00	102.90	7.64					3CC	41.23	5.83	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR3B	23	A	7
LAO	LST3EE2D	116.00	123.30	10.60	1.90	1.40	140.00	R13RSS		40.50		DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR3B	25	A	7
LAO	LST3EELD	116.00	123.30	10.60	1.90	1.40	140.00	R13RSS		40.50		DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR3B	25	A	7
LAO	LST3EO2D	116.00	123.30	10.60	1.90	1.40	140.00	R13RSS		40.50		DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR3B	25	A	7
LAO	LST3EOLD	116.00	123.30	10.60	1.90	1.40	140.00	R13RSS		40.50		DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR3B	25	A	7
LAO	LST3NE2D	116.00	116.10	24.94					3NC	40.83	5.23	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR3B	24	A	7
LAO	LST3NELD	116.00	116.10	24.94					3NC	40.83	5.23	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR3B	24	A	7
LAO	LST3NO2D	116.00	116.10	24.94					3NC	40.83	5.23	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR3B	24	A	7
LAO	LST3NOLD	116.00	116.10	24.94					3NC	40.83	5.23	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR3B	24	A	7
LAO	LST3WE2D	116.00	66.69	12.82					3WC	41.20	5.75	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR3B	22	A	7
LAO	LST3WELD	116.00	66.69	12.82					3WC	41.20	5.75	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR3B	22	A	7

Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
LAO	LST3WO2D	116.00	66.69	12.82					3WC	41.20	5.75	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR3B	22	A	7
LAO	LST3WOLD	116.00	66.69	12.82					3WC	41.20	5.75	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR3B	22	A	7
LAO	LST4CEL1	126.00	103.00	7.12					4CC	41.23	7.12	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR4B	27	A	7
LAO	LST4CEL2	126.00	103.00	7.12					4CC	41.23	7.12	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR4B	27	A	7
LAO	LST4COL1	126.00	103.00	7.12					4CC	41.23	7.12	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR4B	27	A	7
LAO	LST4COL2	126.00	103.00	7.12					4CC	41.23	7.12	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR4B	27	A	7
LAO	LST4EE2D	126.00	123.30	10.60	1.90	1.40	140.00	R13RSS		40.50		DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR4B	29	A	7
LAO	LST4EELD	126.00	123.30	10.60	1.90	1.40	140.00	R13RSS		40.50		DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR4B	29	A	7
LAO	LST4EO2D	126.00	123.30	10.60	1.90	1.40	140.00	R13RSS		40.50		DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR4B	29	A	7
LAO	LST4EOLD	126.00	123.30	10.60	1.90	1.40	140.00	R13RSS		40.50		DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR4B	29	A	7
LAO	LST4NE2D	126.00	117.30	25.00					4NC	40.83	5.23	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR4B	28	A	7
LAO	LST4NELD	126.00	117.30	25.00					4NC	40.83	5.23	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR4B	28	A	7
LAO	LST4NO2D	126.00	117.30	25.00					4NC	40.83	5.23	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR4B	28	A	7
LAO	LST4NOLD	126.00	117.30	25.00					4NC	40.83	5.23	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR4B	28	A	7
LAO	LST4WE2D	126.00	76.79	12.28					4WC	41.20	5.75	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR4B	26	A	7
LAO	LST4WELD	126.00	76.79	12.28					4WC	41.20	5.75	DBL-TYP1	61.20	LE	0.00	33M0G7W--	LSTAR4B	26	A	7
LAO	LST4WO2D	126.00	76.79	12.28					4WC	41.20	5.75	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR4B	26	A	7
LAO	LST4WOLD	126.00	76.79	12.28					4WC	41.20	5.75	DBL-TYP1	61.20	LE	90.00	33M0G7W--	LSTAR4B	26	A	7
LUX	D3328H21	28.20	4.50	48.60					COP	35.00	0.00	MODTES	51.40	LE	7.50	33M0G7WW	DBL-28.2E	9	AE	7
LUX	D3328H22	28.20	4.50	48.60					COP	35.00	0.00	MODTES	51.40	LE	7.50	33M0G7WW	DBL-28.2E	9	AE	7
LUX	D3328H23	28.20	4.50	48.60					COP	35.00	0.00	MODTES	51.40	LE	7.50	33M0G7WW	DBL-28.2E	9	AE	7
LUX	D3328H51	28.20	4.50	48.60					COP	35.00	0.00	MODTES	57.40	LE	7.50	33M0G7WW	DBL-28.2E	9	AE	7
LUX	D3328H52	28.20	4.50	48.60					COP	35.00	0.00	MODTES	57.40	LE	7.50	33M0G7WW	DBL-28.2E	9	AE	7
LUX	D3328H53	28.20	4.50	48.60					COP	35.00	0.00	MODTES	57.40	LE	7.50	33M0G7WW	DBL-28.2E	9	AE	7
LUX	D3328V21	28.20	4.50	48.60					COP	35.00	0.00	MODTES	51.40	LE	97.50	33M0G7WW	DBL-28.2E	9	AE	7
LUX	D3328V22	28.20	4.50	48.60					COP	35.00	0.00	MODTES	51.40	LE	97.50	33M0G7WW	DBL-28.2E	9	AE	7
LUX	D3328V51	28.20	4.50	48.60					COP	35.00	0.00	MODTES	57.40	LE	97.50	33M0G7WW	DBL-28.2E	9	AE	7
LUX	D3328V52	28.20	4.50	48.60					COP	35.00	0.00	MODTES	57.40	LE	97.50	33M0G7WW	DBL-28.2E	9	AE	7
LUX	D33ERH2X	19.20	4.62	48.52					ERH	39.80	0.00	MODTES	51.40	LE	5.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33ERH2Y	19.20	4.62	48.52					ERH	39.80	0.00	MODTES	51.40	LE	5.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33ERH5X	19.20	4.62	48.52					ERH	39.80	0.00	MODTES	57.40	LE	5.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33ERH5Y	19.20	4.62	48.52					ERH	39.80	0.00	MODTES	57.40	LE	5.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33ERV2X	19.20	4.62	48.52					ERV	37.80	0.00	MODTES	51.40	LE	95.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33ERV2Y	19.20	4.62	48.52					ERV	37.80	0.00	MODTES	51.40	LE	95.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33ERV5X	19.20	4.62	48.52					ERV	37.80	0.00	MODTES	57.40	LE	95.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33ERV5Y	19.20	4.62	48.52					ERV	37.80	0.00	MODTES	57.40	LE	95.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33R1H2X	19.20	4.62	48.52					R1H	40.00	0.00	MODTES	51.40	LE	5.10	33M0G7W--	DBL	7	AE	2, 7

Admin. symbol	Beam identification	Orbital position	Boresight		Space station antenna characteristics			Space station antenna code	Shaped beam	Space station antenna gain		Earth station antenna		Polarization		Designation of emission	Identity of the space station	Group code	Sta-tus	Remarks
			Long.	Lat.	Major axis	Minor axis	Orien-tation			Co-polar	Cross-polar	Code	Gain	Type	Angle					
LUX	D33R1H2Y	19.20	4.62	48.52					R1H	40.00	0.00	MODTES	51.40	LE	5.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33R1H5X	19.20	4.62	48.52					R1H	40.00	0.00	MODTES	57.40	LE	5.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33R1H5Y	19.20	4.62	48.52					R1H	40.00	0.00	MODTES	57.40	LE	5.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33R1V2X	19.20	4.62	48.52					R1V	37.80	0.00	MODTES	51.40	LE	95.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33R1V2Y	19.20	4.62	48.52					R1V	37.80	0.00	MODTES	51.40	LE	95.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33R1V5X	19.20	4.62	48.52					R1V	37.80	0.00	MODTES	57.40	LE	95.10	33M0G7W--	DBL	7	AE	2, 7
LUX	D33R1V5Y	19.20	4.62	48.52					R1V	37.80	0.00	MODTES	57.40	LE	95.10	33M0G7W--	DBL	7	AE	2, 7
NOR	BIFROS21	-0.80	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	55.00	CR		27M0FXF	BIFROST-2	6	AE	7
NOR	BIFROS22	-0.80	17.00	61.50	2.00	1.00	10.00	MODRSS		41.00		MODTES	55.00	CL		27M0FXF	BIFROST-2	6	AE	7
NOR	BIFROST	-0.80	17.00	61.50	2.00	0.67	10.00	MODRSS		41.00		MODTES	60.00	CL		27M0F8F--	BIFROST	6	AE	7
RUS	RSTRBD11	36.00	38.00	53.00					COP	38.40	8.40	MODTES	57.00	CR		27M0G7W	RST-1	5	A	7
RUS	RSTRBD12	36.00	38.00	53.00					COP	38.40	8.40	MODTES	57.00	CL		27M0G7W	RST-1	5	A	7
RUS	RSTRBD21	56.00	65.00	63.00					COP	38.40	8.40	MODTES	57.00	CR		27M0G7W	RST-2	14	A	7
RUS	RSTRBD22	56.00	65.00	63.00					COP	38.40	8.40	MODTES	57.00	CL		27M0G7W	RST-2	14	A	7
S	S 13902	5.00	17.00	61.50	2.00	1.00	10.00	R13RSS		41.44		R13TES	57.00	CR		27M0F8W	TELEX	4	AE	7
S	SI2UNA	5.00	18.30	57.30					NOR	43.20	10.20	MODTES	58.60	LE	0.00	32M0F3F	SIRIUS-2	4	AE	3, 7, 8
S	SI2UNAA	5.00	18.30	57.30					NOR	43.20	10.20	MODTES	58.60	LE	0.00	32M0F3F	SIRIUS-2	4	AE	3, 7, 8
S	SI2UNAS	5.00	12.50	46.00					STR	37.10	4.10	MODTES	58.60	LE	90.00	32M0F3F	SIRIUS-2	4	AE	3, 7, 8
S	SI2UND	5.00	18.30	57.30					NOR	43.20	10.20	MODTES	58.60	LE	0.00	32M0G7W	SIRIUS-2	4	AE	3, 7, 8
S	SI2UNDA	5.00	18.30	57.30					NOR	43.20	10.20	MODTES	58.60	LE	0.00	32M0G7W	SIRIUS-2	4	AE	3, 7, 8
S	SI2UNDS	5.00	12.50	46.00					STR	37.10	4.10	MODTES	58.60	LE	90.00	32M0G7W	SIRIUS-2	4	AE	3, 7, 8
S	SI3NHA	5.20	18.30	57.30					NOR	43.20	10.20	MODTES	58.60	LE	0.00	32M0F3F	SIRIUS-3	4	AE	7, 8
S	SI3NHD	5.20	18.30	57.30					NOR	43.20	10.20	MODTES	58.60	LE	0.00	32M0G7W	SIRIUS-3	4	AE	7, 8
S	SI3NVA	5.20	18.30	57.30					NOR	43.20	10.20	MODTES	58.60	LE	90.00	32M0F3F	SIRIUS-3	4	AE	7, 8
S	SI3NVD	5.20	18.30	57.30					NOR	43.20	10.20	MODTES	58.60	LE	90.00	32M0G7W	SIRIUS-3	4	AE	7, 8
S	SIRIUS01	5.20	14.00	63.00	1.30	0.70	142.00	R13RSS		43.00		R13TES	57.00	CL		27M0F8W	SIRIUS	4	AE	7
S	SIRIUS02	5.20	14.00	63.00	1.30	0.70	142.00	R13RSS		43.00		R13TES	57.00	CL		27M0F8W	SIRIUS	4	AE	7
S	SIRIUSW1	-13.00	15.00	60.00	1.30	0.70	142.00	MODRSS		43.00		MODTES	57.00	CL		27M0F9WWW	SIRIUS-W		AE	7
TUR	TKBSSEED	42.00	45.67	40.24	7.08	1.42	6.00	R123FR		40.00		MODTES	57.00	LE	355.70	33M0G7W	TURKSAT-BSS	36	A	5, 7
TUR	TKBSSWED	42.00	12.82	46.90	2.52	1.52	21.00	R123FR		44.00		MODTES	57.00	LE	65.30	33M0G7W	TURKSAT-BSS	36	A	5, 7

Section 2 – Equivalent isotropic radiated power of the assignments in the Regions 1 and 3 feeder-link Lists of additional uses

COLUMN HEADINGS

Col. 1 *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. 2 *Notifying administration symbol*.

Col. 3 *Beam identification*.

Col. 4 *Polarization* (CL – circular left, CR – circular right, LE – linear referenced to the equatorial plane).

Col. 5 *Channel number*.

Equivalent isotropic radiated power (dBW) in the direction of maximum radiation for the assignments in the Regions 1 and 3 feeder-link List of additional uses (14 GHz)

1	2	3	4	5 (Channel number)					
Orbital Position	Admin. symbol	Beam Identification	Polarization type	2	4	6	8	10	12
113.00	KOR	KO11202D	CL	82.0	82.0	82.0	82.0	82.0	82.0

Equivalent isotropic radiated power (dBW) in the direction of maximum radiation for the assignments in the Regions 1 and 3 feeder-link List of additional uses (17 GHz) (sorted by orbital position)

1	2	3	4	5 (Channel number)																																							
Orbital position	Admin. symbol	Beam identifi-cation	Polari-zation type	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	29	30	31	32	33	34	35	36	37	38	39	40
-30.00	E	HISPASA2	CR																					84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0	
-24.00	G	GE6HD001	LE		78.5		78.5		78.5		78.5		78.5		78.5		78.5		78.5		78.5		81.7		83.5		83.5		83.5		83.5		83.5		83.5		83.5		83.5		83.5		83.5
-24.00	G	GE6HD002	LE		73.8		73.8		73.8		73.8		73.8		73.8		73.8		73.8		73.8		77.0		78.8		78.8		78.8		78.8		78.8		78.8		78.8		78.8		78.8		78.8
-24.00	G	GE6VD001	LE	79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5		83.5		83.5		83.5		83.5		83.5		83.5		83.5		83.5		83.5		83.5	
-24.00	G	GE6VD002	LE	74.8		74.8		74.8		74.8		74.8		74.8		74.8		74.8		74.8		74.8		78.8		78.8		78.8		78.8		78.8		78.8		78.8		78.8		78.8		78.8	
-13.00	S	SIRIUSW1	CL				84.0				84.0				84.0				84.0				84.0																				
-7.00	EGY	D33NI1S1	LE			82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0																					
-7.00	EGY	D33NI1S2	LE		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0																						
-7.00	F	F5_27D16	LE																					76.6				76.6				76.6				76.6				76.6			
-7.00	F	F5_27D17	LE		76.6				76.6				76.6				76.6				76.6																						
-7.00	F	F5_27D18	LE																						76.6				76.6				76.6				76.6				76.6		
-7.00	F	F5_27D19	LE																							73.5				73.5				73.5				73.5				73.5	
-7.00	F	F5_27D20	LE																								76.6				76.6				76.6				76.6				76.6
-7.00	F	F5_33D16	LE																					76.6				76.6				76.6				76.6				76.6			
-7.00	F	F5_33D17	LE		76.6				76.6				76.6				76.6				76.6																						
-7.00	F	F5_33D18	LE																						76.6				76.6				76.6				76.6				76.6		
-7.00	F	F5_33D19	LE																							74.3				74.3				74.3				74.3				74.3	
-7.00	F	F5_33D20	LE																								76.6				76.6				76.6				76.6				76.6
-7.00	F	F93D2751	LE	75.3				73.8				73.8				73.8				73.8																							
-7.00	F	F93D2753	LE			76.6				76.6				76.6				76.6				76.6																					
-7.00	F	F93D2754	LE				73.8				73.8				73.8				73.8				73.8																				
-7.00	F	F93D3351	LE	75.3				73.8				73.8				73.8				73.8																							

1	2	3	4	5 (Channel number)																																							
Orbital position	Admin. symbol	Beam identification	Polarization type	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	29	30	31	32	33	34	35	36	37	38	39	40
-7.00	F	F93D3353	LE			76.6				76.6				76.6				76.6				76.6																						
-7.00	F	F93D3354	LE				73.8				73.8				73.8				73.8				73.8																				
-0.80	NOR	BIFROS21	CR																							84.0				84.0				84.0				84.0				84.0	
-0.80	NOR	BIFROS22	CL		84.0				84.0				84.0				84.0				84.0						84.0				84.0				84.0				84.0				84.0
-0.80	NOR	BIFROST	CL				77.5				77.0				77.0				76.0				76.0																				
5.00	S	S 13902	CR																																								84.0
5.00	S	SI2UNA	LE																								77.5				77.5		77.5		77.5		77.5		77.5		77.5		85.6
5.00	S	SI2UNAA	LE																				77.5																				
5.00	S	SI2UNAS	LE																			85.6										82.6		82.6		82.6		82.6		82.6		82.6	
5.00	S	SI2UND	LE																								77.5				77.5		77.5		77.5		77.5		77.5		77.5		85.6
5.00	S	SI2UNDA	LE																				77.5																				
5.00	S	SI2UNDS	LE																			85.6										82.6		82.6		82.6		82.6		82.6		82.6	
5.20	S	SI3NHA	LE				85.6				85.6				85.6		85.6		85.6		85.6																						
5.20	S	SI3NHD	LE				85.6				85.6				85.6		85.6		85.6		85.6																						
5.20	S	SI3NVA	LE													85.6		85.6		85.6																							
5.20	S	SI3NVD	LE													85.6		85.6		85.6																							
5.20	S	SIRIUS01	CL				84.0				84.0																																
5.20	S	SIRIUS02	CL												84.0				84.0				84.0																				
13.00	F/EUT	E1327AS1	LE		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0
13.00	F/EUT	E1327AS2	LE	84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0	
13.00	F/EUT	E1327DS1	LE		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0
13.00	F/EUT	E1327DS2	LE	84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0	
13.00	F/EUT	E1333AS1	LE		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0
13.00	F/EUT	E1333AS2	LE	84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0	
13.00	F/EUT	E1333DS1	LE		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0
13.00	F/EUT	E1333DS2	LE	84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0	
19.20	LUX	D33ERH2X	LE		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4																						
19.20	LUX	D33ERH2Y	LE																				76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4
19.20	LUX	D33ERH5X	LE		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4																						
19.20	LUX	D33ERH5Y	LE																				82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4
19.20	LUX	D33ERV2X	LE	76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4																					
19.20	LUX	D33ERV2Y	LE																					76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4	
19.20	LUX	D33ERV5X	LE	82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4																					
19.20	LUX	D33ERV5Y	LE																					82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4	
19.20	LUX	D33R1H2X	LE		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4																						
19.20	LUX	D33R1H2Y	LE																				76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4
19.20	LUX	D33R1H5X	LE		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4																						
19.20	LUX	D33R1H5Y	LE																				82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4

1	2	3	4	5 (Channel number)																																							
Orbital position	Admin. symbol	Beam identification	Polarization type	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	29	30	31	32	33	34	35	36	37	38	39	40
19.20	LUX	D33R1V2X	LE	76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4																					
19.20	LUX	D33R1V2Y	LE																					76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4	
19.20	LUX	D33R1V5X	LE	82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4																					
19.20	LUX	D33R1V5Y	LE																					82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4	
26.00	ARS	REGBSU11	LE	80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0																					
26.00	ARS	REGBSU12	LE		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0																						
26.00	ARS	REGBSU13	LE	80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0																					
26.00	ARS	REGBSU14	LE		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0																						
26.00	ARS	REGBSU15	LE	80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0																					
26.00	ARS	REGBSU16	LE		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0																						
26.00	ARS	REGBSU17	LE	80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0																					
26.00	ARS	REGBSU18	LE		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0																						
26.00	ARS	REGBSX13	LE																					80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0	
26.00	ARS	REGBSX14	LE																				80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0
26.00	ARS	REGBSX17	LE																					80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0	
26.00	ARS	REGBSX18	LE																				80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0		80.0
28.20	LUX	D3328H21	LE		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4																						
28.20	LUX	D3328H22	LE																				76.4																				
28.20	LUX	D3328H23	LE																						76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4
28.20	LUX	D3328H51	LE		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4																						
28.20	LUX	D3328H52	LE																				82.4																				
28.20	LUX	D3328H53	LE																						77.4		77.4		77.4		77.4		77.4		77.4		77.4		77.4		77.4		77.4
28.20	LUX	D3328V21	LE	76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4																					
28.20	LUX	D3328V22	LE																					76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4		76.4	
28.20	LUX	D3328V51	LE	82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4		82.4																					
28.20	LUX	D3328V52	LE																					77.4		77.4		77.4		77.4		77.4		77.4		77.4		77.4		77.4		77.4	
36.00	F/EUT	E3FA3EL1	LE	84.0		83.0		84.0		83.0		84.0		83.0		84.0		83.0		83.0		83.0		84.0		84.0																	
36.00	F/EUT	E3FA3EL2	LE		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		84.0																		
36.00	F/EUT	E3FA3EL3	LE																									75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0	
36.00	F/EUT	E3FA3EL4	LE																								75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0
36.00	F/EUT	E3FA3ST1	LE	84.0		83.0		84.0		83.0		84.0		83.0		84.0		83.0		83.0		83.0		84.0		84.0																	
36.00	F/EUT	E3FA3ST2	LE		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		84.0																		
36.00	F/EUT	E3FA3ST3	LE																									79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5	
36.00	F/EUT	E3FA3ST4	LE																								79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5
36.00	F/EUT	E3FA7EL1	LE	84.0		83.0		84.0		83.0		84.0		83.0		84.0		83.0		83.0		83.0		84.0		84.0																	
36.00	F/EUT	E3FA7EL2	LE		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		84.0																		
36.00	F/EUT	E3FA7EL3	LE																									75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0	
36.00	F/EUT	E3FA7EL4	LE																								75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0

1	2	3	4	5 (Channel number)																																							
Orbital position	**Admin. symbol**	**Beam identification**	**Polarization type**	**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**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
36.00	F/EUT	E3FA7ST1	LE	84.0		83.0		84.0		83.0		84.0		83.0		84.0		83.0		83.0		83.0		84.0		84.0																	
36.00	F/EUT	E3FA7ST2	LE		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		84.0																		
36.00	F/EUT	E3FA7ST3	LE																									79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5	
36.00	F/EUT	E3FA7ST4	LE																								79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5
36.00	F/EUT	E3FD3EL1	LE	84.0		83.0		84.0		83.0		84.0		83.0		84.0		83.0		83.0		83.0		84.0		84.0																	
36.00	F/EUT	E3FD3EL2	LE		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		84.0																		
36.00	F/EUT	E3FD3EL3	LE																									75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0	
36.00	F/EUT	E3FD3EL4	LE																								75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0
36.00	F/EUT	E3FD3ST1	LE	84.0		83.0		84.0		83.0		84.0		83.0		84.0		83.0		83.0		83.0		84.0		84.0																	
36.00	F/EUT	E3FD3ST2	LE		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		84.0																		
36.00	F/EUT	E3FD3ST3	LE																									79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5	
36.00	F/EUT	E3FD3ST4	LE																								79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5
36.00	F/EUT	E3FD7EL1	LE	84.0		83.0		84.0		83.0		84.0		83.0		84.0		83.0		83.0		83.0		84.0		84.0																	
36.00	F/EUT	E3FD7EL2	LE		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		84.0																		
36.00	F/EUT	E3FD7EL3	LE																									75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0	
36.00	F/EUT	E3FD7EL4	LE																								75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0		75.0
36.00	F/EUT	E3FD7ST1	LE	84.0		83.0		84.0		83.0		84.0		83.0		84.0		83.0		83.0		83.0		84.0		84.0																	
36.00	F/EUT	E3FD7ST2	LE		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		83.0		84.0																		
36.00	F/EUT	E3FD7ST3	LE																									79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5	
36.00	F/EUT	E3FD7ST4	LE																								79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5		79.5
36.00	RUS	RSTRBD11	CR																									84.0				84.0				84.0				84.0			
36.00	RUS	RSTRBD12	CL																										84.0				84.0				84.0				84.0		
42.00	TUR	TKBSSEED	LE		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0
42.00	TUR	TKBSSWED	LE	82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0		82.0	
45.00	D	ESTR1-DH	LE	81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5	
45.00	D	ESTR1-DV	LE		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5
45.00	D	ESTR3-DH	LE	81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5																	
45.00	D	ESTR3-DV	LE		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5		81.5																		
56.00	RUS	RSTRBD21	CR																											84.0				84.0				84.0				84.0	
56.00	RUS	RSTRBD22	CL																												84.0				84.0				84.0				84.0
116.00	LAO	LST3CEL1	LE		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																						
116.00	LAO	LST3CEL2	LE																				84.0		84.0		84.0																
116.00	LAO	LST3COL1	LE	84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																					
116.00	LAO	LST3COL2	LE																					84.0		84.0																	
116.00	LAO	LST3EE2D	LE																				84.0		84.0		84.0																
116.00	LAO	LST3EELD	LE		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																						
116.00	LAO	LST3EO2D	LE																					84.0		84.0																	
116.00	LAO	LST3EOLD	LE	84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																					

1	2	3	4	5 (Channel number)																																							
Orbital position	Admin. symbol	Beam identification	Polarization type	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	29	30	31	32	33	34	35	36	37	38	39	40
116.00	LAO	LST3NE2D	LE																				84.0		84.0		84.0																
116.00	LAO	LST3NELD	LE		82.6		84.0		84.0		84.0		84.0		84.0		81.4		81.4		84.0																						
116.00	LAO	LST3NO2D	LE																					84.0		84.0																	
116.00	LAO	LST3NOLD	LE	82.4		84.0		84.0		84.0		84.0		84.0		82.9		81.2		84.0		84.0																					
116.00	LAO	LST3WE2D	LE																				84.0		84.0		84.0																
116.00	LAO	LST3WELD	LE		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																						
116.00	LAO	LST3WO2D	LE																					84.0		84.0																	
116.00	LAO	LST3WOLD	LE	84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																					
126.00	LAO	LST4CEL1	LE		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																						
126.00	LAO	LST4CEL2	LE																				84.0		84.0		84.0																
126.00	LAO	LST4COL1	LE	84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																					
126.00	LAO	LST4COL2	LE																					84.0		84.0																	
126.00	LAO	LST4EE2D	LE																				84.0		84.0		84.0																
126.00	LAO	LST4EELD	LE		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																						
126.00	LAO	LST4EO2D	LE																					84.0		84.0																	
126.00	LAO	LST4EOLD	LE	84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																					
126.00	LAO	LST4NE2D	LE																				84.0		84.0		84.0																
126.00	LAO	LST4NELD	LE		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																						
126.00	LAO	LST4NO2D	LE																					84.0		84.0																	
126.00	LAO	LST4NOLD	LE	84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																					
126.00	LAO	LST4WE2D	LE																				84.0		84.0		84.0																
126.00	LAO	LST4WELD	LE		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																						
126.00	LAO	LST4WO2D	LE																					84.0		84.0																	
126.00	LAO	LST4WOLD	LE	84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0		84.0																					

Section 3 – Equivalent protection margins of the assignments in the Regions 1 and 3 feeder-link Lists of additional uses

COLUMN HEADINGS

Col. 1 *Notifying administration symbol*.

Col. 2 *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. 3 *Beam identification*.

Col. 4 *Indication of minimum or maximum EPM for a given assignment derived from the set of values for all test points belonging to the given beam* (min – indicates that the minimum EPM value is shown in this row; max – indicates that the maximum EPM value is shown in this row).

Col. 5 *Channel number*.

Maximum and minimum EPM (dB) of the assignments in the Regions 1 and 3 feeder-link List of additional uses (14 GHz)

1	2	3	4	5 (Channel number)					
Admin. symbol	Orbital position	Beam Identification	EPM	2	4	6	8	10	12
KOR	113.00	KO11202D	max	6.4	6.4	6.4	6.4	6.4	6.4
KOR	113.00	KO11202D	min	4.5	4.5	4.5	4.5	4.5	4.5

Maximum and minimum EPM (dB) of the assignments in the Regions 1 and 3 feeder-link List of additional uses (17 GHz) (sorted by administration)

1	2	3	4	5 (Channel number)																																							
Admin symbol	Orbital position	Beam identificat.	EPM	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	29	30	31	32	33	34	35	36	37	38	39	40
ARS	26.00	REGBSU11	max	0.7		0.3		0.3		0.3		0.2		0.2		0.2		0.1		0.1		0.3																					
ARS	26.00	REGBSU11	min	-22.0		-22.4		-22.4		-22.5		-22.5		-22.5		-22.6		-22.6		-22.6		-22.4																					
ARS	26.00	REGBSU12	max		0.8		0.7		0.7		0.7		0.6		0.6		0.5		0.5		0.5																						
ARS	26.00	REGBSU12	min		-22.0		-22.0		-22.0		-22.1		-22.1		-22.2		-22.2		-22.2		-22.2																						
ARS	26.00	REGBSU13	max	0.7		0.3		0.3		0.3		0.2		0.2		0.2		0.1		0.1		0.3																					
ARS	26.00	REGBSU13	min	-22.0		-22.4		-22.4		-22.5		-22.5		-22.5		-22.6		-22.6		-22.6		-22.4																					
ARS	26.00	REGBSU14	max		0.8		0.7		0.7		0.7		0.6		0.6		0.5		0.5		0.5																						
ARS	26.00	REGBSU14	min		-22.0		-22.0		-22.0		-22.1		-22.1		-22.2		-22.2		-22.2		-22.2																						
ARS	26.00	REGBSU15	max	0.2		-0.3		-0.3		-0.3		-0.4		-0.4		-0.4		-0.5		-0.5		-0.3																					
ARS	26.00	REGBSU15	min	-22.6		-23.1		-23.1		-23.1		-23.1		-23.1		-23.2		-23.2		-23.2		-23.0																					
ARS	26.00	REGBSU16	max		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.3		-0.3		-0.3																						
ARS	26.00	REGBSU16	min		-22.9		-22.9		-22.9		-22.9		-22.9		-23.0		-23.0		-23.0		-23.1																						
ARS	26.00	REGBSU17	max	0.2		-0.3		-0.3		-0.3		-0.4		-0.4		-0.4		-0.5		-0.5		-0.3																					
ARS	26.00	REGBSU17	min	-22.6		-23.1		-23.1		-23.1		-23.1		-23.1		-23.2		-23.2		-23.2		-23.0																					
ARS	26.00	REGBSU18	max		-0.2		-0.2		-0.2		-0.2		-0.2		-0.2		-0.3		-0.3		-0.3																						
ARS	26.00	REGBSU18	min		-22.9		-22.9		-22.9		-22.9		-22.9		-23.0		-23.0		-23.0		-23.1																						
ARS	26.00	REGBSX13	max																					4.9		4.6		4.8		4.8		4.8		4.8		4.8		4.8		4.8		4.8	
ARS	26.00	REGBSX13	min																					4.0		3.7		3.8		3.8		3.8		3.8		3.8		3.8		3.8		3.8	
ARS	26.00	REGBSX14	max																				4.2		4.1		4.2		4.2		4.2		4.2		4.2		4.2		4.2		4.2		4.8
ARS	26.00	REGBSX14	min																				3.3		3.2		3.2		3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.8
ARS	26.00	REGBSX17	max																					4.2		3.8		3.9		3.9		3.9		4.0		4.0		4.0		4.0		4.0	
ARS	26.00	REGBSX17	min																					3.2		2.9		3.0		3.0		3.0		3.0		3.0		3.0		3.0		3.0	
ARS	26.00	REGBSX18	max																				3.4		3.6		3.7		3.7		3.7		3.7		3.7		3.7		3.8		3.8		4.5
ARS	26.00	REGBSX18	min																				2.4		2.7		2.7		2.8		2.8		2.8		2.8		2.8		2.8		2.8		3.6

1	2	3	4	5 (Channel number)																																							
Admin symbol	Orbital position	Beam identificat.	EPM	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	29	30	31	32	33	34	35	36	37	38	39	40
D	45.00	ESTR1-DH	max	8.3		7.7		7.6		7.7		7.6		7.7		7.6		7.7		7.7		7.7		9.1		9.2		9.8		9.8		9.8		9.8		9.8		9.8		9.8		9.8	
D	45.00	ESTR1-DH	min	4.5		3.9		3.8		3.9		3.8		3.9		3.8		3.9		3.9		3.9		5.2		5.4		5.9		5.9		5.9		5.9		5.9		5.9		5.9		5.9	
D	45.00	ESTR1-DV	max		7.9		7.9		7.9		7.9		7.9		7.9		7.9		7.9		7.9		8.3		9.1		9.6		9.8		9.8		9.8		9.8		9.8		9.8		9.8		10.8
D	45.00	ESTR1-DV	min		4.1		4.1		4.1		4.1		4.1		4.1		4.1		4.1		4.1		4.4		5.2		5.7		5.9		5.9		5.9		5.9		5.9		5.9		5.9		7.0
D	45.00	ESTR3-DH	max	14.4		14.3		14.3		14.3		14.3		14.3		14.3		14.3		14.3		14.3		15.1		15.2																	
D	45.00	ESTR3-DH	min	5.7		5.5		5.5		5.5		5.5		5.5		5.5		5.5		5.5		5.5		6.3		6.4																	
D	45.00	ESTR3-DV	max		16.2		16.2		16.2		16.2		16.2		16.2		16.2		16.2		16.2		16.5		17.5																		
D	45.00	ESTR3-DV	min		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.7		8.7																		
E	-30.00	HISPASA2	max																					9.0		6.5		6.5		6.5		6.5		6.5		6.3		6.3		6.4		6.4	
E	-30.00	HISPASA2	min																					5.6		3.1		3.1		3.0		3.0		3.1		2.9		2.9		3.0		3.0	
EGY	-7.00	D33NI1S1	max			14.4		14.4		14.4		14.4		14.4		14.4		15.3		16.4		16.4																					
EGY	-7.00	D33NI1S1	min			11.4		11.4		11.4		11.4		11.4		11.4		12.3		13.4		13.4																					
EGY	-7.00	D33NI1S2	max		14.0		14.8		14.0		14.8		14.0		14.8		14.0		17.8		16.1																						
EGY	-7.00	D33NI1S2	min		11.1		11.9		11.1		11.9		11.1		11.9		11.1		14.9		13.2																						
F	-7.00	F5_27D16	max																					-1.3				-3.7				-3.7				-3.7				-3.7			
F	-7.00	F5_27D16	min																					-1.3				-3.7				-3.7				-3.7				-3.7			
F	-7.00	F5_27D17	max		17.9				17.9				17.9				17.9				18.0																						
F	-7.00	F5_27D17	min		17.9				17.9				17.9				17.9				18.0																						
F	-7.00	F5_27D18	max																						-6.1				-6.1				-6.1				-6.1				-6.1		
F	-7.00	F5_27D18	min																						-6.1				-6.1				-6.1				-6.1				-6.1		
F	-7.00	F5_27D19	max																							-6.8				-6.8				-6.8				-6.8				-6.8	
F	-7.00	F5_27D19	min																							-6.8				-6.8				-6.8				-6.8				-6.8	
F	-7.00	F5_27D20	max																								-6.1				-6.1				-6.1				-6.1				-6.1
F	-7.00	F5_27D20	min																								-6.1				-6.1				-6.1				-6.1				-6.1
F	-7.00	F5_33D16	max																					-2.8				-5.1				-5.1				-5.1				-5.1			
F	-7.00	F5_33D16	min																					-2.8				-5.1				-5.1				-5.1				-5.1			
F	-7.00	F5_33D17	max		17.7				17.7				17.7				17.7				17.8																						
F	-7.00	F5_33D17	min		17.7				17.7				17.7				17.7				17.8																						
F	-7.00	F5_33D18	max																						-6.1				-6.1				-6.1				-6.1				-6.1		
F	-7.00	F5_33D18	min																						-6.1				-6.1				-6.1				-6.1				-6.1		
F	-7.00	F5_33D19	max																							-7.4				-7.4				-7.4				-7.4				-7.4	
F	-7.00	F5_33D19	min																							-7.4				-7.4				-7.4				-7.4				-7.4	
F	-7.00	F5_33D20	max																								-6.1				-6.1				-6.1				-6.1				-6.1
F	-7.00	F5_33D20	min																								-6.1				-6.1				-6.1				-6.1				-6.1
F	-7.00	F93D2751	max	20.8				18.7				18.7				18.7				18.9																							
F	-7.00	F93D2751	min	-2.6				-4.7				-4.7				-4.7				-4.5																							
F	-7.00	F93D2753	max			21.5				21.5				21.5				21.7				21.7																					
F	-7.00	F93D2753	min			-1.9				-1.9				-1.9				-1.8				-1.7																					
F	-7.00	F93D2754	max				18.7				18.9				18.9				19.4				2.7																				
F	-7.00	F93D2754	min				-4.7				-4.5				-4.5				-4.0				-20.7																				
F	-7.00	F93D3351	max	19.2				16.9				16.9				16.9				17.2																							
F	-7.00	F93D3351	min	-4.2				-6.5				-6.5				-6.5				-6.3																							
F	-7.00	F93D3353	max			19.7				19.7				19.7				19.9				19.9																					

1	2	3	4	5 (Channel number)																																							
Admin symbol	Orbital position	Beam identificat.	EPM	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	29	30	31	32	33	34	35	36	37	38	39	40
F	-7.00	F93D3353	min			-3.7				-3.7				-3.7				-3.5				-3.5																					
F	-7.00	F93D3354	max				18.2				18.4				18.4				18.9				1.7																				
F	-7.00	F93D3354	min				-5.2				-5.0				-5.0				-4.5				-21.8																				
F	13.00	E1327AS1	max		3.7		3.5		3.7		3.5		3.7		3.4		3.4		3.4		3.4		4.2		3.7		3.7		3.7		3.7		3.6		3.7		3.7		3.7		3.7		3.6
F/EUT	13.00	E1327AS1	min		1.1		0.9		1.1		0.9		1.1		0.9		0.9		0.9		0.9		1.7		1.2		1.2		1.2		1.2		1.1		1.2		1.2		1.2		1.2		1.1
F/EUT	13.00	E1327AS2	max	4.5		3.6		3.6		3.6		3.6		3.6		3.4		3.4		3.4		3.4		6.5		5.8		5.8		5.8		5.8		5.8		5.8		5.8		5.8		5.8	
F/EUT	13.00	E1327AS2	min	2.0		1.1		1.1		1.1		1.1		1.1		0.9		0.9		0.9		0.9		4.0		3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3	
F/EUT	13.00	E1327DS1	max		3.7		3.5		3.7		3.5		3.7		3.4		3.4		3.4		3.4		4.2		3.7		3.7		3.7		3.7		3.6		3.7		3.7		3.7		3.7		3.6
F/EUT	13.00	E1327DS1	min		1.1		0.9		1.1		0.9		1.1		0.9		0.9		0.9		0.9		1.7		1.2		1.2		1.2		1.2		1.1		1.2		1.2		1.2		1.2		1.1
F/EUT	13.00	E1327DS2	max	4.5		3.6		3.6		3.6		3.6		3.6		3.4		3.4		3.4		3.4		6.5		5.8		5.8		5.8		5.8		5.8		5.8		5.8		5.8		5.8	
F/EUT	13.00	E1327DS2	min	2.0		1.1		1.1		1.1		1.1		1.1		0.9		0.9		0.9		0.9		4.0		3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3	
F/EUT	13.00	E1333AS1	max		3.1		2.9		3.1		2.9		3.1		2.8		2.8		2.8		2.8		3.8		3.7		3.6		3.7		3.6		3.6		3.6		3.6		3.7		3.7		3.6
F/EUT	13.00	E1333AS1	min		0.6		0.4		0.6		0.4		0.6		0.3		0.3		0.2		0.3		1.3		1.2		1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.0
F/EUT	13.00	E1333AS2	max	4.1		3.0		3.0		3.0		3.0		3.0		2.8		2.8		2.8		2.8		5.2		4.5		4.5		4.5		4.5		4.5		4.5		4.5		4.5		4.4	
F/EUT	13.00	E1333AS2	min	1.6		0.5		0.5		0.5		0.5		0.5		0.3		0.3		0.3		0.3		2.7		2.0		2.0		2.0		2.0		2.0		2.0		2.0		2.0		1.9	
F/EUT	13.00	E1333DS1	max		3.1		2.9		3.1		2.9		3.1		2.8		2.8		2.8		2.8		3.8		3.7		3.6		3.7		3.6		3.6		3.6		3.6		3.7		3.7		3.6
F/EUT	13.00	E1333DS1	min		0.6		0.4		0.6		0.4		0.6		0.3		0.3		0.2		0.3		1.3		1.2		1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.1		1.0
F/EUT	13.00	E1333DS2	max	4.1		3.0		3.0		3.0		3.0		3.0		2.8		2.8		2.8		2.8		5.2		4.5		4.5		4.5		4.5		4.5		4.5		4.5		4.5		4.4	
F/EUT	13.00	E1333DS2	min	1.6		0.5		0.5		0.5		0.5		0.5		0.3		0.3		0.3		0.3		2.7		2.0		2.0		2.0		2.0		2.0		2.0		2.0		2.0		1.9	
F/EUT	36.00	E3FA3EL1	max	0.8		-1.3		-0.3		-1.3		-0.3		-1.3		-0.3		-1.3		-1.3		-1.3		0.5		0.7																	
F/EUT	36.00	E3FA3EL1	min	-3.2		-5.4		-4.4		-5.4		-4.4		-5.4		-4.4		-5.4		-5.4		-5.4		-3.6		-3.4																	
F/EUT	36.00	E3FA3EL2	max		-1.3		-1.3		-1.3		-1.3		-1.3		-1.3		-1.3		-1.3		-1.3		-1.1		0.7																		
F/EUT	36.00	E3FA3EL2	min		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-5.2		-3.4																		
F/EUT	36.00	E3FA3EL3	max																									-6.3		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4	
F/EUT	36.00	E3FA3EL3	min																									-6.3		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4	
F/EUT	36.00	E3FA3EL4	max																								-1.2		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-6.3
F/EUT	36.00	E3FA3EL4	min																								-1.2		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-6.3
F/EUT	36.00	E3FA3ST1	max	0.2		-2.0		-1.0		-2.0		-1.0		-2.0		-1.0		-2.0		-2.0		-2.0		-0.7		-0.5																	
F/EUT	36.00	E3FA3ST1	min	-0.5		-2.7		-1.7		-2.7		-1.7		-2.7		-1.7		-2.7		-2.7		-2.7		-1.4		-1.2																	
F/EUT	36.00	E3FA3ST2	max		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-0.6																		
F/EUT	36.00	E3FA3ST2	min		-2.8		-2.8		-2.8		-2.8		-2.8		-2.8		-2.8		-2.8		-2.8		-2.8		-1.3																		
F/EUT	36.00	E3FA3ST3	max																									-3.7		-4.2		-4.2		-4.2		-4.2		-4.2		-4.2		-4.2	
F/EUT	36.00	E3FA3ST3	min																									-5.4		-5.8		-5.8		-5.8		-5.8		-5.8		-5.8		-5.8	
F/EUT	36.00	E3FA3ST4	max																								-2.7		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3		-3.4
F/EUT	36.00	E3FA3ST4	min																								-4.3		-5.9		-5.9		-5.9		-5.9		-5.9		-5.9		-5.9		-5.0
F/EUT	36.00	E3FA7EL1	max	1.2		-0.7		0.3		-0.7		0.3		-0.7		0.3		-0.7		-0.7		-0.7		1.1		1.3																	
F/EUT	36.00	E3FA7EL1	min	-2.9		-4.8		-3.8		-4.8		-3.8		-4.8		-3.8		-4.8		-4.8		-4.8		-3.0		-2.8																	
F/EUT	36.00	E3FA7EL2	max		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.6		1.3																		
F/EUT	36.00	E3FA7EL2	min		-4.9		-4.9		-4.9		-4.9		-4.9		-4.9		-4.9		-4.9		-4.9		-4.7		-2.8																		
F/EUT	36.00	E3FA7EL3	max																									-6.0		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8	
F/EUT	36.00	E3FA7EL3	min																									-6.0		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8	
F/EUT	36.00	E3FA7EL4	max																								0.2		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.0
F/EUT	36.00	E3FA7EL4	min																								0.2		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.0

1	2	3	4	5 (Channel number)																																							
Admin symbol	Orbital position	Beam identificat.	EPM	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	29	30	31	32	33	34	35	36	37	38	39	40
F/EUT	36.00	E3FA7ST1	max	0.7		-1.4		-0.4		-1.4		-0.4		-1.4		-0.4		-1.4		-1.4		-1.4		0.0		0.1																	
F/EUT	36.00	E3FA7ST1	min	0.0		-2.1		-1.1		-2.1		-1.1		-2.1		-1.1		-2.1		-2.1		-2.1		-0.7		-0.6																	
F/EUT	36.00	E3FA7ST2	max		-1.6		-1.6		-1.6		-1.6		-1.6		-1.6		-1.6		-1.6		-1.6		-1.6		-0.1																		
F/EUT	36.00	E3FA7ST2	min		-2.4		-2.4		-2.4		-2.4		-2.4		-2.4		-2.4		-2.4		-2.4		-2.3		-0.8																		
F/EUT	36.00	E3FA7ST3	max																									-3.1		-3.5		-3.5		-3.5		-3.5		-3.5		-3.5		-3.5	
F/EUT	36.00	E3FA7ST3	min																									-4.7		-5.1		-5.1		-5.1		-5.1		-5.1		-5.1		-5.1	
F/EUT	36.00	E3FA7ST4	max																								-2.2		-3.8		-3.8		-3.8		-3.8		-3.8		-3.8		-3.8		-3.1
F/EUT	36.00	E3FA7ST4	min																								-3.8		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-4.7
F/EUT	36.00	E3FD3EL1	max	0.8		-1.3		-0.3		-1.3		-0.3		-1.3		-0.3		-1.3		-1.3		-1.3		0.5		0.7																	
F/EUT	36.00	E3FD3EL1	min	-3.2		-5.4		-4.4		-5.4		-4.4		-5.4		-4.4		-5.4		-5.4		-5.4		-3.6		-3.4																	
F/EUT	36.00	E3FD3EL2	max		-1.3		-1.3		-1.3		-1.3		-1.3		-1.3		-1.3		-1.3		-1.3		-1.1		0.7																		
F/EUT	36.00	E3FD3EL2	min		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-5.2		-3.4																		
F/EUT	36.00	E3FD3EL3	max																									-6.3		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4	
F/EUT	36.00	E3FD3EL3	min																									-6.3		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4	
F/EUT	36.00	E3FD3EL4	max																								-1.2		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-6.3
F/EUT	36.00	E3FD3EL4	min																								-1.2		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-7.4		-6.3
F/EUT	36.00	E3FD3ST1	max	0.2		-2.0		-1.0		-2.0		-1.0		-2.0		-1.0		-2.0		-2.0		-2.0		-0.7		-0.5																	
F/EUT	36.00	E3FD3ST1	min	-0.5		-2.7		-1.7		-2.7		-1.7		-2.7		-1.7		-2.7		-2.7		-2.7		-1.4		-1.2																	
F/EUT	36.00	E3FD3ST2	max		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-2.1		-0.6																		
F/EUT	36.00	E3FD3ST2	min		-2.8		-2.8		-2.8		-2.8		-2.8		-2.8		-2.8		-2.8		-2.8		-2.8		-1.3																		
F/EUT	36.00	E3FD3ST3	max																									-3.7		-4.2		-4.2		-4.2		-4.2		-4.2		-4.2		-4.2	
F/EUT	36.00	E3FD3ST3	min																									-5.4		-5.8		-5.8		-5.8		-5.8		-5.8		-5.8		-5.8	
F/EUT	36.00	E3FD3ST4	max																								-2.7		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3		-4.3		-3.4
F/EUT	36.00	E3FD3ST4	min																								-4.3		-5.9		-5.9		-5.9		-5.9		-5.9		-5.9		-5.9		-5.0
F/EUT	36.00	E3FD7EL1	max	1.2		-0.7		0.3		-0.7		0.3		-0.7		0.3		-0.7		-0.7		-0.7		1.1		1.3																	
F/EUT	36.00	E3FD7EL1	min	-2.9		-4.8		-3.8		-4.8		-3.8		-4.8		-3.8		-4.8		-4.8		-4.8		-3.0		-2.8																	
F/EUT	36.00	E3FD7EL2	max		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.8		-0.6		1.3																		
F/EUT	36.00	E3FD7EL2	min		-4.9		-4.9		-4.9		-4.9		-4.9		-4.9		-4.9		-4.9		-4.9		-4.7		-2.8																		
F/EUT	36.00	E3FD7EL3	max																									-6.0		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8	
F/EUT	36.00	E3FD7EL3	min																									-6.0		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8	
F/EUT	36.00	E3FD7EL4	max																								0.2		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.0
F/EUT	36.00	E3FD7EL4	min																								0.2		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.8		-6.0
F/EUT	36.00	E3FD7ST1	max	0.7		-1.4		-0.4		-1.4		-0.4		-1.4		-0.4		-1.4		-1.4		-1.4		0.0		0.1																	
F/EUT	36.00	E3FD7ST1	min	0.0		-2.1		-1.1		-2.1		-1.1		-2.1		-1.1		-2.1		-2.1		-2.1		-0.7		-0.6																	
F/EUT	36.00	E3FD7ST2	max		-1.6		-1.6		-1.6		-1.6		-1.6		-1.6		-1.6		-1.6		-1.6		-1.6		-0.1																		
F/EUT	36.00	E3FD7ST2	min		-2.4		-2.4		-2.4		-2.4		-2.4		-2.4		-2.4		-2.4		-2.4		-2.3		-0.8																		
F/EUT	36.00	E3FD7ST3	max																									-3.1		-3.5		-3.5		-3.5		-3.5		-3.5		-3.5		-3.5	
F/EUT	36.00	E3FD7ST3	min																									-4.7		-5.1		-5.1		-5.1		-5.1		-5.1		-5.1		-5.1	
F/EUT	36.00	E3FD7ST4	max																								-2.2		-3.8		-3.8		-3.8		-3.8		-3.8		-3.8		-3.8		-3.1
F/EUT	36.00	E3FD7ST4	min																								-3.8		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-5.4		-4.7
G	-24.00	GE6HD001	max		4.7		4.7		4.7		4.7		4.7		4.7		4.7		4.7		4.7		9.7		13.6		13.6		13.6		13.6		13.6		13.6		13.6		13.6		13.6		15.1
G	-24.00	GE6HD001	min		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		-1.0		3.9		7.9		7.9		7.9		7.9		7.9		7.9		7.9		7.9		7.9		9.3
G	-24.00	GE6HD002	max		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		5.0		8.9		8.9		8.9		8.9		8.9		8.9		8.9		8.9		8.9		10.4

1	2	3	4	5 (Channel number)																																							
Admin symbol	Orbital position	Beam identificat.	EPM	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	29	30	31	32	33	34	35	36	37	38	39	40
G	-24.00	GE6HD002	min		-5.7		-5.7		-5.7		-5.7		-5.7		-5.7		-5.7		-5.7		-5.7		-0.8		3.2		3.2		3.2		3.2		3.2		3.2		3.2		3.2		3.2		4.6
G	-24.00	GE6VD001	max	4.7		5.1		4.5		5.1		4.5		5.1		4.5		5.1		4.5		5.1		13.2		13.1		13.1		13.1		13.1		13.1		13.1		13.1		13.1		13.1	
G	-24.00	GE6VD001	min	-1.1		-0.6		-1.3		-0.6		-1.3		-0.6		-1.3		-0.6		-1.3		-0.6		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.4		7.4	
G	-24.00	GE6VD002	max	0.0		0.4		-0.2		0.4		-0.2		0.4		-0.2		0.4		-0.2		0.4		8.5		8.4		8.4		8.4		8.4		8.4		8.4		8.4		8.4		8.4	
G	-24.00	GE6VD002	min	-5.8		-5.3		-6.0		-5.3		-6.0		-5.3		-6.0		-5.3		-6.0		-5.3		2.7		2.7		2.7		2.7		2.7		2.7		2.7		2.7		2.7		2.7	
LAO	116.00	LST3CEL1	max		-8.4		-9.4		-9.4		-9.4		-9.4		-9.4		-7.7		-7.7		-9.4																						
LAO	116.00	LST3CEL1	min		-16.0		-17.0		-17.0		-17.0		-17.0		-17.0		-15.3		-15.3		-17.0																						
LAO	116.00	LST3CEL2	max																				-10.6		-10.6		-10.6																
LAO	116.00	LST3CEL2	min																				-10.8		-10.8		-10.7																
LAO	116.00	LST3COL1	max	-8.2		-9.4		-9.4		-9.4		-9.4		-9.4		-8.6		-7.5		-9.4		-9.4																					
LAO	116.00	LST3COL1	min	-15.8		-17.0		-17.0		-17.0		-17.0		-17.0		-16.2		-15.1		-17.0		-17.0																					
LAO	116.00	LST3COL2	max																					-10.6		-10.6																	
LAO	116.00	LST3COL2	min																					-10.8		-10.8																	
LAO	116.00	LST3EE2D	max																				-11.1		-11.0		-10.9																
LAO	116.00	LST3EE2D	min																				-12.5		-12.5		-12.4																
LAO	116.00	LST3EELD	max		-11.3		-12.0		-12.0		-12.0		-12.0		-12.0		-10.8		-10.8		-12.0																						
LAO	116.00	LST3EELD	min		-12.8		-13.5		-13.5		-13.5		-13.5		-13.5		-12.2		-12.3		-13.5																						
LAO	116.00	LST3EO2D	max																					-11.0		-11.0																	
LAO	116.00	LST3EO2D	min																					-12.5		-12.5																	
LAO	116.00	LST3EOLD	max	-11.0		-12.0		-12.0		-12.0		-12.0		-12.0		-11.4		-10.7		-12.0		-12.0																					
LAO	116.00	LST3EOLD	min	-12.5		-13.5		-13.5		-13.5		-13.5		-13.5		-12.9		-12.1		-13.5		-13.4																					
LAO	116.00	LST3NE2D	max																				-4.9		-4.9		-4.9																
LAO	116.00	LST3NE2D	min																				-16.4		-16.4		-16.4																
LAO	116.00	LST3NELD	max		-6.4		-5.0		-5.0		-5.0		-5.0		-5.0		-7.6		-7.6		-5.0																						
LAO	116.00	LST3NELD	min		-17.8		-16.4		-16.4		-16.4		-16.4		-16.4		-19.0		-19.0		-16.4																						
LAO	116.00	LST3NO2D	max																					-4.9		-4.9																	
LAO	116.00	LST3NO2D	min																					-16.4		-16.4																	
LAO	116.00	LST3NOLD	max	-6.5		-5.0		-5.0		-5.0		-5.0		-5.0		-6.1		-7.8		-5.0		-5.0																					
LAO	116.00	LST3NOLD	min	-18.0		-16.4		-16.4		-16.4		-16.4		-16.4		-17.5		-19.2		-16.4		-16.4																					
LAO	116.00	LST3WE2D	max																				1.6		1.6		1.8																
LAO	116.00	LST3WE2D	min																				-15.0		-15.0		-14.8																
LAO	116.00	LST3WELD	max		1.0		0.7		0.7		0.7		0.7		0.7		1.2		1.2		0.7																						
LAO	116.00	LST3WELD	min		-15.6		-15.9		-15.9		-15.9		-15.9		-15.9		-15.4		-15.4		-15.9																						
LAO	116.00	LST3WO2D	max																					1.6		1.6																	
LAO	116.00	LST3WO2D	min																					-15.0		-15.0																	
LAO	116.00	LST3WOLD	max	1.2		0.7		0.7		0.7		0.7		0.7		1.0		1.2		0.8		0.7																					
LAO	116.00	LST3WOLD	min	-15.4		-15.9		-15.9		-15.9		-15.9		-15.9		-15.7		-15.4		-15.9		-15.9																					
LAO	126.00	LST4CEL1	max		-7.1		-7.1		-7.1		-7.1		-7.1		-7.1		-7.1		-7.1		-7.1																						
LAO	126.00	LST4CEL1	min		-15.3		-15.3		-15.3		-15.3		-15.3		-15.3		-15.3		-15.3		-15.3																						
LAO	126.00	LST4CEL2	max																				-9.0		-9.0		-8.9																
LAO	126.00	LST4CEL2	min																				-9.0		-9.0		-9.0																
LAO	126.00	LST4COL1	max	-7.0		-7.1		-7.1		-7.1		-7.1		-7.1		-7.1		-7.1		-7.1		-7.1																					
LAO	126.00	LST4COL1	min	-15.2		-15.3		-15.3		-15.3		-15.3		-15.3		-15.3		-15.3		-15.3		-15.3																					

1	2	3	4	5 (Channel number)																																							
Admin symbol	Orbital position	Beam identificat.	EPM	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	29	30	31	32	33	34	35	36	37	38	39	40
LAO	126.00	LST4COL2	max																					-9.0		-9.0																	
LAO	126.00	LST4COL2	min																					-9.0		-9.0																	
LAO	126.00	LST4EE2D	max																				-11.3		-11.2		-11.1																
LAO	126.00	LST4EE2D	min																				-12.6		-12.6		-12.4																
LAO	126.00	LST4EELD	max		-12.2		-12.2		-12.2		-12.2		-12.2		-12.2		-12.2		-12.2		-12.2																						
LAO	126.00	LST4EELD	min		-13.6		-13.6		-13.6		-13.6		-13.6		-13.6		-13.6		-13.6		-13.6																						
LAO	126.00	LST4EO2D	max																					-11.2		-11.2																	
LAO	126.00	LST4EO2D	min																					-12.6		-12.6																	
LAO	126.00	LST4EOLD	max	-12.1		-12.2		-12.2		-12.2		-12.2		-12.2		-12.2		-12.2		-12.2		-12.2																					
LAO	126.00	LST4EOLD	min	-13.5		-13.6		-13.6		-13.6		-13.6		-13.6		-13.6		-13.6		-13.6		-13.6																					
LAO	126.00	LST4NE2D	max																				-6.3		-6.3		-6.2																
LAO	126.00	LST4NE2D	min																				-17.9		-17.9		-17.8																
LAO	126.00	LST4NELD	max		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3																						
LAO	126.00	LST4NELD	min		-17.9		-17.9		-17.9		-17.9		-17.9		-17.9		-17.9		-17.9		-17.9																						
LAO	126.00	LST4NO2D	max																					-6.3		-6.3																	
LAO	126.00	LST4NO2D	min																					-17.9		-17.9																	
LAO	126.00	LST4NOLD	max	-6.2		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3		-6.3																					
LAO	126.00	LST4NOLD	min	-17.8		-17.9		-17.9		-17.9		-17.9		-17.9		-17.9		-17.9		-17.9		-17.9																					
LAO	126.00	LST4WE2D	max																				0.4		0.4		0.5																
LAO	126.00	LST4WE2D	min																				-15.1		-15.1		-14.9																
LAO	126.00	LST4WELD	max		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4																						
LAO	126.00	LST4WELD	min		-15.9		-15.9		-15.9		-15.9		-15.9		-15.9		-15.9		-15.9		-15.9																						
LAO	126.00	LST4WO2D	max																					0.4		0.4																	
LAO	126.00	LST4WO2D	min																					-15.1		-15.1																	
LAO	126.00	LST4WOLD	max	-0.3		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4		-0.4																					
LAO	126.00	LST4WOLD	min	-15.8		-15.9		-15.9		-15.9		-15.9		-15.9		-15.9		-15.9		-15.9		-15.9																					
LUX	19.20	D33ERH2X	max		4.8		5.6		5.6		5.6		5.6		5.6		5.6		5.5		5.5																						
LUX	19.20	D33ERH2X	min		-4.4		-3.5		-3.6		-3.6		-3.6		-3.6		-3.6		-3.6		-3.7																						
LUX	19.20	D33ERH2Y	max																				2.8		0.7		0.7		0.7		0.7		0.7		0.6		0.6		0.7		0.7		2.1
LUX	19.20	D33ERH2Y	min																				0.7		-1.4		-1.4		-1.4		-1.4		-1.4		-1.5		-1.5		-1.4		-1.4		0.0
LUX	19.20	D33ERH5X	max		10.8		11.6		11.6		11.6		11.6		11.6		11.6		11.5		11.5																						
LUX	19.20	D33ERH5X	min		1.6		2.5		2.5		2.4		2.5		2.4		2.4		2.4		2.3																						
LUX	19.20	D33ERH5Y	max																				8.8		6.7		6.7		6.7		6.7		6.7		6.6		6.6		6.7		6.7		8.1
LUX	19.20	D33ERH5Y	min																				6.7		4.6		4.6		4.6		4.6		4.6		4.5		4.6		4.6		4.6		6.0
LUX	19.20	D33ERV2X	max	5.9		3.9		3.9		3.8		3.8		3.8		3.7		3.7		3.6		3.6																					
LUX	19.20	D33ERV2X	min	-1.5		-3.4		-3.5		-3.5		-3.6		-3.6		-3.7		-3.7		-3.8		-3.8																					
LUX	19.20	D33ERV2Y	max																					2.2		1.1		1.1		1.1		1.1		1.1		1.0		1.1		1.1		1.1	
LUX	19.20	D33ERV2Y	min																					-1.8		-2.9		-2.9		-2.9		-2.9		-2.9		-3.0		-2.9		-2.9		-2.9	
LUX	19.20	D33ERV5X	max	11.9		9.9		9.9		9.8		9.8		9.8		9.7		9.7		9.6		9.6																					
LUX	19.20	D33ERV5X	min	4.5		2.6		2.5		2.5		2.4		2.4		2.4		2.3		2.2		2.2																					
LUX	19.20	D33ERV5Y	max																					8.2		7.1		7.1		7.1		7.1		7.1		7.0		7.1		7.1		7.1	
LUX	19.20	D33ERV5Y	min																					4.2		3.1		3.1		3.1		3.1		3.1		3.1		3.1		3.1		3.1	
LUX	19.20	D33R1H2X	max		4.2		5.2		5.2		5.2		5.2		5.2		5.1		5.1		5.1																						

1	2	3	4	5 (Channel number)																																							
Admin symbol	**Orbital position**	**Beam identificat.**	**EPM**	**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**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
LUX	19.20	D33R1H2X	min		-6.4		-5.4		-5.5		-5.5		-5.5		-5.5		-5.5		-5.5		-5.5																						
LUX	19.20	D33R1H2Y	max																				4.5		2.7		2.7		2.7		2.7		2.7		2.7		2.7		2.7		2.8		4.2
LUX	19.20	D33R1H2Y	min																				-2.5		-4.2		-4.2		-4.2		-4.2		-4.2		-4.3		-4.2		-4.2		-4.1		-2.7
LUX	19.20	D33R1H5X	max		10.2		11.2		11.2		11.2		11.2		11.2		11.1		11.1		11.1																						
LUX	19.20	D33R1H5X	min		-0.4		0.6		0.6		0.5		0.6		0.5		0.5		0.5		0.5																						
LUX	19.20	D33R1H5Y	max																				10.5		8.7		8.7		8.7		8.7		8.7		8.7		8.7		8.7		8.8		10.2
LUX	19.20	D33R1H5Y	min																				3.6		1.8		1.8		1.8		1.8		1.8		1.8		1.8		1.8		1.9		3.3
LUX	19.20	D33R1V2X	max	7.1		5.3		5.3		5.3		5.2		5.2		5.1		5.1		5.1		5.1																					
LUX	19.20	D33R1V2X	min	-5.6		-7.4		-7.4		-7.5		-7.5		-7.5		-7.6		-7.6		-7.7		-7.7																					
LUX	19.20	D33R1V2Y	max																					3.6		2.0		2.0		2.0		2.0		1.9		1.9		1.9		2.0		2.0	
LUX	19.20	D33R1V2Y	min																					-6.3		-7.9		-7.9		-7.9		-7.9		-7.9		-7.9		-7.9		-7.9		-7.9	
LUX	19.20	D33R1V5X	max	13.1		11.3		11.3		11.3		11.2		11.2		11.1		11.1		11.1		11.1																					
LUX	19.20	D33R1V5X	min	0.4		-1.4		-1.4		-1.5		-1.5		-1.5		-1.6		-1.6		-1.7		-1.7																					
LUX	19.20	D33R1V5Y	max																					9.6		8.0		8.0		8.0		8.0		7.9		7.9		7.9		8.0		8.0	
LUX	19.20	D33R1V5Y	min																					-0.3		-1.9		-1.9		-1.9		-1.9		-1.9		-1.9		-1.9		-1.9		-1.9	
LUX	28.20	D3328H21	max		-1.0		0.1		0.0		0.0		0.0		-0.1		-0.1		-0.1		-0.2																						
LUX	28.20	D3328H21	min		-10.8		-9.7		-9.8		-9.8		-9.8		-9.8		-9.9		-9.9		-10.0																						
LUX	28.20	D3328H22	max																				-0.1																				
LUX	28.20	D3328H22	min																				-1.2																				
LUX	28.20	D3328H23	max																						0.3		0.7		0.8		0.8		0.8		0.8		0.8		0.8		0.8		2.5
LUX	28.20	D3328H23	min																						-0.7		-0.4		-0.3		-0.3		-0.3		-0.3		-0.3		-0.3		-0.2		1.5
LUX	28.20	D3328H51	max		5.0		6.1		6.0		6.0		6.0		6.0		5.9		5.9		5.8																						
LUX	28.20	D3328H51	min		-4.8		-3.7		-3.8		-3.8		-3.8		-3.8		-3.9		-3.9		-4.0																						
LUX	28.20	D3328H52	max																				5.9																				
LUX	28.20	D3328H52	min																				4.8																				
LUX	28.20	D3328H53	max																						1.3		1.7		1.8		1.8		1.8		1.8		1.8		1.8		1.8		3.5
LUX	28.20	D3328H53	min																						0.3		0.7		0.7		0.7		0.7		0.7		0.7		0.8		0.8		2.5
LUX	28.20	D3328V21	max	2.7		0.1		0.0		0.0		-0.1		0.0		-0.1		-0.1		-0.1		-0.2																					
LUX	28.20	D3328V21	min	-7.1		-9.7		-9.8		-9.8		-9.8		-9.8		-9.9		-9.9		-9.9		-10.0																					
LUX	28.20	D3328V22	max																					0.4		0.5		0.8		0.8		0.8		0.8		0.8		0.8		0.8		0.8	
LUX	28.20	D3328V22	min																					-0.7		-0.6		-0.2		-0.2		-0.2		-0.3		-0.3		-0.3		-0.2		-0.2	
LUX	28.20	D3328V51	max	8.7		6.1		6.0		6.0		6.0		6.0		5.9		5.9		5.9		5.8																					
LUX	28.20	D3328V51	min	-1.1		-3.7		-3.8		-3.8		-3.8		-3.8		-3.9		-3.9		-3.9		-4.0																					
LUX	28.20	D3328V52	max																					1.4		1.5		1.8		1.8		1.8		1.8		1.8		1.8		1.8		1.8	
LUX	28.20	D3328V52	min																					0.4		0.4		0.8		0.8		0.8		0.8		0.8		0.7		0.8		0.8	
NOR	-0.80	BIFROS21	max																							0.9				0.9				0.8				0.9				0.8	
NOR	-0.80	BIFROS21	min																							-1.2				-1.2				-1.3				-1.3				-1.3	
NOR	-0.80	BIFROS22	max		-0.2				-0.2				-0.2				-0.4				0.2						3.2				3.2				3.2				3.2				4.0
NOR	-0.80	BIFROS22	min		-2.3				-2.3				-2.3				-2.5				-1.9						1.1				1.1				1.1				1.1				1.9
NOR	-0.80	BIFROST	max				-2.9				-3.4				-3.5				-4.3				-3.6																				
NOR	-0.80	BIFROST	min				-8.5				-9.0				-9.1				-10.0				-9.2																				
RUS	36.00	RSTRBD11	max																									1.7				1.7				1.7				1.7			
RUS	36.00	RSTRBD11	min																									-0.5				-0.5				-0.5				-0.5			

1	2	3	4	5 (Channel number)																																							
Admin symbol	**Orbital position**	**Beam identificat.**	**EPM**	**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**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
RUS	36.00	RSTRBD12	max																										1.5				1.5				1.5				1.5		
RUS	36.00	RSTRBD12	min																										-0.7				-0.7				-0.7				-0.7		
RUS	56.00	RSTRBD21	max																											19.4				18.9				18.9				18.9	
RUS	56.00	RSTRBD21	min																											17.6				17.1				17.1				17.1	
RUS	56.00	RSTRBD22	max																												19.4				18.9				18.9				19.9
RUS	56.00	RSTRBD22	min																												17.6				17.2				17.2				18.2
S	-13.00	SIRIUSW1	max				0.4				0.4				0.4				0.4				0.3																				
S	-13.00	SIRIUSW1	min				-1.6				-1.6				-1.6				-1.6				-1.7																				
S	5.00	S 13902	max																																								10.6
S	5.00	S 13902	min																																								7.7
S	5.00	SI2UNA	max																								-4.3				-4.3		-4.1		-4.3		-4.1		-4.3		-4.1		6.5
S	5.00	SI2UNA	min																								-25.1				-25.1		-24.9		-25.0		-24.9		-25.0		-24.9		-14.2
S	5.00	SI2UNAA	max																				-7.2																				
S	5.00	SI2UNAA	min																				-27.9																				
S	5.00	SI2UNAS	max																			3.3										1.4		1.3		1.4		1.3		1.4		1.3	
S	5.00	SI2UNAS	min																			-0.9										-2.8		-2.9		-2.8		-2.9		-2.8		-2.9	
S	5.00	SI2UND	max																								-1.7				-1.7		-1.3		-1.7		-1.3		-1.7		-1.3		8.9
S	5.00	SI2UND	min																								-22.4				-22.4		-22.1		-22.4		-22.1		-22.4		-22.1		-11.9
S	5.00	SI2UNDA	max																				-4.3																				
S	5.00	SI2UNDA	min																				-25.0																				
S	5.00	SI2UNDS	max																			6.2										4.2		4.0		4.2		4.0		4.2		4.0	
S	5.00	SI2UNDS	min																			2.0										0.0		-0.2		0.0		-0.2		0.0		-0.2	
S	5.20	SI3NHA	max				9.7				9.7				9.7		9.2		9.7		9.2																				
S	5.20	SI3NHA	min				-12.7				-12.7				-12.7		-13.2		-12.7		-13.2																				
S	5.20	SI3NHD	max				11.9				12.0				12.0		11.2		12.0		11.2																				
S	5.20	SI3NHD	min				-10.4				-10.4				-10.4		-11.2		-10.4		-11.2																				
S	5.20	SI3NVA	max													9.5		9.5		9.6																					
S	5.20	SI3NVA	min													-12.8		-12.8		-12.8																					
S	5.20	SI3NVD	max													11.7		11.8		11.8																					
S	5.20	SI3NVD	min													-10.6		-10.6		-10.6																					
S	5.20	SIRIUS01	max				13.3				13.4																																
S	5.20	SIRIUS01	min				9.2				9.2																																
S	5.20	SIRIUS02	max												13.4				13.5				13.9																				
S	5.20	SIRIUS02	min												9.2				9.3				9.7																				
TUR	42.00	TKBSSEED	max		6.9		6.9		6.9		6.9		6.9		6.9		6.9		7.0		7.0		7.0		7.4		8.7		9.3		9.3		9.3		9.3		9.3		9.3		9.3		10.0
TUR	42.00	TKBSSEED	min		3.6		3.6		3.6		3.6		3.6		3.6		3.6		3.7		3.7		3.7		4.1		5.3		5.9		5.9		5.9		5.9		5.9		5.9		5.9		6.7
TUR	42.00	TKBSSWED	max	8.2		7.1		7.0		7.1		7.0		7.1		7.0		7.1		7.1		7.1		5.6		5.4		6.2		6.2		6.2		6.2		6.2		6.2		6.2		6.2	
TUR	42.00	TKBSSWED	min	5.3		4.2		4.1		4.2		4.1		4.2		4.1		4.2		4.2		4.2		2.7		2.6		3.3		3.3		3.3		3.3		3.3		3.3		3.3		3.3	

RESOLUTION 603 (WRC-2000)

Studies on compatibility between stations of the radionavigation-satellite service (Earth-to-space) operating in the frequency band 5 000-5 010 MHz and the international standard system (microwave landing system) operating in the band 5 030-5 150 MHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the band 5 000-5 250 MHz is allocated to the aeronautical radionavigation service on a primary basis;

b) that this Conference added a primary allocation to the radionavigation-satellite service (RNSS) (Earth-to-space) in the 5 000-5 010 MHz band;

c) that the band 5 030-5 150 MHz is to be used for the operation of the international standard microwave landing system (MLS) for precision approach and landing; the requirements for this system shall take precedence over other uses of this band in accordance with No. **S5.444**;

d) that unwanted emissions from RNSS stations may fall into the frequency band used by the MLS;

e) that studies have not been carried out to determine the compatibility between such RNSS transmitters and the MLS receivers operated on board aircraft used during approach and landing;

f) that the MLS can be well protected through the implementation of an adequate separation distance between RNSS (Earth-to-space) transmitters and MLS receivers, and other mitigation techniques,

resolves to invite ITU-R

to conduct, as a matter of urgency, the appropriate technical, operational and regulatory studies to ensure that stations of the RNSS (Earth-to-space) do not cause harmful interference to the operation of the international standard MLS, and to develop, if needed, appropriate Recommendations,

urges administrations

to participate actively in the aforementioned studies by submitting contributions to ITU-R,

instructs the Secretary-General

to bring this Resolution to the attention of the International Civil Aviation Organization (ICAO).

RESOLUTION 604 (WRC-2000)

Studies on compatibility between the radionavigation-satellite service (space-to-Earth) operating in the frequency band 5 010-5 030 MHz and the radio astronomy service operating in the band 4 990-5 000 MHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that new radiocommunication services are developing, many of which require satellite transmitters, and need to be allocated sufficient spectrum;

b) that research in radio astronomy depends critically upon the ability to make observations at the extreme limits of sensitivity and/or precision;

c) that transmissions from space stations of the radionavigation-satellite service (RNSS) in the frequency band 5 010-5 030 MHz near the radio astronomy service operating in the band 4 990-5 000 MHz may cause interference harmful to the radio astronomy service (RAS);

d) that Recommendation ITU-R RA.769-1 recommends, *inter alia*, that all practicable steps be taken to reduce to the absolute minimum all unwanted emissions falling into RAS bands, particularly emissions from aircraft, spacecraft and balloons;

e) that protection requirements for RAS are explained and interference threshold values detailed in the Annex to Recommendation ITU-R RA.769-1;

f) that different coupling mechanisms apply to interfering emissions from terrestrial transmitters or from transmitters on board geostationary (GSO) or non-GSO satellites;

g) that this Conference has revised Recommendation **66 (Rev.WRC-97)**, which calls for study of those frequency bands and instances where, for technical or operational reasons, out-of-band emission limits may be required in order to protect safety services and passive services such as radio astronomy, and the impact on all concerned services of implementing or not implementing such limits;

h) that administrations may require criteria to protect RAS from interference detrimental to radio astronomy observations caused by space-to-Earth transmissions of space stations,

noting

a) that this Conference has adopted No. **S5.444C** specifying a provisional power flux-density (pfd) limit in the band 4 990-5 000 MHz for out-of-band space-to-Earth emissions of the RNSS operating in the band 5 010-5 030 MHz;

b) that the general problem of protection of radio astronomy and passive services is under study in ITU-R, *inter alia* in response to Recommendation **66**,

resolves

1 to invite WRC-03 to review the provisional pfd limit on the RNSS in the band 4 990-5 000 MHz for out-of-band space-to-Earth emissions of the RNSS operating in the band 5 010-5 030 MHz;

2 that the limits indicated in No. **S5.444C** shall be applied provisionally for systems for which complete notification information has been received by the Bureau after 2 June 2000;

3 that, as of 3 June 2000, when notifying frequency assignments to a satellite network in the RNSS in the bands 5 010-5 030 MHz, the responsible administration shall provide the calculated values of the aggregate pfd in the bands above 5 030 MHz and in the band 4 990-5 000 MHz, as defined in No. **S5.444C**, in addition to the relevant characteristics listed in Appendix **S4**,

invites ITU-R

to conduct, or continue to conduct, as a matter of urgency and in time for consideration by WRC-03, the appropriate technical, operational and regulatory studies to review the provisional pfd limit concerning the operation of space stations, including the development of a methodology for calculating the aggregate power levels in order to ensure that the RNSS (space-to-Earth) in the band 5 010-5 030 MHz will not cause interference detrimental to the RAS in the band 4 990-5 000 MHz,

urges administrations

1 to participate actively in the aforementioned studies by submitting contributions to ITU-R;

2 to ensure that, to the extent feasible, systems designed to operate in the RNSS frequency band 5 010-5 030 MHz incorporate interference avoidance techniques, such as filtering,

instructs the Radiocommunication Bureau

as of the end of WRC-03, to review and, if appropriate, revise any finding previously made in respect of the compliance with the out-of-band emission limits contained in No. **S5.444C** of an RNSS (space-to-Earth) system for which notification information has been received before the end of WRC-03; this review shall be based on the values, as revised, if appropriate, by WRC-03.

RESOLUTION 605 (WRC-2000)

Use of the frequency band 1 164-1 215 MHz by systems of the radionavigation-satellite service (space-to-Earth)

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that in accordance with the Radio Regulations, the band 960-1 215 MHz is allocated on a primary basis to the aeronautical-radionavigation service in all the ITU Regions;

b) that this Conference has decided to introduce a new allocation for the radionavigation-satellite service (RNSS) (space-to-Earth) in the frequency band 1 164-1 215 MHz, with a provisional limit on the aggregate power flux-density (pfd) produced by all the space stations within all radionavigation-satellite systems at the Earth's surface of –115 dB(W/m^2) in any 1 MHz band for all angles of arrival;

c) that it is likely that no RNSS system will be fully operational in this band before the next WRC;

d) that only a few RNSS systems are expected to be deployed in this band;

e) that it is unlikely that more than two systems will have overlapping frequencies,

noting

a) that the studies conducted to date by the International Civil Aviation Organization (ICAO) to ensure protection of current operation of distance measuring equipments (DME) indicate that a provisional pfd value for the RNSS allocation in this band should be in the range of –115 to –119 dB(W/m^2) in any 1 MHz band for the aggregate interference from all space stations of all RNSS systems operating in the same band;

b) that no methodology is available to derive an aggregate pfd for all RNSS space stations of one system from the aggregate pfd for all systems given in No. **S5.328A**,

resolves

1 that the provisional pfd limit given in No. **S5.328A** shall be applied for all RNSS (space-to-Earth) systems as of 2 June 2000;

2 to recommend that WRC-03 review the results of the studies in *invites ITU-R* and take appropriate action;

3 that the administrations planning to implement RNSS systems in this band shall consult each other in order to ensure that the provisional aggregate pfd limit is not exceeded;

4 that, as of 3 June 2000, when notifying frequency assignments to a satellite network in the RNSS service in the bands 1 164-1 215 MHz, the responsible administration shall provide the calculated values of the aggregate pfd, as defined in No. **S5.328A**, in addition to the relevant characteristics listed in Appendix **S4**,

invites ITU-R

to conduct, as a matter of urgency and in time for WRC-03, the appropriate technical, operational and regulatory studies on the overall compatibility between the RNSS and the aeronautical radionavigation service in the band 960-1 215 MHz, including an assessment of the need for an aggregate pfd limit, and revision, if necessary, of the provisional pfd limit given in No. **S5.328A** concerning the operation of RNSS (space-to-Earth) systems in the frequency band 1 164-1 215 MHz,

instructs the Radiocommunication Bureau

as of the end of WRC-03, to review and, if necessary, revise any finding previously made on the compliance with the limit of a RNSS (space-to-Earth) system for which notification information has been received before the end of WRC-03; this review shall be based on the values as revised, if necessary, by WRC-03,

urges administrations

to participate actively in the aforementioned studies by submitting contributions to ITU-R,

instructs the Secretary-General

to communicate the contents of this resolution to the ICAO for such actions as it may consider appropriate and to invite ICAO to participate actively in the study activity identified under *invites ITU-R*.

RESOLUTION 606 (WRC-2000)

Use of the frequency band 1 215-1 300 MHz by systems of the radionavigation-satellite service (space-to-Earth)

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has decided to introduce a new allocation for the radionavigation-satellite service (RNSS) (space-to-Earth) in the frequency band 1 260-1 300 MHz;

b) that in the band 1 215-1 260 MHz RNSS (space-to-Earth) systems have been successfully operated for a considerable time in a band used by radars;

c) the importance of the radionavigation service authorized in certain countries in accordance with No. **S5.331** and of the radiolocation service, and the need for adequate protection and continued operation of these services throughout the band 1 215-1 300 MHz,

resolves

1 that no additional constraints shall be placed on RNSS (space-to-Earth) systems operating in the band 1 215-1 260 MHz;

2 to recommend that WRC-03 review the results of the studies in *invites ITU-R* and take appropriate action,

invites ITU-R

to conduct, as a matter of urgency and in time for WRC-03, the appropriate technical, operational and regulatory studies, including an assessment of the need for a power flux-density limit concerning the operation of RNSS (space-to-Earth) systems in the frequency band 1 215-1 300 MHz in order to ensure that the RNSS (space-to-Earth) will not cause harmful interference to the radionavigation and the radiolocation services,

instructs the Secretary-General

to communicate the contents of this Resolution to the International Civil Aviation Organization (ICAO) for such actions as it may consider appropriate and to invite ICAO to participate actively in the study activity identified under *invites ITU-R*.

RESOLUTION 607 (WRC-2000)

Studies on compatibility between stations of the radionavigation-satellite service (Earth-to-space) and the radiolocation service operating in the frequency band 1 300-1 350 MHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has added a primary allocation to the radionavigation-satellite service (RNSS) (Earth-to-space) in the 1 300-1 350 MHz band;

b) that this Conference has raised the status of the radiolocation service from secondary to primary in the 1 300-1 350 MHz band;

c) that studies to determine compatibility between airborne radar systems operating in the radiolocation service and the RNSS have not yet been carried out;

d) that there is a potential for interference between ground-based beacons in the RNSS and airborne radiolocation systems;

e) that airborne radiolocation systems can be protected with the implementation of adequate separation distances, if necessary;

f) that a maximum of twenty ground-based beacons in the RNSS are expected to be deployed globally,

resolves to invite ITU-R

to conduct, as a matter of urgency, the appropriate studies to ensure that stations of the RNSS (Earth-to-space) in the band 1 300-1 350 MHz do not cause harmful interference to the operation of airborne radiolocation systems and to develop, if needed, appropriate Recommendations,

urges administrations

to participate actively in these studies by submitting contributions to ITU-R.

RESOLUTION 644 (Rev.WRC-2000)

Telecommunication resources for disaster mitigation and relief operations

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that ITU, in the same spirit as reflected in Articles 40 and 46 of its Constitution has specifically recognized the importance of the international use of radiocommunications in the event of natural disasters, epidemics, famines and similar emergencies;

b) that the Plenipotentiary Conference (Minneapolis, 1998), in endorsing Resolution 19 of the World Telecommunication Development Conference (Valetta, 1998), adopted Resolution 36 (Rev. Minneapolis, 1998) on telecommunications in the service of humanitarian assistance;

c) that administrations have been urged to take all practical steps to facilitate the rapid deployment and effective use of telecommunication resources for disaster mitigation and disaster relief operations by reducing and, where possible, removing regulatory barriers and strengthening transborder cooperation between States,

recognizing

a) the potential of modern telecommunication technologies as an essential tool for disaster mitigation and relief operations and the vital role of telecommunications for the safety and security of relief workers in the field;

b) the particular needs of developing countries and the special requirements of the inhabitants of remote areas,

noting

that the Intergovernmental Conference on Emergency Telecommunications (ICET-98), held from 16 to 18 June 1998 in Tampere, Finland, adopted the Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations (Tampere Convention),

resolves

to invite the ITU Radiocommunication Sector to continue to study, as a matter of urgency, those aspects of radiocommunications that are relevant to disaster mitigation and relief operations, such as decentralized means of communications that are appropriate and generally available, including amateur radio facilities and mobile and portable satellite terminals,

instructs the Director of the Radiocommunication Bureau

to support administrations in their work towards the implementation of Resolution 36 (Rev. Minneapolis, 1998) and the Tampere Convention.

RESOLUTION 645 (WRC-2000)

Global harmonization of spectrum for public protection and disaster relief

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) the growing telecommunication needs of public agencies and organizations dealing with law and order, disaster relief and emergency response;

b) that future advanced solutions used by such public protection agencies and organizations will require high data rates, video and multimedia;

c) that there is a need for interoperability and interworking between security and emergency networks, both nationally and for cross-border operations, in emergency situations and disaster relief;

d) the importance of the needs of public protection agencies and organizations, including those dealing with emergency situations and disaster relief for:

– maintenance of law and order;

– emergency and disaster response;

– safety of life and property,

recognizing

a) the benefits of globally harmonized frequency bands for such applications;

b) the increased potential for cooperation between countries for the provision of effective and appropriate humanitarian assistance during disasters;

c) the needs of developing countries for low-cost solutions for public protection agencies and organizations;

d) that global harmonization of spectrum for such usage will lead to economies of scale and reduce the costs of such solutions,

resolves to invite ITU-R

1 to study, as a matter of urgency, identification of frequency bands that could be used on a global/regional basis by administrations intending to implement future solutions for public protection agencies and organizations, including those dealing with emergency situations and disaster relief;

2 to study, as a matter of urgency, regulatory provisions necessary for identifying globally/regionally harmonized frequency bands for such purposes;

3 to conduct studies for the development of a Resolution identifying the technical and operational basis for global cross-border circulation of radiocommunication equipment in emergency and disaster relief situations,

instructs the Director of the Radiocommunication Bureau

to report on the results of these studies to WRC-03,

urges administrations

to participate actively in the aforementioned studies by submitting contributions to ITU-R,

recommends

that WRC-03 consider the identification of globally/regionally harmonized frequency bands for future advanced solutions to meet the needs of public protection agencies and organizations, including those dealing with emergency situations and disaster relief, and make regulatory provisions, as necessary.

RESOLUTION 703 (Rev.WARC-92)

Calculation methods and interference criteria recommended by the ITU-R for sharing frequency bands between space radiocommunication and terrestrial radiocommunication services or between space radiocommunication services*

* WRC-2000 reviewed this Resolution and decided to recommend that WRC-03 review the need for this Resolution and, until that time, the implementation of the Resolution should be suspended, except that once a year the Director will send a list of ITU-R Recommendations as identified according to *resolves* 1 to all administrations for information.

RESOLUTION 706 (Rev.WRC-2000)

Operation of the fixed service in the band 90-110 kHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) the need to protect phased pulse hyperbolic radionavigation systems (Loran-C) operating in the band 90-110 kHz used as a safety service for both maritime and aeronautical services;

b) the studies made by the ITU-R in this band;

c) that harmful interference affecting safety of flight and ship navigation may be caused to this service by the operation of the fixed service having a secondary allocation in this band;

d) that, WARC Mob-87 removed the allocation for the maritime mobile service from this band,

noting

that WARC Mob-87 was not competent to affect significantly the allocation of the fixed service,

resolves

to invite the next competent conference to review the fixed service allocation in this band with a view to its possible deletion.

RESOLUTION 716 (Rev.WRC-2000)

Use of the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz in all three Regions and 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2 by the fixed and mobile-satellite services and associated transition arrangements

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that WARC-92 allocated the bands 1 980-2 010 MHz and 2 170-2 200 MHz for the mobile-satellite service with a date of entry into force of 1 January 2005, these allocations being co-primary with fixed and mobile service allocations;

b) that the use of the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz in all three Regions and 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2 by the mobile-satellite service (MSS), in accordance with the provisions of Nos. **S5.389A**, **S5.389C** and **S5.389D** of the Radio Regulations, as adopted by WRC-95 and WRC-97, is subject to a date of entry into force of 1 January 2000, 1 January 2002 (for Region 2) or 1 January 2005;

c) that these bands are shared with the fixed and mobile[1] services on a primary basis and that they are widely used by the fixed service in many countries;

d) that the studies made have shown that, while sharing of the MSS with the fixed service in the short to medium term would be generally feasible, in the long term sharing will be complex and difficult in both bands, so that it would be advisable to transfer the fixed service stations operating in the bands in question to other segments of the spectrum;

e) that for many developing countries, the use of the 2 GHz band offers a substantial advantage for their radiocommunication networks and that it is not attractive to transfer these systems to higher frequency bands because of the economic consequences that this would entail;

f) that ITU-R has developed a new frequency plan for the fixed service in the 2 GHz band, set out in Recommendation ITU-R F.1098 which will facilitate the introduction of new fixed service systems in band segments that do not overlap with the above-mentioned MSS allocations at 2 GHz;

g) that sharing between fixed service systems using tropospheric scatter and Earth-to-space links in the MSS in the same frequency band segments is generally not feasible;

h) that some countries utilize these bands in application of Article 48 of the Constitution (Geneva, 1992),

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[1] This Resolution does not apply to the mobile service. In this respect, the use of these bands by the mobile-satellite service is subject to coordination with the mobile service under the provisions of Resolution **46 (Rev.WRC-97)** or No. **S9.11A**, as applicable.

recognizing

a) that WARC-92 identified the bands 1 885-2 025 MHz and 2 110-2 200 MHz for worldwide use by International Mobile Telecommunications-2000 (IMT-2000), the satellite component being limited to the bands 1 980-2 010 MHz and 2 170-2 200 MHz, and that the development of IMT-2000 can offer great potential in helping the developing countries develop more rapidly their telecommunication infrastructure;

b) that WARC-92 resolved to request the Telecommunication Development Bureau, when formulating its immediate plans for assistance to the developing countries, to consider the introduction of specific modifications in the radiocommunication networks of the developing countries and that a future world development conference should examine the needs of developing countries and should assist them with the resources needed to implement the required modifications to their radiocommunication networks,

resolves

1 to request administrations to notify to the Radiocommunication Bureau the basic characteristics of frequency assignments to existing or planned fixed stations requiring protection, or those typical[2] of existing and planned fixed stations brought into use before 1 January 2000 in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz in all three Regions and 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2;

2 that administrations proposing to bring an MSS system into service must take account of the fact that, when coordinating their system with administrations having terrestrial services, such administrations may have existing or planned installations covered by Article 48 of the Constitution;

3 that in respect of stations of the fixed service taken into account in the application of Resolution **46 (Rev.WRC-97)/**No. **S9.11A**, administrations responsible for MSS networks operating in the bands 1 980-2 010 MHz and 2 170-2 200 MHz in all three Regions and 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2 shall ensure that unacceptable interference is not caused to fixed service stations notified and brought into use before 1 January 2000;

4 that to facilitate the introduction and future use of the 2 GHz bands by the MSS:

4.1 administrations are urged to ensure that frequency assignments to new fixed service systems, to be brought into operation after 1 January 2000, do not overlap with the 1 980-2 010 MHz and 2 170-2 200 MHz in all three Regions and 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2 MSS allocations, for example by using the channel plans of Recommendation ITU-R F.1098;

[2] With respect to the notification of frequency assignments to stations in the fixed and mobile services, it was possible to notify the characteristics of typical stations in the fixed service in accordance with No. **S11.17** without restriction up until 1 January 2000.

4.2 administrations are urged to take all practicable steps to phase out troposcatter systems operating in the band 1 980-2 010 MHz in all three Regions and 2 010-2 025 MHz in Region 2 by 1 January 2000. New troposcatter systems shall not be brought into operation in these bands;

4.3 administrations are encouraged, where practicable, to draw up plans for the gradual transfer of the frequency assignments to their fixed service stations in the bands 1 980-2 010 MHz and 2 170-2 200 MHz in all three Regions and 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2 to non-overlapping bands, giving priority to the transfer of their frequency assignments in the band 1 980-2 010 MHz in all three Regions and 2 010-2 025 MHz in Region 2, considering the technical, operational and economical aspects;

5 that administrations responsible for the introduction of mobile-satellite systems should take into account and address the concerns of affected countries, especially developing countries, to minimize the possible economic impact of transition measures in respect to existing systems;

6 to invite the Bureau to provide assistance to developing countries requesting it for the introduction of specific modifications to their radiocommunication networks that will facilitate their access to the new technologies being developed in the 2 GHz band as well as in all coordination activities;

7 that administrations responsible for the introduction of mobile-satellite systems urge their mobile-satellite system operators to participate in the protection of terrestrial fixed services especially in the least developed countries,

invites ITU-R

to conduct, as a matter of urgency, further studies, in conjunction with the Bureau, to:

– develop and provide to administrations the necessary tools in a timely manner and not later than WRC-03 to assess the impact of interference in the detailed coordination of mobile-satellite systems;

– develop the necessary planning tools as soon as possible to assist those administrations considering a replanning of their terrestrial fixed networks in the 2 GHz range not later than WRC-03,

invites ITU-D

to evaluate, as a matter of urgency, the financial and economic impact on the developing countries of the transfer of fixed services, and to present its results to a future competent world radiocommunication conference and/or world telecommunication development conference, *invites the Director of the Telecommunication Development Bureau*

to implement *invites ITU-D* by encouraging joint activities between the relevant study groups of both ITU-D and ITU-R,

instructs the Director of the Radiocommunication Bureau

to submit a report on the implementation of this Resolution to world radiocommunication conferences.

RESOLUTION 723 (Rev.WRC-2000)

Consideration by a future competent world radiocommunication conference of issues dealing with allocations to science services

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference recognized the importance of proper consideration of science service issues based on technical and operational criteria developed in radiocommunication study groups;

b) that circumstances did not enable the completion of all necessary studies relating to a number of proposals concerning science services;

c) that a deficiency in telecommand (uplink) frequency allocations exists, compared to available telemetry (downlink) allocations in the 100 MHz to 1 GHz range;

d) that certain existing allocations may provide the means to satisfy requirements for space research applications without the need for additional frequency allocations, subject to the determination of the appropriate allocation status and/or sharing conditions,

resolves

to recommend that WRC-03 consider the following matters:

1) provision of up to 3 MHz of frequency spectrum for the implementation of telecommand links in the space research and space operations services in the frequency range 100 MHz to 1 GHz;

2) to consider incorporating in the Table of Frequency Allocations the existing primary allocation to the space research service in the band 7 145-7 235 MHz under No. **S5.460**;

3) to review the allocations to the space research service (deep space) (space-to-Earth) and the inter-satellite service, taking into account the coexistence of these two services in the frequency range 32-32.3 GHz, with a view to facilitating satisfactory operation of these services;

4) to review existing allocations to space science services near 15 GHz and 26 GHz, with a view to accommodating wideband space-to-Earth space research applications,

invites ITU-R

to complete the necessary studies, as a matter of urgency, taking into account the present use of allocated bands, with a view to presenting, at the appropriate time, the technical information likely to be required as a basis for the work of the Conference,

instructs the Secretary-General

to bring this Resolution to the attention of the international and regional organizations concerned.

RESOLUTION 727 (Rev.WRC-2000)

Use of the frequency band 420-470 MHz by the Earth exploration-satellite service (active)

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the United Nations Conference on Environment and Development (UNCED) (Rio de Janeiro, 1992) identified an urgent need for assessment and systematic observations of forest cover and rate of forest degradation in tropical and temperate regions;

b) that, during WRC-97, many countries agreed to the principle that ITU should take action in response to the need identified by UNCED;

c) that frequencies around 450 MHz have been identified as having the unique capability to penetrate the canopy of forests and to determine the ground-trunk interaction;

d) that a bandwidth of about 6 MHz is considered necessary to provide the required resolution,

recognizing

a) that WRC-97 considered a proposal for a secondary allocation for the Earth exploration-satellite service (active) within the frequency band 432-438 MHz;

b) that CPM-97 concluded that spaceborne sensors cannot be considered technically compatible with terrestrial tracking radars without restriction on the spaceborne sensors;

c) that measures may be needed to minimize interference to fixed, mobile, mobile-satellite, amateur, amateur-satellite and space operation services,

resolves

1 to invite ITU-R to study, as a matter of urgency, emission criteria, specific sharing criteria and operational characteristics for active spaceborne sensors in the frequency band 420-470 MHz, and develop a relevant Recommendation;

2 to invite ITU-R to develop an ITU-R Report by the date of a future CPM on the specific emission and operational characteristics used by the Earth exploration-satellite service (active) in order to minimize the potential interference to existing services, and in order to support the selection of a frequency band having the optimal sharing scenarios;

3 that, on the basis of proposals from administrations, and taking into account the results of the ITU-R studies, the ITU-R Report mentioned in *resolves* 2, and a future CPM Report, a future competent world radiocommunication conference should consider provision of up to 6 MHz of frequency spectrum to the Earth exploration-satellite service (active) in the frequency band 420-470 MHz.

RESOLUTION 728 (Rev.WRC-2000)

Studies relating to consideration of allocations in the broadcasting band 470-862 MHz to non-geostationary mobile-satellite services

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the agenda of this Conference included consideration of the adoption of additional allocations for non-geostationary mobile-satellite services (non-GSO MSSs);

b) that the CPM-99 Report stated that the Radiocommunication Bureau has identified at least 22 non-GSO MSS networks as at 28 April 1999 at frequencies below 1 GHz, at some stage of coordination under Resolution **46**, and that many of the proposed networks cannot be implemented in the existing allocations because there is not enough spectrum;

c) that CPM-97 considered the protection requirements for analogue television in the band 470-862 MHz against a narrow-band MSS signal in the most sensitive and least sensitive portions of an analogue television channel and the protection requirements for a digital television channel, based on existing Recommendations ITU-R BT.655-4, ITU-R BT.417-4 and ITU-R IS.851-1;

d) that CPM-97 stated that the protection ratios for a narrow-band interfering signal in the least sensitive parts of an analogue television channel are to be verified by further studies;

e) that CPM-97 stated the region of lower protection requirements and commensurately higher permissible interfering power flux-density levels as being 100 kHz from the band edges of an analogue television channel, at least in some countries;

f) that CPM-97 stated that the interfering effects of a non-GSO MSS transmission will depend on its specific characteristics (e.g. duty-cycle, duration, periodicity, etc.), that interference contributions from sources other than MSS (even those from other broadcasting stations) have to be taken into account, that slightly lower values of field strength to be protected may need to be assumed in countries where television networks are relatively sparse, and that studies on sharing are necessary;

g) that the permissible aggregate interfering power flux-density resulting from these protection requirements, in some portions of an analogue television channel, may be useful in determining the feasibility of sharing with non-GSO MSS transmitter space-to-Earth links;

h) that these bands are also allocated in part to fixed and mobile terrestrial systems and radionavigation systems;

i) that, in many countries, the channels assigned for analogue television may also be used for digital television, and that during the transition period of parallel operation of analogue and digital television networks the usage of this band for television will increase;

j) that ITU-R studies are currently under way to determine television broadcasting requirements under Question ITU-R 268/11 and sound broadcasting requirements under Question ITU-R 224/10,

noting

a) that on completion of studies, parts of the bands now allocated to the broadcasting service between 470 MHz and 862 MHz might be considered suitable for worldwide allocation to non-GSO MSS (space-to-Earth) transmissions;

b) that the bandwidth required in these television channels may be 1-2% of the total band 470-862 MHz to be shared with the above systems;

c) the need to protect the radio astronomy service in the band 608-614 MHz against interference from MSS transmissions, including unwanted emissions,

resolves

1 to invite ITU-R to carry out additional studies to determine operational and technical means that may facilitate co-frequency sharing between narrow-band non-GSO MSS (space-to-Earth) transmissions and the services to which the band 470-862 MHz is allocated, including the bands where the broadcasting service is also allocated, and including consideration of digital television systems and parallel transmissions during the transition period;

2 to recommend that WRC-05/06 consider, on the basis of the results of the studies referred to in *resolves* 1, the possibility of making additional allocations on a worldwide basis for the non-GSO MSS,

urges administrations

to participate actively in such studies, with the involvement of interested parties.

RESOLUTION 730 (WRC-2000)

Use of the frequency band 35.5-35.6 GHz by spaceborne precipitation radars

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the frequency band 35.5-36 GHz is allocated to the Earth exploration-satellite service (active) on a primary basis under No. **S5.551A** and is also allocated to the meteorological aids and radiolocation services on a primary basis;

b) that, before WRC-97, operation on a primary basis of radars located on spacecraft was allowed in the band 35.5-35.6 GHz;

c) that performance criteria and interference criteria for spaceborne precipitation radars in the band 35.5-36 GHz are contained in Recommendation ITU-R SA.1166-2;

d) that spaceborne precipitation radars are very important for the measurement of rain rate globally and for the study of global water circulation;

e) that the minimum observable rain rate at around 35 GHz is less than 0.2 mm/h;

f) that combining measurements in part of the band 35.5-35.6 GHz and in the band 13.4-13.75 GHz is very useful for the precise measurement of rain rate;

g) that studies have shown that sharing between spaceborne active sensors and radiolocation systems in the band 35.5-36 GHz is feasible, as indicated in § 5.7.2.1 of Chapter 5 of the CPM-97 Report,

resolves

1 to invite ITU-R to study sharing between spaceborne precipitation radars and other services in the band 35.5-35.6 GHz;

2 to recommend that WRC-03 review the results of those studies and consider the removal of the restriction currently contained in No. **S5.551A** on spaceborne precipitation radars operating in the Earth exploration-satellite service in the band 35.5-35.6 GHz.

RESOLUTION 731 (WRC-2000)

Consideration by a future competent world radiocommunication conference of issues dealing with sharing and adjacent-band compatibility between passive and active services above 71 GHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that the changes made to the Table of Frequency Allocations by this Conference in bands above 71 GHz were based on the requirements known at the time of the Conference;

b) that the passive service spectrum requirements above 71 GHz are based on physical phenomena and therefore are well known, and are reflected in the changes made to the Table of Frequency Allocations by this Conference;

c) that several bands above 71 GHz are already used by Earth exploration-satellite service (passive) and space research service (passive) because they are unique bands for the measurement of specific atmospheric parameters;

d) that there is currently only limited knowledge of requirements and implementation plans for the active services that will operate in bands above 71 GHz;

e) that, in the past, technological developments have led to viable communication systems operating at increasingly higher frequencies, and that this can be expected to continue so as to make communication technology available in the future in the frequency bands above 71 GHz;

f) that, in the future, alternative spectrum needs for the active and passive services should be accommodated when the new technologies become available;

g) that, following the revisions to the Table of Frequency Allocations by this Conference, sharing studies may be required for services in some bands above 71 GHz;

h) that interference criteria for passive sensors have been developed and are given in Recommendation ITU-R SA.1029;

i) that protection criteria for radio astronomy have been developed and are given in Recommendation ITU-R RA.769;

j) that several satellite downlink allocations have been made in bands adjacent to those allocated to the radio astronomy service;

k) that, sharing criteria for active and passive services in bands above 71 GHz have not yet been fully developed within ITU-R;

l) that, in order to ensure protection of passive services above 71 GHz, this Conference avoided making allocations to both active and passive services in some bands such as 100-102 GHz, 148.5-151.5 GHz and 226-231.5 GHz, so as to prevent potential sharing problems,

recognizing

that, to the extent practicable, the burden of sharing among active and passive services should be equitably distributed among the services to which allocations are made,

resolves

that a future competent conference should consider the results of ITU-R studies with a view to revising the Radio Regulations, as appropriate, in order to accommodate the emerging requirements of active services, taking into account the requirements of the passive services, in bands above 71 GHz,

urges administrations

to note the possibility of changes to Article **S5** to accommodate emerging requirements for active services, as indicated in this Resolution, and to take this into account in the development of national policies and regulations,

invites ITU-R

1 to continue its studies to determine if and under what conditions sharing is possible between active and passive services in the bands above 71 GHz, such as, but not limited to, 100-102 GHz, 116-122.25 GHz, 148.5-151.5 GHz, 174.8-191.8 GHz, 226-231.5 GHz and 235-238 GHz;

2 to study means of avoiding adjacent-band interference from space services (down-links) into radio astronomy bands above 71 GHz;

3 to take into account the principles of burden-sharing to the extent practicable in their studies;

4 to complete the necessary studies when the technical characteristics of the active services in these bands are known;

5 to develop Recommendations specifying sharing criteria for those bands where sharing is feasible,

instructs the Secretary-General

to bring this Resolution to the attention of the international and regional organizations concerned.

RESOLUTION 732 (WRC-2000)

Consideration by a future competent world radiocommunication conference of issues dealing with sharing between active services above 71 GHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has made changes to the Table of Frequency Allocations above 71 GHz, following consideration of science service issues;

b) that there are several co-primary active services in some bands above 71 GHz in the Table of Frequency Allocations as revised by this Conference;

c) that there is limited knowledge of characteristics of active services that may be developed to operate in bands above 71 GHz;

d) that sharing criteria for sharing between active services in bands above 71 GHz have not yet been fully developed within ITU-R;

e) that sharing between multiple co-primary active services may hinder the development of each active service in bands above 71 GHz;

f) that the technology for some active services may be commercially available earlier than for some other active services;

g) that adequate spectrum should be available for the active services for which the technology is available at a later time,

noting

that sharing criteria need to be developed, to be used by a future competent conference, for determining to what extent sharing between multiple co-primary active services is possible in each of the bands,

resolves

1 that appropriate measures should be taken to meet the spectrum requirements for active services for which the technology will be commercially available at a later time;

2 that sharing criteria be developed for co-primary active services in bands above 71 GHz;

3 that the sharing criteria developed should form the basis for a review of active service allocations above 71 GHz at a future competent conference, if necessary,

urges administrations

to note the possibility of changes to Article **S5** to accommodate emerging requirements for active services, as indicated in this Resolution, and to take this into account in the development of national policies and regulations,

invites ITU-R

to complete the necessary studies with a view to presenting, at the appropriate time, the technical information likely to be required as a basis for the work of a future competent conference,

instructs the Secretary-General

to bring this Resolution to the attention of the international and regional organizations concerned.

RESOLUTION 733 (WRC-2000)

Review of sharing conditions between services in the band 13.75-14 GHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that WARC-92 added an allocation to the fixed-satellite service (FSS) (Earth-to-space) in the band 13.75-14 GHz;

b) that this band is shared with the radiolocation and radionavigation services and certain limitations have been placed on the fixed-satellite, radiolocation and radionavigation services under No. **S5.502**;

c) that the services operating in this band are evolving and may have new technical requirements;

d) that the band 13.772-13.778 GHz is also shared with the space research service under the conditions set out in No. **S5.503**;

e) that, in some countries, the band is also allocated to the fixed service and the mobile service (Nos. **S5.499** and **S5.500**) and to the radionavigation service (No. **S5.501**);

f) that the geostationary (GSO) FSS operators have expressed interest in operating earth station antennas with a diameter of less than 4.5 m in the band 13.75-14 GHz;

g) that there is a need to determine the sharing conditions affecting the radiolocation, space research and fixed-satellite services and to maintain the delicate balance between these services,

resolves to invite ITU-R

1 to conduct studies, as a matter of urgency and in time for consideration by WRC-03, on the sharing conditions indicated in Nos. **S5.502** and **S5.503**, with a view to reviewing the constraints in No. **S5.502** regarding the minimum antenna diameter of GSO FSS earth stations and the constraints on the e.i.r.p. of the radiolocation service;

2 to identify and study, in time for consideration by WRC-03, possible alternative sharing conditions to those indicated in Nos. **S5.502** and **S5.503**.

RESOLUTION 734 (WRC-2000)

Feasibility of use by high altitude platform stations in the fixed and mobile services in the frequency bands above 3 GHz allocated exclusively for terrestrial radiocommunication

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that ITU has among its purposes “to promote the extension of the benefit of the new telecommunication technologies to all the world’s inhabitants” (No. 6 of the Constitution);

b) that systems based on new technologies using high altitude platform stations (HAPS) can potentially be used for various applications such as the provision of high-capacity services to urban and rural areas;

c) that WRC-97 made provision for the use of HAPS within the fixed service in the bands 47.2-47.5 GHz and 47.9-48.2 GHz (see also Resolution **122 (Rev.WRC-2000)**);

d) that in view of the altitude at which HAPS are placed, the area visible from a HAPS may be within a country or also include neighbouring countries;

e) that some administrations intend to operate systems using HAPS in the bands allocated exclusively by the Table of Frequency Allocations or by footnotes for terrestrial radiocommunication such as the fixed and mobile services,

recognizing

a) ITU-R studies relating to geometrical coordination distance for the visible distance from HAPS, as described in Recommendation ITU-R F.1501,

resolves

to recommend to WRC-03 to review the feasibility of facilitating the implementation of systems using HAPS in the fixed and mobile services in bands above 3 GHz allocated exclusively by the Table of Frequency Allocations or by footnotes for terrestrial radiocommunication,

invites ITU-R

to carry out, as a matter of urgency, regulatory and technical studies to determine the feasibility of facilitating systems using HAPS in the fixed and mobile services in bands above 3 GHz allocated exclusively by the Table of Frequency Allocations or by footnotes for terrestrial radiocommunication, taking account of existing use and future requirements in these bands, and any impact on allocations in adjacent bands,

encourages administrations

to contribute actively to the sharing studies in accordance with this Resolution.

RESOLUTION 735 (WRC-2000)

Sharing procedures and criteria between receiving earth stations in the broadcasting-satellite service and transmitting earth stations or terrestrial stations in frequency bands allocated to the broadcasting-satellite service and the fixed-satellite service (Earth-to-space) or to terrestrial services

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that receiving earth stations in the broadcasting-satellite service (BSS) are ubiquitously deployed throughout the service area of the associated satellite network and therefore cannot be coordinated or notified on the basis of specific earth stations;

b) that Nos. **S9.17** and **S9.17A** and the associated provisions in Article **S11** provide for the coordination and notification of specific earth stations in respect of terrestrial stations or of earth stations only;

c) that transmitting earth stations or terrestrial stations sharing spectrum with the BSS are required to coordinate with receiving earth stations in this service under No. **S9.19**;

d) that No. **S9.19** was introduced in the Radio Regulations by WRC-97 as a new provision, without specific criteria for sharing between these services;

e) that this Conference has modified No. **S9.19** to include the coordination of earth stations in opposite directions of transmission and the protection of typical earth stations in the BSS;

f) that the harmonious development of terrestrial and space services in the bands allocated to the BSS may be impeded by the lack of suitable procedures and associated sharing criteria;

g) that Appendix **S7** and Annex 3 to Appendix **S30** provide sharing criteria that may be reviewed and adjusted in order to cover the sharing situations referred to above,

resolves to invite ITU-R

to undertake, as a matter of urgency, and complete in time for consideration by WRC-03, the appropriate regulatory, operational and technical studies in the bands allocated to the BSS and the fixed-satellite service (Earth-to-space) or to terrestrial services, consistent with the decisions of WRC-2000 concerning No. **S9.19**, in order to enable WRC-03 to review, and if appropriate revise, the regulatory and technical sharing conditions between these services, with a view to enabling equitable access to spectrum by these services in these bands and ensure their harmonious development,

urges administrations

to participate actively in these studies, with the involvement of terrestrial, broadcasting-satellite and fixed-satellite service interests.

RESOLUTION 736 (WRC-2000)

Consideration by a future competent world radiocommunication conference of issues dealing with allocations to the mobile, fixed, radiolocation, Earth exploration-satellite (active), and space research (active) services in the frequency range 5 150-5 725 MHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that there is a need to provide globally harmonized frequencies in the bands 5 150-5 350 MHz and 5 470-5 725 MHz for the mobile service for wireless access systems including radio local area networks (RLANs);

b) that there is a need for frequencies for fixed wireless access applications in the fixed service in Region 3 in the band 5 250-5 350 MHz;

c) that there is a need for additional spectrum for the Earth exploration-satellite service (active) and space research service (active) in the frequency range 5 460-5 570 MHz;

d) that ongoing studies in ITU-R indicate that sharing in the band 5 150-5 350 MHz between RLANs and space services is feasible under specified conditions;

e) that there is a need to upgrade the status of frequency allocations to the radiolocation service in the frequency range 5 350-5 650 MHz,

recognizing

a) that sharing criteria between existing services and the proposed new allocations should be established;

b) that it is important to protect the existing primary services having allocations in the frequency range 5 150-5 725 MHz;

c) that the existing and new allocations are interdependent, particularly with respect to the relationship between the terrestrial and the space services,

resolves

that, on proposals from administrations and taking into account the results of ITU-R studies and the Conference Preparatory Meeting, WRC-03 should consider:

1 allocation of frequencies to the mobile service in the bands 5 150-5 350 MHz and 5 470-5 725 MHz for the implementation of wireless access systems including RLANs;

2 a possible allocation in Region 3 to the fixed service in the band 5 250-5 350 MHz, while fully protecting the worldwide Earth exploration-satellite (active) and space research (active) services;

3 additional primary allocations for the Earth exploration-satellite service (active) and space research service (active) in the frequency range 5 460-5 570 MHz;

4 a review, with a view to upgrading, of the status of frequency allocations to the radiolocation service in the frequency range 5 350-5 650 MHz,

invites ITU-R

to conduct, and complete in time for WRC-03, the appropriate studies leading to technical and operational recommendations to facilitate sharing between the services referred to in *resolves* and existing services.

RESOLUTION 737 (WRC-2000)

Review of spectrum and regulatory requirements to facilitate worldwide harmonization of emerging terrestrial wireless interactive multimedia applications

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) the rapid technical evolution taking place in several areas of telecommunications;

b) the importance of finding global solutions and worldwide spectrum for new terrestrial wireless interactive multimedia applications;

c) the need for terrestrial wireless interactive multimedia applications to individual end-users;

d) the convergence between some applications of the fixed, mobile and broadcasting services;

e) the need for worldwide allocations to such services, which also calls for higher spectrum efficiency;

f) the benefit, also for developing countries, of new, globally harmonized equipment and spectrum for the implementation of market-driven universal services,

noting

a) the historical practice of frequency segmentation, particularly the differences between Regions, but also segmentation between services, in the Table of Frequency Allocations (Article **S5**);

b) Recommendation **34 (WRC-95)**, derived from the recommendations of the Voluntary Group of Experts (VGE) to study alternative allocation methods, merging of services, etc. which sets the objectives of allocating frequency bands on a worldwide basis and to the most broadly defined services, wherever possible,

also noting

c) Resolution 9 of the World Telecommunication Development Conference (Valletta, 1998), calling for active participation by the developing countries in the review of global spectrum requirements for new technologies;

d) that ITU-R study groups are currently addressing the relevant issues, including, *inter alia*, the digitization of broadcasting services and studies on spectrum requirements,

recognizing

a) the time necessary to develop and agree on the technical, operational, spectrum and regulatory issues associated with the introduction of harmonized multimedia wireless applications;

b) that service functionalities in fixed, mobile and broadcasting networks are increasingly converging;

c) that, for international operation and economy of scale, it is desirable to agree on the technical, operational and spectrum-related parameters of systems;

d) that spectrum consideration is a prerequisite for the technological and economical success of multimedia wireless applications,

resolves to invite ITU-R

1 to pursue its studies to facilitate the development of common, worldwide allocations or identification of spectrum suitable for new terrestrial wireless interactive multimedia technologies and applications;

2 to review regulatory methods and appropriate means of worldwide spectrum identification in order to facilitate the harmonization of emerging terrestrial wireless interactive multimedia systems for the instant and flexible implementation of universal personal services;

3 to review, if necessary, service definitions in the light of convergence of applications;

4 to report to a future competent conference,

requests administrations

to participate in these studies by submitting contributions to ITU-R, and to submit proposals to future WRCs on this subject.

RESOLUTION 800 (WRC-2000)

Agenda for the 2003 World Radiocommunication Conference

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that, in accordance with No. 118 of the Convention, the general scope of the agenda for a world radiocommunication conference should be established four to six years in advance and a final agenda shall be established by the Council two years before the conference;

b) Article 13 of the Constitution relating to the competence and scheduling of world radiocommunication conferences and Article 7 of the Convention relating to their agendas;

c) the relevant Resolutions and Recommendations of previous world administrative radio conferences (WARCs) and world radiocommunication conferences (WRCs),

recognizing

a) that this Conference has identified a number of urgent issues requiring further examination by WRC-03;

b) that, in preparing this agenda, many items proposed by administrations could not be included and have had to be deferred to future conference agendas,

resolves

to recommend to the Council that a world radiocommunication conference be held in 2003 for a period of four weeks, with the following agenda:

1 on the basis of proposals from administrations and the Report of the Conference Preparatory Meeting, taking account of the results of WRC-2000, and with due regard to the requirements of existing and future services in the bands under consideration, to consider and take appropriate action with respect to the following items:

1.1 requests from administrations to delete their country footnotes or to have their country name deleted from footnotes, if no longer required, in accordance with Resolution **26 (Rev.WRC-97)**;

1.2 to review and take action, as required, on No. **S5.134** and related Resolutions **517 (Rev.WRC-97)** and **537 (WRC-97)** and Recommendations **515 (Rev.WRC-97)**, **517 (HFBC-87)**, **519 (WARC-92)** and Appendix **S11**, in the light of the studies and actions set out therein, having particular regard to the advancement of new modulation techniques, including digital techniques, capable of providing an optimum balance between sound quality, bandwidth and circuit reliability in the use of the HF bands allocated to the broadcasting service;

1.3 to consider identification of globally/regionally harmonized bands, to the extent practicable, for the implementation of future advanced solutions to meet the needs of public protection agencies, including those dealing with emergency situations and disaster relief, and to make regulatory provisions, as necessary, taking into account Resolution **645 (WRC-2000)**;

1.4 to consider the results of studies related to Resolution **114 (WRC-95)**, dealing with the use of the band 5 091-5 150 MHz by the fixed-satellite service (FSS) (Earth-to-space) (limited to non-geostationary (non-GSO) mobile-satellite service (MSS) feeder links), and review the allocations to the aeronautical radionavigation service and the FSS in the band 5 091-5 150 MHz;

1.5 to consider, in accordance with Resolution **736 (WRC-2000)**, regulatory provisions and spectrum requirements for new and additional allocations to the mobile, fixed, Earth exploration-satellite and space research services, and to review the status of the radiolocation service in the frequency range 5 150-5 725 MHz, with a view to upgrading it, taking into account the results of ITU-R studies;

1.6 to consider regulatory measures to protect feeder links (Earth-to-space) for the MSS which operate in the band 5 150-5 250 MHz, taking into account the latest ITU-R Recommendations (for example, Recommendations ITU-R S.1426, ITU-R S.1427 and ITU-R M.1454);

1.7 to consider issues concerning the amateur and amateur-satellite services:

1.7.1 possible revision of Article **S25**;

1.7.2 review of the provisions of Article **S19** concerning the formation of call signs in the amateur services in order to provide flexibility for administrations;

1.7.3 review of the terms and definitions of Article **S1** to the extent required as a consequence of changes made in Article **S25**;

1.8 to consider issues related to unwanted emissions:

1.8.1 consideration of the results of studies regarding the boundary between spurious and out-of-band emissions, with a view to including the boundary in Appendix **S3**;

1.8.2 consideration of the results of studies, and proposal of any regulatory measures regarding the protection of passive services from unwanted emissions, in particular from space service transmissions, in response to *recommends* 5 and 6 of Recommendation **66 (Rev.WRC-2000)**;

1.9 to consider Appendix **S13** and Resolution **331 (Rev.WRC-97)** with a view to their deletion and, if appropriate, to consider related changes to Chapter SVII and other provisions of the Radio Regulations, as necessary, taking into account the continued transition to and introduction of the Global Maritime Distress and Safety System (GMDSS);

1.10 to consider the results of studies, and take necessary actions, relating to:

1.10.1 exhaustion of the maritime mobile service identity numbering resource (Resolution **344 (WRC-97)**);

1.10.2 shore-to-ship distress communication priorities (Resolution **348 (WRC-97)**);

1.11 to consider possible extension of the allocation to the MSS (Earth-to-space) on a secondary basis in the band 14-14.5 GHz to permit operation of the aeronautical mobile-satellite service as stipulated in Resolution **216 (Rev.WRC-2000)**;

1.12 to consider allocations and regulatory issues related to the space science services in accordance with Resolution **723 (Rev.WRC-2000)** and to review all Earth exploration-satellite service and space research service allocations between 35 and 38 GHz, taking into account Resolution **730 (WRC-2000)**;

1.13 to consider regulatory provisions and possible identification of existing frequency allocations for services which may be used by high altitude platform stations, taking into account No. **S5.543A** and the results of the ITU-R studies conducted in accordance with Resolutions **122 (Rev.WRC-2000)** and **734 (WRC-2000)**;

1.14 to consider measures to address harmful interference in the bands allocated to the maritime mobile and aeronautical mobile (R) services, taking into account Resolutions **207 (Rev.WRC-2000)** and **350 (WRC-2000)**, and to review the frequency and channel arrangements in the maritime MF and HF bands concerning the use of new digital technology, also taking into account Resolution **347 (WRC-97)**;

1.15 to review the results of studies concerning the radionavigation-satellite service in accordance with Resolutions **604 (WRC-2000)**, **605 (WRC-2000)** and **606 (WRC-2000)**;

1.16 to consider allocations on a worldwide basis for feeder links in bands around 1.4 GHz to the non-GSO MSS with service links operating below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolution **127 (Rev.WRC-2000)**, provided that due recognition is given to the passive services, taking into account No. **S5.340**;

1.17 to consider upgrading the allocation to the radiolocation service in the frequency range 2 900-3 100 MHz to primary;

1.18 to consider a primary allocation to the fixed service in the band 17.3-17.7 GHz for Region 1, taking into account the primary allocations to various services in all three Regions;

1.19 to consider regulatory provisions to avoid misapplication of the non-GSO FSS single-entry limits in Article **S22** based on the results of ITU-R studies carried out in accordance with Resolution **135 (WRC-2000)**;

1.20 to consider additional allocations on a worldwide basis for the non-GSO MSS with service links operating below 1 GHz, in accordance with Resolution **214 (Rev.WRC-2000)**;

1.21 to consider progress of the ITU-R studies concerning the technical and regulatory requirements of terrestrial wireless interactive multimedia applications, in accordance with Resolution **737 (WRC-2000)**, with a view to facilitating global harmonization;

1.22 to consider progress of ITU-R studies concerning future development of IMT-2000 and systems beyond IMT-2000, in accordance with Resolution **228 (WRC-2000)**;

1.23 to consider realignment of the allocations to the amateur, amateur-satellite and broadcasting services around 7 MHz on a worldwide basis, taking into account Recommendation **718 (WARC-92)**;

1.24 to review the usage of the band 13.75-14 GHz, in accordance with Resolution **733 (WRC-2000)**, with a view to addressing sharing conditions;

1.25 to consider, with a view to global harmonization to the greatest extent possible, having due regard to not constraining the development of other services, and in particular of the fixed service and the broadcasting-satellite service (BSS), regulatory provisions and possible identification of spectrum for high-density systems in the FSS above 17.3 GHz, focusing particularly on frequency bands above 19.7 GHz;

1.26 to consider the provisions under which earth stations located on board vessels could operate in FSS networks, taking into account the ITU-R studies in response to Resolution **82 (WRC-2000)**;

1.27 to review, in accordance with Resolutions **540 (WRC-2000)** and **735 (WRC-2000)**, the ITU-R studies requested in those Resolutions, and modify, as appropriate, the relevant regulatory procedures and associated sharing criteria contained in Appendices **S30** and **S30A** and in the associated provisions;

1.28 to permit the use of the band 108-117.975 MHz for the transmission of radionavigation satellite differential correction signals by ground-based systems standardized by the International Civil Aviation Organization (ICAO);

1.29 to consider the results of studies related to Resolutions **136 (WRC-2000)** and **78 (WRC-2000)** dealing with sharing between non-GSO and GSO systems;

1.30 to consider possible changes to the procedures for the advance publication, coordination and notification of satellite networks in response to Resolution 86 (Minneapolis, 1998);

1.31 to consider the additional allocations to the MSS in the 1-3 GHz band, in accordance with Resolutions **226 (WRC-2000)** and **227 (WRC-2000)**;

1.32 to consider technical and regulatory provisions concerning the band 37.5-43.5 GHz, in accordance with Resolutions **128 (Rev.WRC-2000)** and **84 (WRC-2000)**;

1.33 to review and revise technical, operational and regulatory provisions, including provisional limits in relation to the operation of high altitude platform stations within International Mobile Telecommunications-2000 (IMT-2000) in the bands referred to in No. **S5.388A**, in response to Resolution **221 (WRC-2000)**;

1.34 to review the results of studies in response to Resolution **539 (WRC-2000)** concerning threshold values for non-GSO BSS (sound) in the band 2 630-2 655 MHz, and to take actions as required;

1.35 to consider the Report of the Director of the Radiocommunication Bureau on the results of the analysis in accordance with Resolution **53 (Rev.WRC-2000)** and take appropriate action;

2 to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations communicated by the Radiocommunication Assembly, in accordance with Resolution **28 (Rev.WRC-2000)**, and to decide whether or not to update the corresponding references in the Radio Regulations, in accordance with principles contained in the Annex to Resolution **27 (Rev.WRC-2000)**;

3 to consider such consequential changes and amendments to the Radio Regulations as may be necessitated by the decisions of the Conference;

4 in accordance with Resolution **95 (Rev.WRC-2000)**, to review the Resolutions and Recommendations of previous conferences with a view to their possible revision, replacement or abrogation;

5 to review, and take appropriate action on, the Report from the Radiocommunication Assembly submitted in accordance with Nos. 135 and 136 of the Convention;

6 to identify those items requiring urgent action by the Radiocommunication Study Groups in preparation for the next world radiocommunication conference;

7 in accordance with Article 7 of the Convention:

7.1 to consider and approve the Report of the Director of the Radiocommunication Bureau on the activities of the Radiocommunication Sector since WRC-2000, including on any difficulties or inconsistencies encountered in the application of the Radio Regulations, and action in response to Resolution **80 (Rev.WRC-2000);**

7.2 to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution **801 (WRC-2000)**, *further resolves*

8 to recommend to the Council that additional budgetary and conference resources be provided so that the following items can be included in this agenda for WRC-03:

8.1 to examine the adequacy of the frequency allocations for HF broadcasting from about 4 MHz to 10 MHz, taking into account the seasonal planning procedures adopted by WRC-97;

8.2 to consider the regulatory and technical provisions for satellite networks using highly elliptical orbits;

8.3 to consider provision of up to 6 MHz of frequency spectrum to the Earth exploration-satellite service (active) in the frequency band 420-470 MHz, in accordance with Resolution **727 (Rev.WRC-2000)**;

8.4 to examine the spectrum requirements in the FSS bands below 17 GHz for telemetry, tracking and telecommand of FSS networks operating with service links in the frequency bands above 17 GHz;

9 to activate the Special Committee,

invites the Council

to finalize the agenda and arrange for the convening of WRC-03, and to initiate as soon as possible the necessary consultation with Member States,

instructs the Director of the Radiocommunication Bureau

to make the necessary arrangements to convene meetings of the Conference Preparatory Meeting and to prepare a report to WRC-03,

instructs the Secretary-General

to communicate this Resolution to international and regional organizations concerned.

RESOLUTION 801 (WRC-2000)

Preliminary agenda for the 2005/2006 World Radiocommunication Conference

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that, in accordance with No. 118 of the ITU Convention, the general scope of the agenda for WRC-05/06 should be established four to six years in advance;

b) Article 13 of the Constitution relating to the competence and scheduling of world radiocommunication conferences and Article 7 of the ITU Convention relating to their agendas;

c) the relevant Resolutions and Recommendations of previous world administrative radio conferences (WARCs) and world radiocommunication conferences (WRCs),

resolves to give the view

that the following items should be included in the preliminary agenda for WRC-05/06:

1 to take appropriate action in respect of those urgent issues that were specifically requested by WRC-03;

2 on the basis of proposals from administrations and the Report of the Conference Preparatory Meeting, and taking account of the results of WRC-03, to consider and take appropriate action in respect of the following items:

2.1 requests from administrations to delete their country footnotes or to have their country name deleted from footnotes, if no longer required, taking into account Resolution **26 (Rev.WRC-97)**;

2.2 to review the operational procedures of the Global Maritime Distress and Safety System (GMDSS), taking into account the experience since its introduction and the needs of all classes of shipping;

2.3 to review studies and consider allocations in the frequency bands above 275 GHz;

2.4 to consider a Resolution specifying the technical bases for the global operation of stations in the land mobile and land mobile-satellite services between 30 MHz and 6 GHz;

2.5 to review the allocations to services in the HF bands, taking account of the impact of new modulation and adaptive control techniques and any recommendations by WRC-03 on the adequacy of the frequency allocations for HF broadcasting and the fixed and mobile services (excluding those bands whose allotment plans are in Appendices **S25**, **S26** and **S27**), from about 4 MHz to 10 MHz;

2.6 to consider possible changes in response to Resolution 86 (Minneapolis, 1998): "Coordination and notification procedures for satellite networks";

2.7 to consider potential for sharing at around 4 300 MHz between radio altimeters and space-based passive earth sensors;

2.8 on the basis of the results of studies, to consider allocations, if appropriate, to non-geostationary (non-GSO) mobile-satellite services (MSS) with service links below 1 GHz in the band 470-862 MHz, in accordance with Resolution **728 (Rev.WRC-2000)**;

2.9 to consider the use of frequency adaptive systems in the MF/HF bands, in accordance with Resolution **729 (WRC-97)**;

2.10 to consider allocation of the frequency band 14.5-14.8 GHz to the fixed-satellite service (FSS) (Earth-to-space) in Region 3 (expansion of the FSS to include links other than feeder links of the broadcasting-satellite service);

2.11 to review the possibility for additional allocations for the fixed service in the bands above 3 GHz;

2.12 to consider spectrum requirements for wideband aeronautical telemetry in the band between 3 GHz and 30 GHz;

2.13 to review No. **S5.332** in respect of the frequency band 1 215-1 260 MHz and No. **S5.333** in respect of the frequency band 1 260-1 300 MHz, concerning the Earth exploration-satellite service (active) and other services;

2.14 to take into account ITU-R studies in accordance with Resolution **342 (WRC-2000)**, and to consider the use of new digital technology for the maritime mobile service in the band 156-174 MHz, and consequential revision of Appendix **S18**;

2.15 to review, with a view to identifying necessary spectrum for global harmonization, spectrum and regulatory issues related to terrestrial wireless interactive multimedia applications in accordance with Resolution **737 (WRC-2000)**;

2.16 to review the requirements for the future development of International Mobile Telecommunications-2000 (IMT-2000) and systems beyond IMT-2000, taking into account Resolution **228 (WRC-2000)**;

3 to consider the results of the studies related to the following, with a view to considering them for inclusion in the agendas of future conferences:

3.1 to consider results of ITU-R studies on the feasibility of sharing in the band 2 700-2 900 MHz between the aeronautical radionavigation service, meteorological radars and the mobile service, and to take appropriate action on this subject;

3.2 to consider results of ITU-R studies in accordance with Resolution **222 (WRC-2000)** to ensure spectrum availability and protection for the aeronautical mobile-satellite (R) service and the GMDSS, and to take appropriate action on this subject, while retaining the generic allocation for the MSS;

4 to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations communicated by the Radiocommunication Assembly, in accordance with Resolution **28 (Rev.WRC-2000)**, and to decide whether or not to update the corresponding references in the Radio Regulations, in accordance with the principles contained in the Annex 1 to Resolution **27 (Rev.WRC-2000)**;

5 to consider such consequential changes and amendments to the Radio Regulations as may be necessitated by the decisions of the Conference;

6 in accordance with Resolution **95 (Rev.WRC-2000)**, to review the Resolutions and Recommendations of previous conferences with a view to their possible revision, replacement or abrogation;

7 to review, and take appropriate action on, the Report from the Radiocommunication Assembly submitted in accordance with Nos. 135 and 136 of the Convention;

8 to identify those items requiring urgent action by the Radiocommunication Study Groups;

9 in accordance with Article 7 of the Convention:

9.1 to consider and approve the Report of the Director of the Radiocommunication Bureau on the activities of the Radiocommunication Sector since WRC-03;

9.2 to recommend to the Council items for inclusion in the agenda for the following world radiocommunication conference,

invites the Council

to consider the views given in this Resolution,

instructs the Director of the Radiocommunication Bureau

to make the necessary arrangements to convene meetings of the Conference Preparatory Meeting and to prepare a report to WRC-05/06,

instructs the Secretary-General

to communicate this Resolution to international and regional organizations concerned.

RECOMMENDATION 66 (Rev.WRC-2000)

Studies of the maximum permitted levels of unwanted emissions

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that Appendix **S3** specifies the maximum permitted levels of spurious emissions, in terms of the mean power level of any spurious component supplied by a transmitter to the antenna transmission line;

b) that the principal objective of Appendix **S3** is to specify the maximum permitted levels of spurious emissions that, while being achievable, provide protection against harmful interference;

c) that excessive levels of unwanted emissions may give rise to harmful interference;

d) that while out-of-band emissions can also give rise to harmful interference, the Radio Regulations do not provide general limits for these emissions;

e) that while Appendix **S3** applies generally to the mean power of a transmitter and its spurious emissions, it also takes account of a variety of emissions where interpretation of the term "mean power", and thus its measurement, would be difficult, particularly in the cases of digital modulation broadband systems, pulsed modulation and narrow-band high-power transmitters;

f) that unwanted emissions from transmitters operating in space stations may cause harmful interference, particularly emissions from wideband amplifiers which cannot be adjusted after launch;

g) that unwanted emissions may cause harmful interference to safety services and radio astronomy and space services using passive sensors;

h) that, for technical or operational reasons, more stringent spurious emission limits than the general limits in Appendix **S3** may be required to protect specific services, such as safety services and passive services in specific bands or situations;

i) that broadband digital modulation may cause unwanted emissions at frequencies far from the carrier frequency,

noting

a) that safety services and passive services have in many cases been allocated frequencies adjacent or close to those of services employing high-power transmitters;

b) that some administrations have adopted more stringent limits for spurious emissions than those specified in Appendix **S3**;

c) that, at this time, in response to *resolves* 2.3.2 of Resolution **722 (WRC-97)**, ITU-R has decided to recommend not including general out-of-band limits in the Radio Regulations,

recommends that ITU-R

1 continue the study of spurious emission levels in all frequency bands, emphasizing the study of those frequency bands, services and modulation techniques not presently covered by Appendix **S3**;

2 study the question of unwanted emissions resulting from transmitters of all services and all modulation methods, and, on the basis of those studies, develop a Recommendation or Recommendations for maximum permitted levels of spurious emissions and out-of-band emissions;

3 establish appropriate measurement techniques for unwanted emissions, where those techniques do not currently exist, including the determination of reference levels for wideband transmissions as well as the applicability of reference measurement bandwidths;

4 study the reasonable boundary between spurious emissions and out-of-band emissions with a view to defining such a boundary in Article **S1**;

5 study those frequency bands and instances where, for technical or operational reasons, more stringent spurious emission limits than the general limits in Appendix **S3** may be required to protect safety services and passive services such as radio astronomy, and the impact on all concerned services of implementing or not implementing such limits;

6 study those frequency bands and instances where, for technical or operational reasons, out-of-band limits may be required to protect safety services and passive services such as radio astronomy, and the impact on all concerned services of implementing or not implementing such limits;

7 study the matter of reference bandwidth in the space services and the option of modifying Table II of Appendix **S3** by separately identifying individual space services;

8 report the results of these studies to a competent world radiocommunication conference(s).

RECOMMENDATION 503 (Rev.WRC-2000)

High-frequency broadcasting

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) the congestion in the HF broadcasting bands;

b) the extent of co-channel and adjacent-channel interference;

c) that AM reception quality is relatively poor compared with FM broadcast or CD quality;

d) that new digital techniques have enabled significant improvements in reception quality to be obtained in other broadcasting bands;

e) that the introduction of digital modulation systems in the broadcasting bands below 30 MHz has been shown to be feasible using low bit-rate coding;

f) that Resolution **517 (Rev.WRC-97)** invites ITU-R to continue its studies on digital techniques in HF broadcasting, as a matter of urgency;

g) that urgent studies on this subject are currently being carried out by ITU-R under former Question ITU-R 217/10, with a view to issuing a relevant Recommendation in a very short time period,

recognizing

a) that the implementation of an ITU-recommended worldwide system for digital sound in the HF bands would be extremely beneficial, particularly for developing countries, since it allows for:

– mass-scale production resulting in receivers as economical as possible;

– more economical analogue-to-digital conversion of existing transmitting infrastructures;

b) that the above system would result in digital receivers having a number of advanced features such as assisted tuning, improved audio quality and robustness to co-channel and adjacent-channel interference, which would greatly contribute to a better spectrum utilization, *recommends administrations*

1 to draw the attention of manufacturers to this matter, in order to ensure that future digital receivers take full advantage of the advanced technology while maintaining low cost;

2 to encourage manufacturers to monitor closely the development of the studies carried out by ITU-R, with a view to starting mass production of new low-cost digital receivers as soon as possible after the approval of relevant ITU-R Recommendation(s).