International Telecommunication Union

Radio Regulations

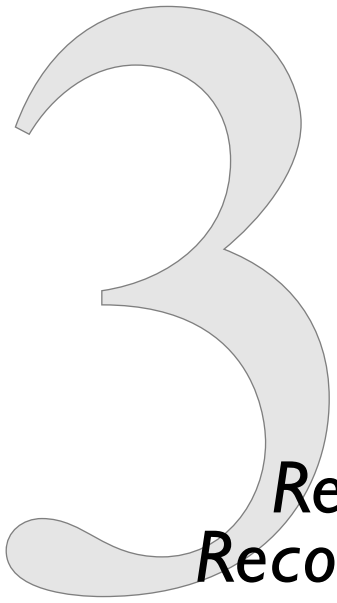
3

Resolutions and Recommendations

Edition of 2001

International Telecommunication Union

Radio Regulations



Resolutions and Recommendations

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Note by the Secretariat

This revision of the Radio Regulations, complementing the Constitution and the Convention of the International Telecommunication Union, incorporates the decisions of the World Radiocommunication Conferences of 1995 (WRC-95), of 1997 (WRC-97) and of 2000 (WRC-2000). The majority of the provisions of these Regulations shall enter into force as from 1 January 2002; the remaining provisions shall apply as from the special dates of application indicated in Article **59** of the revised Radio Regulations.

In preparing the Radio Regulations, edition of 2001, the Secretariat corrected the typographical errors that were drawn to the attention of WRC-2000 and which were approved by WRC-2000.

In accordance with the decisions of WRC-2001, this edition uses a new numbering scheme, which consists, *inter alia*, in abolishing the prefix "**S**" in front of the provision numbers, Article numbers and Appendix numbers. The numbering scheme is identical to the previous edition of the Radio Regulations, but without the prefix "**S**" in front of the provision numbers, Article numbers and Appendix numbers. In some cases, however, the prefix "**S**" was maintained due to historical reasons or for referential purposes.

With respect to *Article numbers*, this edition follows the standard sequential numbering. The Article numbers are not followed by any abbreviation (such as "WRC-97" or "WRC-2000"). Consequently, any reference to an Article, in any of the provisions of these Radio Regulations (e.g. in No. **13.1** of Article **13**), in the texts of the Appendices as contained in Volume 2 of this edition (e.g. in § 1 of Appendix **2**), in the texts of the Resolutions included in Volume 3 of this edition (e.g. in Resolution **1 (Rev.WRC-97)**), and in the texts of the Recommendations included in Volume 3 of this edition (e.g. in Recommendation **8**), is considered as a reference to the text of the concerned Article which appears in this edition, unless otherwise specified.

With respect to *provision numbers in Articles*, this edition continues to use composite numbers indicating the number of the Article and the provision number within that Article (e.g. No. 9.2B means provision No. 2B of Article **9**). The abbreviation "(WRC-2000)" or "(WRC-97)" at the end of such a provision means that the relevant provision was modified or added by WRC-2000 or by WRC-97, as applicable. The absence of an abbreviation at the end of the provision means that the provision is identical with the provision of the simplified Radio Regulations as approved by WRC-95, and whose complete text was contained in Document 2 of WRC-97. However, as some of the Resolutions call for the application of a provision of the Radio Regulations, this edition of the Radio Regulations and the corresponding Resolutions contains references to three differents sets of provision numbers:

– provision numbers that are **not preceded by the letter "S" and which follow the new numbering scheme** comprising a composite number indicating the number of the Article and the provision number within that Article; the quoted provision number corresponds to its version in the current edition;

– provision numbers that are **not preceded by the letter "S" and which follow the old numbering scheme** of sequential numbers. Their quotation was maintained in those cases where their application is still relevant. To avoid any ambiguity, these provisions are normally followed by the additional explication that they refer to provisions of the Radio Regulations, edition of 1990, revised in 1994;

– provision numbers that are **preceded by the letter "S"**; the quoted provision number corresponds to the provisions of the Radio Regulations, edition of 1998, unless otherwise specified. These quotations were maintained only in those cases where justified, either for historical reasons, or for reference purposes (i.e., when the quoted provision is different from the new provision). When the reference was maintained for historical reasons, and where applicable, an appropriate note by the Secretariat has been added to indicate the provision number corresponding to the new numbering scheme.

With respect to *Appendix numbers*, this edition follows the standard sequential numbering, with the addition of the appropriate abbreviation after the Appendix number (such as "(WRC-97)" or "(WRC-2000)"), where applicable. As a rule, any reference to an Appendix, in any of the provisions of these Radio Regulations, in the texts of the Appendices as contained in Volume 2 of this edition, in the texts of the Resolutions and of the Recommendations included in Volume 3 of this edition, is presented in the standard manner (e.g. "Appendix **30 (WRC-2000)**") if not explicitly described in the text (e.g. Appendix **4** as modified by WRC-2000). Simple references to Appendix numbers, where the number is preceded by the letter "**S**" but without an abbreviation at the end (such as "Appendix **S30**"), correspond to the version of the concerned Appendix in the 1998 edition of the Radio Regulations, unless otherwise specified. Simple references to Appendix numbers, where the number is not preceded by the letter "**S**" and without an abbreviation at the end (such as "Appendix **19**"), correspond to the current version of the concerned Appendix, as it appears in this edition of the Radio Regulations. In the texts of Appendices that were partially modified by WRC-2000, the provisions that were modified by WRC-2000 are indicated with the abbreviation "(WRC-2000)") at the end of the concerned text.

The abolishing of the prefix "**S**" in front of the Article numbers, provision numbers and Appendix numbers in this edition of the Radio Regulations is purely an editorial matter as there is equivalence between the provisions of the Radio Regulations (edition of 2001) which do not include the prefix "**S**" and the provisions of the Radio Regulations (edition of 1998) which include the prefix "**S**", excepting the case of provisions which contain the abbreviation "(WRC-2000)") at the end of the provision.

Also, from the regulatory point of view, the cross-references to provisions which include the prefix "**S**" in the Resolutions appearing in the Final Acts of WRC-2000, as well as in the Resolutions appearing in Volume 3 of the 1998 edition that have not been modified by WRC-2000, and the cross-references to provisions without the prefix "**S**" which appear in the Resolutions contained in this edition, are considered equivalent.

Within the text of the Radio Regulations, 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
WRC-05/06	World Radiocommunication Conference, 2005/2006[1]

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

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RESOLUTION 1 (Rev.WRC-97)

Notification of frequency assignments[1]

The World Radiocommunication Conference (Geneva, 1997),

referring to

– the Preamble of the Constitution,

– Article 42 of the Constitution (Special Arrangements),

– Article **6** of the Radio Regulations (Special agreements),

– Article **11** of the Radio Regulations (Notification and recording of frequency assignments),

– Article **12** of the Radio Regulations (Seasonal Planning of the HF bands allocated to the broadcasting Service between 5 900 kHz and 26 100 kHz),

resolves

that, unless specifically stipulated otherwise by special arrangements communicated to the Union by administrations, any notification of a frequency assignment to a station shall be made by the administration of the country on whose territory the station is located.

[1] WRC-97 made editorial amendments to this Resolution.

RESOLUTION 2

Relating to the equitable use, by all countries, with equal rights, of the geostationary-satellite orbit and of frequency bands for space radiocommunication services[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

that all countries have equal rights in the use of both the radio frequencies allocated to various space radiocommunication services and the geostationary-satellite orbit for these services,

taking into account

that the radio frequency spectrum and the geostationary-satellite orbit are limited natural resources and should be most effectively and economically used,

having in mind

that the use of the allocated frequency bands and fixed positions in the geostationary-satellite orbit by individual countries or groups of countries can start at various dates depending on the requirements and readiness of technical facilities of countries,

resolves

1 that the registration with the Radiocommunication Bureau of frequency assignments for space radiocommunication services and their use should not provide any permanent priority for any individual country or groups of countries and should not create an obstacle to the establishment of space systems by other countries;

2 that, accordingly, a country or a group of countries having registered with the Bureau frequencies for their space radiocommunication services should take all practicable measures to realize the possibility of the use of new space systems by other countries or groups of countries so desiring;

3 that the provisions contained in § 1 and 2 of this Resolution should be taken into account by the administrations and the organs in the structure of the Union.

[1] WRC-97 made editorial amendments to this Resolution.

RESOLUTION 4 (Rev.Orb-88)

Period of validity of frequency assignments to space stations using the geostationary-satellite orbit[1]

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session - Geneva, 1988),

considering

a) that rational and efficient use must be made of the frequency spectrum and the geostationary-satellite orbit and that account should be taken of the provisions of Resolution **2** of WARC-79 relating to the use by all countries, with equal rights, of frequency bands for space radiocommunication services;

b) that limiting the period of validity of frequency assignments to space stations using the geostationary-satellite orbit is a concept which could promote the attainment of these objectives;

c) that amortizing the considerable investments made in connection with the development of space radiocommunications is a particularly heavy burden for all administrations and that these investments should be spread over a predetermined period;

d) that efforts should be made to encourage administrations in a position to do so to develop techniques designed to improve the utilization of the frequency spectrum and the geostationary-satellite orbit with a view to increasing the total radiocommunication facilities available to the world community;

e) that it would be advantageous to introduce an experimental procedure to gain experience from application of the new concept of notifying the period of validity of an assignment in space radiocommunication, but that it is not desirable to impose on administrations a statutory period identical in all cases but that on the contrary administrations should be left to propose the period of validity themselves in the light of their requirements and of the common interest;

f) that the present Conference has reviewed this Resolution and decided that more time is required in its application before it can be properly assessed,

[1] This Resolution does not apply to the frequency bands covered by the Allotment Plan as contained in Appendix **30B**.

resolves

1 that, until this Resolution is reviewed by the next competent world radiocommunication conference, frequency assignments to space radiocommunication stations located on the geostationary orbit shall be dealt with as follows:

1.1 a frequency assignment to a space station[2] on a geostationary satellite shall be deemed definitively discontinued after the expiry of the period of operation shown on the assignment notice, reckoned from the date on which the assignment was brought into service. This period shall be limited to that for which the satellite network was designed. The Radiocommunication Bureau shall then invite the notifying administration to take steps to cancel the assignment. If the Bureau receives no reply within three months following the expiry of the period of operation, it shall insert a symbol in the Remarks Column of the Master Register to indicate that the assignment is not in conformity with this Resolution;

1.2 if a notifying administration which wishes to extend the period of operation originally shown on the assignment notice of a frequency assignment of an existing space station[2] informs the Bureau accordingly more than three years before the expiry of the period in question and if all other basic characteristics of that assignment remain unchanged, the Bureau shall amend as requested the period of operation originally recorded in the Master Register and publish that information in a special section of the Weekly Circular;

1.3 if, at least three years before the expiry of the period of operation recorded in the Master Register of a frequency assignment to an existing space station[2], an administration initiates the coordination procedure specified in No. **9.7** to bring into service a new space station using the same assigned frequency and the same orbital position but with different technical characteristics, and if the Bureau finds after the notification that the new assignment conforms with the provisions of No. **11.31** and does not increase, in relation to the preceding assignment, the probability of interference to the detriment of a frequency assignment recorded in the Master Register or involved in the coordination procedure, the new assignment shall be given a favourable finding and shall be entered in the Master Register;

1.4 a notifying administration which wishes to modify a basic characteristic of a frequency assignment of a space station[2] recorded in the Master Register shall initiate, in any case other than those covered by § 1.2 and 1.3, the appropriate modification procedure in accordance with the provisions of Nos. **11.43A** to **11.46**;

2 that, for the application of the provisions of § 1.1 above, the information concerning the period of validity of frequency assignments to space stations shall be notified in addition to that contained in Appendix **4** to the Radio Regulations,

3 that the application of this Resolution shall not prejudge in any way the decisions of future radiocommunication conferences,

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[2] The expression "space station" may apply to more than one satellite provided that only one satellite is in operation at any particular moment and that the stations installed on board successive satellites have identical basic characteristics.

invites the next competent world radiocommunication conference

to take cognizance of the results of the application of this Resolution and take action, as appropriate,

instructs the Secretary-General

to bring this Resolution to the attention of the Council.

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 7

Relating to the development of national radio frequency management[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that the Radio Regulations contain, *inter alia*, procedures for the coordination, notification and registration of frequencies which specify the rights and obligations of Member States;

b) that the application of the above-mentioned procedures necessitates an appropriate radio frequency management unit in each Member State;

c) that the existence of such a unit helps Member States to safeguard their rights and to discharge their obligations under the Radio Regulations;

d) that the application of the Radio Regulations through the agency of such units is in the interest of the international community as a whole,

noting

that such a unit requires an adequate number of suitably qualified staff,

noting further

that the administrations of many developing countries need to create or to strengthen such a unit, appropriate to their administrative structure, with responsibility for the application of the Radio Regulations at the national and international levels,

recommends

that the administrations of such countries take appropriate action,

resolves

1 that meetings shall be organized between representatives of the Radiocommunication Bureau and the personnel involved in frequency management matters from administrations of developing and developed countries;

2 that such meetings shall be aimed at designing standard structures suitable for administrations of developing countries and include discussions concerning the establishment and operation of radio frequency management units;

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1 WRC-97 made editorial amendments to this Resolution.

3 that such meetings should also identify the particular needs of developing countries in establishing such units, and the means required to meet those needs,

recommends

that developing countries when planning the use of funds, particularly those received from international sources, make provision for participation in these meetings as well as for the introduction and development of such units,

invites the Council

to take the necessary measures for the organization of such meetings,

instructs the Secretary-General

1 to circulate this Resolution to all Member States, drawing their attention to its importance;

2 to circulate the results of such meetings, particularly to the developing countries;

3 to inform the developing countries of the types of assistance the ITU can provide in setting up the desired structure,

draws the attention of the next Plenipotentiary Conference to

1 the particular problems identified in this Resolution;

2 the need for prompt and effective action to resolve them;

3 the need to take all practicable measures to ensure that resources are made available for this purpose.

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 over-loaded, 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 13 (Rev.WRC-97)

Formation of call signs and allocation of new international series

The World Radiocommunication Conference (Geneva, 1997),

considering

the increasing demand for call signs justified by the increased number of Member States and by the increased requirements of countries which are already Member States,

believing

that call signs already in use should, as far as possible, not be changed,

noting

a) that the former call-sign series formed of three letters, or a figure and two letters, having been exhausted, a new series has been introduced formed of a letter, a figure and a letter; but in no case may the figure be 0 or 1;

b) that the method referred to in *noting a)* is not applicable to series beginning with one of the following letters: B, F, G, I, K, M, N, R, W,

resolves

1 that the Director of the Radiocommunication Bureau shall continue to urge administrations:

1.1 to make maximum use of the possibilities of the series at present allocated, in order to avoid, as far as possible, further requests;

1.2 to review the call-sign assignments they have already made from their present allocations, with a view to releasing any series and placing them at the disposal of the Union;

2 that the Director of the Radiocommunication Bureau shall, upon request, furnish advice to administrations on the means of effecting the greatest economy, which should be the rule, in the use of a series of call signs;

3 that if, nevertheless, before the next competent world radiocommunication conference, it appears that all the possibilities of the present system of forming call signs will be exhausted, the Director of the Radiocommunication Bureau shall:

3.1 explore the possibility of extending the present allocations of international call-sign series by lifting the limitation on use of the letter “Q” and the digits “0” and “1”;

3.2 issue a circular-letter:

3.2.1 explaining the position;

3.2.2 urging administrations to send in their proposals for possible solutions;

4 that, from the information thus submitted, the Director of the Radiocommunication Bureau shall prepare a report, together with his comments and suggestions, for submission to the next competent world radiocommunication conference.

RESOLUTION 15

Relating to international cooperation and technical assistance in the field of space radiocommunications[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that a large number of Member States are not in a position to take immediate advantage of satellite techniques for the development of their telecommunication services;

b) that such Member States would benefit immensely through the technical assistance programmes sponsored by the Union,

recognizing

a) that international satellite-communication systems are subject to the Convention and Regulations and that they permit participation of all countries including, in particular, the developing countries, in space communication systems;

b) that a number of problems need to be solved in order that the developing countries may participate effectively in international space communication systems and integrate these systems with their national telecommunication networks,

resolves to invite the Council

1 to draw the attention of administrations to the means by which they may avail themselves of technical assistance in connection with the introduction of space communications;

2 to consider the most effective manner in which requests for such assistance by Member States may be formulated and presented in order to secure maximum financial and other assistance;

3 to consider how best to make use of funds made available by the United Nations in accordance with its Resolution 1721 to give technical and other assistance to administrations of Member States to make effective use of space communications;

4 to consider in what way the work of the ITU-T, ITU-R and ITU-D and other organs in the structure of the Union may be utilized in the most effective way for the information and assistance of administrations of Member States in the development of space radiocommunications.

[1] WRC-97 made editorial amendments to this Resolution.

RESOLUTION 18 (Mob-83)

Relating to the procedure for identifying and announcing the position of ships and aircraft of States not parties to an armed conflict[1]

The World Administrative Radio Conference for the Mobile Services (Geneva, 1983),

considering

a) that ships and aircraft encounter considerable risk in the vicinity of an area of armed conflict;

b) that for the safety of life and property it is desirable for ships and aircraft of States not parties to an armed conflict to be able to identify themselves and announce their position in such circumstances;

c) that radiocommunication offers such ships and aircraft a rapid means of self-identification and providing location information prior to their entering areas of armed conflict and during their passage through the areas;

d) that it is considered desirable to provide a supplementary signal and procedure for use, in accordance with customary practice, in the area of armed conflict by ships and aircraft of States representing themselves as not parties to an armed conflict;

resolves

1 that the frequencies for urgency signal and messages specified in Appendix **13** of the Radio Regulations may be used by ships and aircraft of States not parties to an armed conflict for self-identification and establishing communications. The transmission will consist of the urgency or safety signals, as appropriate, described in Appendix **13** followed by the addition of the single group "NNN" in radiotelegraphy and by the addition of the single word “NEUTRAL” pronounced as in French “neutral” in radiotelephony. As soon as practicable, communications shall be transferred to an appropriate working frequency;

2 that the use of the signal as described in the preceding paragraph indicates that the message which follows concerns a ship or aircraft of a State not party to an armed conflict. The message shall convey at least the following data:

a) call sign or other recognized means of identification of such ship or aircraft;

b) position of such ship or aircraft;

c) number and type of such ships or aircraft;

[1] WRC-97 made editorial amendments to this Resolution.

d) intended route;

e) estimated time en route and of departure and arrival, as appropriate;

f) any other information, such as flight altitude, radio frequencies guarded, languages and secondary surveillance radar modes and codes;

3 that the provisions of Appendix **13** relating to urgency and safety transmissions, and medical transports shall apply as appropriate to the use of the urgency and safety signals, respectively, by such ship or aircraft;

4 that the identification and location of ships of a State not party to an armed conflict may be effected by means of appropriate standard maritime radar transponders. The identification and location of aircraft of a State not party to an armed conflict may be effected by the use of the secondary surveillance radar (SSR) system in accordance with procedures to be recommended by the International Civil Aviation Organization (ICAO);

5 that the use of the signals described above would not confer or imply recognition of any rights or duties of a State not party to an armed conflict or a party to the conflict, except as may be recognized by common agreement between the parties to the conflict and a non-party;

6 to encourage parties to a conflict to enter into such agreements,

requests the Secretary-General

to communicate the contents of this Resolution to the International Maritime Organization (IMO) and ICAO for such action as they may consider appropriate,

requests ITU-R

to recommend an appropriate signal in the digital selective calling system for use in the maritime mobile service and other appropriate information as necessary.

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 21 (Rev.WRC-95)

Implementation of changes in frequency allocations between 5 900 kHz and 19 020 kHz

The World Radiocommunication Conference (Geneva, 1995),

considering

a) that parts of the frequency bands between 5 900 kHz and 19 020 kHz which were previously allocated on an exclusive or shared basis to the fixed and mobile services have been reallocated to the broadcasting service;

b) that some existing fixed and mobile assignments may need to be removed progressively from those reallocated bands to make way for the broadcasting service;

c) that the assignments to be removed, termed "displaced assignments", must be reaccommodated in other appropriate frequency bands;

d) that developing countries may require special assistance from the Radiocommunication Bureau, as well as in application of Resolution **22 (WARC-92)**[*], in replacing their displaced assignments with appropriate protection;

e) that procedures already exist in Article **11** that may be used to this effect,

recognizing

the difficulties that administrations and the Bureau might encounter during the period of transition from the previous allocations to those made by WARC-92,

resolves

1 that the duration of the transition period shall be from 1 April 1992 to 1 April 2007;

2 that administrations should no longer notify any frequency assignments to stations of the fixed and mobile services in the reallocated bands. Assignments notified in these bands after 1 April 1992 shall bear a symbol to indicate that the finding will be examined by the Bureau as of 1 April 2007 in accordance with the provisions of No. **11.31**;

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[*] *Note by the Secretariat*: this Resolution was abrogated by WRC-97.

3 that the Bureau shall undertake a continuing action to review the Master International Frequency Register with the help of administrations. In this respect, the Bureau shall periodically consult the administrations concerning the frequency assignments to links for which another satisfactory means of telecommunication exists, with a view to either downgrading assignments of class of operation A or deleting such assignments;

4 that administrations shall, for assignments of class of operation A in the reallocated bands, either notify the replacement frequencies to the Bureau or request the Bureau's assistance in selecting the replacement frequencies in application of Articles **7** and **13**;

5 that the Bureau shall develop in due time a draft procedure to be used for the replacement of remaining frequency assignments and shall consult administrations in accordance with Article **14**;

6 that the Bureau should modify the draft procedures taking into account, to the extent practicable, comments received from administrations, and propose replacement assignments at the latest three years before 1 April 2007. In so doing, the Bureau shall request administrations to take appropriate action to bring their assignments in conformity with the Table of Frequency Allocations by the due date;

7 that a replacement frequency assignment whose basic characteristics, with the exception of the assigned frequency, have not been modified in the above process, shall keep its original date. However, if these basic characteristics of a replacement frequency assignment are different from those of the displaced assignment, the replacement assignment shall be treated in accordance with the relevant provisions of Section II of Article **11**,

invites administrations

when seeking reaccommodation of the displaced assignments for their fixed and mobile services in the bands between 5 900 kHz and 19 020 kHz which have been reallocated to the broadcasting service, to make every effort to find replacement assignments in the bands allocated to the fixed and mobile services concerned.

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 **18** 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 **17** and **18**, in particular No. **18.1**,

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 26 (Rev.WRC-97)

Footnotes to the Table of Frequency Allocations in Article 5 of the Radio Regulations

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that footnotes are an integral part of the Table of Frequency Allocations in the Radio Regulations and, as such, form part of an international treaty text;

b) that footnotes to the Table of Frequency Allocations should be clear, concise and easy to understand;

c) that footnotes should relate directly to matters of frequency allocation;

d) that, in order to ensure that footnotes allow modification of the Table of Frequency Allocations without introducing unnecessary complications, principles relating to the use of footnotes are needed;

e) that, currently, footnotes are adopted by competent world radiocommunication conferences and any addition, modification or deletion of a footnote is considered and adopted by the competent conference;

f) that some problems concerning country footnotes may be resolved through the application of a special agreement envisaged by Article **6**;

g) that, in certain cases, administrations are confronted with major difficulties due to inconsistencies or omissions in footnotes;

h) that, in order to keep the footnotes to the Table of Frequency Allocations up to date, there should be clear and effective guidelines for additions, modifications and deletions of footnotes,

resolves

1 that, wherever possible, footnotes to the Table of Frequency Allocations should be confined to altering, limiting or otherwise changing the relevant allocations rather than dealing with the operation of stations, assignment of frequencies or other matters;

2 that the Table of Frequency Allocations should include only those footnotes which have international implications for the use of the radio-frequency spectrum;

3 that new footnotes to the Table of Frequency Allocations should only be adopted in order to:

a) achieve flexibility in the Table of Frequency Allocations;

b) protect the relevant allocations in the body of the Table and in other footnotes in accordance with Section II of Article **5**;

c) introduce either transitional or permanent restrictions on a new service to achieve compatibility; or

d) meet the specific requirements of a country or area when it is impracticable to satisfy such needs otherwise within the Table of Frequency Allocations;

4 that footnotes serving a common purpose should be in a common format, and, where possible, be grouped into a single footnote with appropriate references to the relevant frequency bands,

further resolves

1 that any addition of a new footnote or modification of an existing footnote should be considered by a world radiocommunication conference only when:

a) the agenda of that conference explicitly includes the frequency band to which the proposed additional or modified footnote relates; or

b) the frequency bands to which the desired additions or modifications of the footnote belong are considered during the conference and the conference decides to make a change in those bands; or

c) the addition or modification of footnotes is specifically included in the agenda of the conference as a result of the consideration of proposals submitted by one or more interested administration(s);

2 that recommended agendas for future world radiocommunication conferences should include a standing agenda item which would allow for the consideration of proposals by administrations for deletion of country footnotes, or country names in footnotes, if no longer required;

3 that in cases not covered by *further resolves* 1 and 2, proposals for new footnotes or modification of existing footnotes could exceptionally be considered by a world radio-communication conference if they concern corrections of obvious omissions, inconsistencies, ambiguities or editorial errors and have been submitted to ITU as stipulated in No. 316 of the Convention (Geneva, 1992),

urges administrations

1 to review footnotes periodically and to propose the deletion of their country footnotes or of their country names from footnotes, as appropriate;

2 to take account of the *further resolves* above in making proposals to world radio-communication conferences.

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”.

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.

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 29 (WRC-97)

Information on the occupancy by fixed and mobile services in the additional HF bands allocated by WARC-92 to the broadcasting service

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that this Conference, in response to Resolution **529 (WRC-95)***, did not recommend a date or dates by which the fixed and mobile services, in the additional HF bands allocated by WARC-92 to the broadcasting service, would no longer be protected, due to insufficient information on the current use of these bands by the fixed and mobile services;

b) that the fixed and mobile services in use in each of the above-mentioned bands shall be protected until 1 April 2007;

c) that Resolution **21 (Rev.WRC-95)** established a procedure for the transfer of the fixed and mobile service assignments in the above-mentioned bands to other appropriate frequency bands;

d) that it may be possible and desirable for the broadcasting service to use parts of the above-mentioned bands prior to 1 April 2007,

resolves to instruct the Director of the Radiocommunication Bureau

1 to present a report to the 1999 Conference Preparatory Meeting (CPM-99) and WRC-99, providing information gathered by means of consultation with administrations, on the occupancy by fixed and mobile services in each of the additional HF bands allocated by WARC-92 to the broadcasting service;

2 to provide to CPM-99 and WRC-99 any new information with regard to possible sharing between broadcasting and other services in the HF bands, together with the information already provided to WARC-92,

urges administrations

1 to provide to the Director of the Radiocommunication Bureau the information which would permit the action in *resolves* 1 and 2 to be carried out;

2 to submit to WRC-01** proposals with regard to the status to be given prior to 1 April 2007 to the broadcasting service in each of the additional HF bands, or portions thereof, allocated by WARC-92 to the broadcasting service.

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* *Note by the Secretariat:* This Resolution was abrogated by WRC-97.

** *Note by the Secretariat:* This Conference will be held in 2003.

RESOLUTION 33 (Rev.WRC-97)

Bringing into use of space stations in the broadcasting-satellite service, prior to the entry into force of agreements and associated plans for the broadcasting-satellite service

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that while Resolution **507** envisages plans for the broadcasting-satellite service (BSS), some administrations might nevertheless feel the need to bring stations in that service into use prior to such plans being established;

b) that administrations should, as far as possible, avoid proliferation of space stations in the BSS before such plans have been established;

c) that a space station in the BSS may cause harmful interference to terrestrial stations operating in the same frequency band, even if the latter are outside the service area of the space station;

d) that the procedures specified in Articles **S9** to **S14** and Appendix **S5** contain provisions for coordination between stations in the BSS and terrestrial stations, between space systems in that service and space systems of other administrations;

e) that there are many existing and planned stations in the BSS not subject to agreements and associated plans that have submitted advance publication information (API) or a request for coordination under the existing Resolution **33** procedures and that some administrations are currently in coordination under these procedures;

resolves

1 that, except in those cases where agreements and associated plans for the BSS have been established and have entered into force, for satellite networks for which the API or the request for coordination has been received following 1 January 1999 the procedures of Articles **S9** to **S14** shall be applied for the coordination and notification of stations in the BSS and coordination and notification of other services in respect of that service;

2 that, except in those cases where agreements and associated plans for the BSS have been established and have entered into force, for satellite networks for which the API or the request for coordination has been received by the Radiocommunication Bureau prior to 1 January 1999, the procedure in Sections A to C in this Resolution shall be applied;

3 that a future conference review the requirement for the procedures in this Resolution.

Section A – Coordination procedure between space stations in the broadcasting-satellite service and terrestrial stations

2.1 Before an administration notifies to the Bureau or brings into use any frequency assignment to a space station in the broadcasting-satellite service in a frequency band where this frequency band is allocated, with equal rights, to the broadcasting-satellite service and to a terrestrial radiocommunication service, either in the same Region or sub-Region or in different Regions or sub-Regions, it shall coordinate the use of this assignment with any other administration whose terrestrial radiocommunication services may be affected. For this purpose, it shall inform the Bureau of all the technical characteristics of the station, as listed in the relevant sections of Appendix **S4** to the Radio Regulations, which are necessary to assess the risk of interference to a terrestrial radiocommunication service[1].

2.2 The Bureau shall publish this information in a Special section of its Weekly Circular and shall also, when the Weekly Circular contains such information, so advise all administrations by circular telegram.

2.3 Any administration which considers that its terrestrial radiocommunication services may be affected shall forward its comments to the administration seeking coordination and, in any case, to the Bureau. These comments must be forwarded within four months from the date of the relevant BR IFIC. It shall be deemed that any administration which has not forwarded comments within that period considers that its terrestrial radiocommunication services are unlikely to be affected.

2.4 Any administration which has forwarded comments on the projected station shall either give its agreement, with a copy to the Bureau, or, if this is not possible, send to the administration seeking coordination all the data on which its comments are based as well as any suggestions it may be able to offer with a view to a satisfactory solution of the problem.

2.5 The administration which plans to bring into use a space station in the broadcasting-satellite service as well as any other administration which believes that its terrestrial radiocommunication services are likely to be affected by the station in question may request the assistance of the Bureau at any time during the coordination procedure.

2.6 In the event of continuing disagreement between an administration seeking to effect coordination and one with which coordination has been sought, the administration seeking coordination shall, except in the cases where the assistance of the Bureau has been requested, defer the submission of its notice concerning the proposed assignment by six months from the date of publication of the information according to § 2.2.

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[1] The calculation methods and the interference criteria to be employed in evaluating the interference should be based upon relevant ITU-R Recommendations agreed by the administrations concerned either as a result of Resolution **703 (Rev.WARC-92)** or otherwise. In the event of disagreement on an ITU-R Recommendation or in the absence of such Recommendations, the methods and criteria shall be agreed between the administrations concerned. Such agreements shall be concluded without prejudice to other administrations.

Section B – Coordination procedure between space stations in the broadcasting-satellite service and space systems of other administrations

3 An administration intending to bring into use a space station in the broadcasting-satellite service shall, for the purpose of coordination with space systems of other administrations, apply the following provisions of Article **11** of the Radio Regulations (edition of 1990, revised in 1994):

3.1 Nos. **1041** to **1058** inclusive.

3.2.1 Nos. **1060** to **1065**[2].

3.2.2 No coordination under § 3.2.1 is required when an administration proposes to change the characteristics of an existing assignment in such a way as not to increase the probability of harmful interference to stations in the space radiocommunication service of other administrations.

3.2.3 Nos. **1074** to **1105** inclusive.

Section C – Notification, examination and recording in the Master Register of assignments to space stations in the broadcasting-satellite service dealt with under this resolution

4.1 Any frequency assignment[3] to a space station in the broadcasting-satellite service shall be notified to the Bureau. The notifying administration shall apply for this purpose the provisions of Nos. **1495** to **1497** of the Radio Regulations (edition of 1990, revised in 1994).

4.2 Notices made under § 4.1 shall initially be treated in accordance with No. **1498**.

5.1 The Bureau shall examine each notice with respect to:

5.2 *a)* its conformity with the Convention, the Table of Frequency Allocations and the other provisions of the Radio Regulations, with the exception of those relating to the coordination procedures and to the probability of harmful interference, which are the subject of § 5.3, 5.4, and 5.5;

5.3 *b)* its conformity, where applicable, with the provisions of § 2.1 of Section A above, relating to coordination of the use of the frequency assignment with the other administrations concerned;

5.4 *c)* its conformity, where applicable, with the provisions of § 3.2.1 of Section B above, relating to coordination of the use of the frequency assignment with the other administrations concerned;

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2 See footnote 1.

3 The expression *frequency assignment*, wherever it appears in this Resolution, shall be understood to refer either to a new frequency assignment or to a change in an assignment already recorded in the Master International Frequency Register (hereinafter called the *Master Register*).

5.5 *d)* where appropriate, the probability of harmful interference to the service rendered by a station in a space or terrestrial radiocommunication service for which a frequency assignment has already been recorded in the Master Register in conformity with the provisions of No. **1240** or **1503**, as appropriate, if that assignment has not, in fact, caused harmful interference to the service rendered by a station for which an assignment has been previously recorded in the Master Register and which itself is in conformity with No. **1240** or **1503** as appropriate.

6.1 Depending upon the findings of the Bureau subsequent to the examination prescribed in § 5.2, 5.3, 5.4 and 5.5, further action shall be as follows:

6.2 Where the Bureau reaches an unfavourable finding with respect to § 5.2, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Bureau for this finding together with such suggestions as the Bureau is able to offer with a view to a satisfactory solution of the problem.

6.3 Where the Bureau reaches a favourable finding with respect to § 5.2, or where it reaches the same finding after resubmission of the notice, it shall examine the notice with respect to the provisions of § 5.3 and 5.4.

6.4 Where the Bureau finds that the coordination procedures mentioned in § 5.3 and 5.4 have been successfully completed with all administrations whose services may be affected, the assignment shall be recorded in the Master Register. The date of receipt by the Bureau of the notice shall be entered in Column 2d of the Master Register with an entry in the Remarks Column indicating that such recording does not prejudge in any way the decisions to be included in the agreements and associated plans referred to in Resolution **507**.

6.5 Where the Bureau finds that the coordination procedures mentioned in § 5.3 or 5.4 have not, as appropriate, been applied or have been unsuccessfully applied, the notice shall be returned immediately by airmail to the notifying administration with the reason for its return together with such suggestions as the Bureau is able to offer with a view to a satisfactory solution of the problem.

6.6 Where the notifying administration resubmits the notice and states that it has been unsuccessful in endeavouring to effect the coordination, the notice shall be examined by the Bureau with respect to § 5.5.

6.7 Where the notifying administration resubmits the notice and the Bureau finds that the coordination procedures have been successfully completed with all administrations whose services may be affected, the assignment shall be treated as indicated in § 6.4.

6.8 Where the Bureau reaches a favourable finding with respect to § 5.5, the assignment shall be recorded in the Master Register. The appropriate symbol indicating the finding by the Bureau shall indicate that the coordination procedures, as appropriate, referred to in § 2.1 or 3.2.1 were not successfully completed. The date of receipt by the Bureau of the notice shall be entered in Column 2d of the Master Register, with the remark mentioned in § 6.4.

6.9 Where the Bureau reaches an unfavourable finding with respect to § 5.5, the notice shall be returned immediately by airmail to the notifying administration with the reasons for the Bureau's finding together with such suggestions as the Bureau is able to offer with a view to a satisfactory solution of the problem.

6.10 If the administration resubmits the notice unchanged with the insistence that it be reconsidered, but should the Bureau's unfavourable finding under § 5.5 remain unchanged, the assignment shall be recorded in the Master Register. However, this entry shall be made only if the notifying administration informs the Bureau that the assignment has been in use for at least four months without any complaint of harmful interference having been received. The date of receipt by the Bureau of the original notice shall be entered in Column 2d of the Master Register, with the remark mentioned in § 6.4. An appropriate remark shall be placed in Column 13 to indicate that the assignment is not in conformity with the provisions of § 5.3, 5.4 or 5.5, as appropriate. In the event that the administration concerned receives no complaint of harmful interference concerning the operation of the station in question for a period of one year from the commencement of operation, the Bureau shall review its finding.

6.11 If harmful interference is actually caused to the reception of any space station in the broadcasting-satellite service whose frequency assignment has been recorded in the Master Register as a result of a favourable finding with respect to § 5.2, 5.3, 5.4 and 5.5 of this Resolution, as appropriate, by the use of a frequency assignment to a space station which has been subsequently recorded in the Master Register in accordance with the provisions of § 6.10 of this Resolution or of No. **1544**, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

6.12 If harmful interference is actually caused to the reception of any space radio-communication station using an assignment recorded in the Master Register as a result of a favourable finding with respect to Nos. **1503** to **1512**, as appropriate, by the use of an assignment to a space station in the broadcasting-satellite service which has been subsequently recorded in the Master Register in accordance with the provisions of § 6.10 of this Resolution, the station using the latter assignment must, on receipt of advice thereof, immediately eliminate this harmful interference.

6.13 If harmful interference is actually caused to the reception of any terrestrial station using an assignment recorded in the Master Register as a result of a favourable finding with respect to No. **1240**, by the use of an assignment to a space station in the broadcasting-satellite service which has been subsequently recorded in the Master Register in accordance with the provisions of § 6.10 of this Resolution, the station, using the latter assignment must, on receipt of advice thereof, immediately eliminate this harmful interference.

6.14 If harmful interference to the reception of any station whose assignment is in accordance with § 5.2 of this Resolution is actually caused by the use of a frequency assignment which is not in conformity with No. **1240**, **1352** or **1503**, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

RESOLUTION 34

Relating to the establishment of the broadcasting-satellite service in Region 3 in the 12.5-12.75 GHz frequency band and to sharing with space and terrestrial services in Regions 1, 2 and 3

The World Administrative Radio Conference (Geneva, 1979),

considering

that this Conference has allocated the band 12.5-12.75 GHz to the broadcasting-satellite service for community reception in Region 3,

recognizing

that under Resolution **507** the Council may wish to empower a future competent radio-communication conference to establish a plan for the broadcasting-satellite service in the band 12.5-12.75 GHz in Region 3,

resolves

1 that, until such time as a plan may be established for the broadcasting-satellite service in the band 12.5-12.75 GHz in Region 3, the provisions of Resolution **33 (Rev.WRC-97)** together with Article **9** shall continue to apply to the coordination between stations in the broadcasting-satellite service in Region 3 and:

1) space stations in the broadcasting-satellite and fixed-satellite services in Regions 1, 2 and 3;

2) terrestrial stations in Regions 1, 2 and 3;

2 that the ITU-R shall study urgently the technical provisions which may be appropriate for the sharing between stations in the broadcasting-satellite service in Region 3 and:

1) space stations in the broadcasting-satellite and fixed-satellite services in Regions 1 and 2;

2) terrestrial stations in Regions 1 and 2;

3 that, until such time as technical provisions are developed by the ITU-R and accepted by administrations concerned under Resolution **703 (Rev.WARC-92)**, the sharing between space stations in the broadcasting-satellite service in Region 3 and terrestrial services in Regions 1, 2 and 3 shall be based on the following criteria as appropriate:

1) the power flux-density at the Earth's surface, produced by emissions from a space station in the broadcasting-satellite service in Region 3 for all conditions and for all methods of modulation shall not exceed the limits given in Annex 5 of Appendix **30**; noting that § 3 2) shall only apply with respect to protection of the broadcasting service;

2) in addition to § 3 1) above, the provisions of Article **21** (Table **21-4**) shall apply in the countries mentioned in Nos. **5.494** and **5.496**;

3) the limits given in § 3 1) and 2) above may be exceeded on the territory of any country provided the administration of that country has so agreed.

RESOLUTION 42 (Rev.Orb-88)

Use of interim systems in Region 2 in the broadcasting-satellite and fixed-satellite (feeder-link) services in Region 2 for the bands covered by Appendices 30 and 30A

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, prepared a Plan for the broadcasting-satellite service in the band 12.2-12.7 GHz and a Plan for the associated feeder links in the band 17.3-17.8 GHz with provisions for implementing interim systems in accordance with Resolution 2 (Sat-R2);

b) that in the implementation of their assignments in the Plans, administrations of Region 2 may find it more appropriate to adopt a phased approach and initially use characteristics different from those appearing in the appropriate Region 2 Plan;

c) that some administrations of Region 2 may cooperate in the joint development of a space system with a view to covering two or more service areas from the same orbital position or to using a beam which would encompass two or more service areas;

d) that some administrations of Region 2 may cooperate in the joint development of a space system with a view to covering two or more feeder-link service areas from the same orbital position or to using a beam which encompasses two or more feeder-link service areas;

e) that interim systems shall not adversely affect the Plans nor hamper the implementation and evolution of the Plans;

f) that the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the Region 2 Plan which are to be suspended;

g) that the interim systems shall not in any case use orbital positions that are not in the Region 2 Plan;

h) that an interim system shall not be introduced without the agreement of all administrations whose space and terrestrial services are considered to be affected;

resolves

that administrations and the Radiocommunication Bureau shall apply the procedure contained in the Annex to this Resolution, so long as Appendices **30** and **30A** remain in force.

ANNEX TO RESOLUTION 42 (Rev.Orb-88)

1 An administration or a group of administrations in Region 2 may, after successful application of the procedure contained in this Annex and with the agreement of the affected administrations, use an interim system during a specified period not exceeding ten years in order:

1.1 For an interim system in the broadcasting-satellite service

a) to use an increased e.i.r.p. in any direction relative to that appearing in the Region 2 Plan provided that the power flux-density does not exceed the limits given in Annex 5 to Appendix **30**;

b) to use modulation characteristics[1] different from those appearing in the Annexes to the Region 2 Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;

c) to change the coverage area by displacing boresight, or by increasing the major or minor axis, or by rotating them from an orbital position which shall be one of the corresponding orbital positions appearing in the Region 2 Plan;

d) to use a coverage area appearing in the Region 2 Plan or a coverage area encompassing two or more coverage areas appearing in the Region 2 Plan from an orbital position which shall be one of the corresponding positions appearing in the Region 2 Plan;

e) to use a polarization different from that in the Region 2 Plan.

1.2 For an interim feeder-link system

a) to use an increased e.i.r.p. in any direction relative to that appearing in the Region 2 feeder-link Plan;

b) to use modulation characteristics[1] different from those appearing in the Annexes to the Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;

c) to change the feeder-link beam area by displacing the boresight, or by increasing the major or minor axis, or by rotating them in relation to an orbital position which shall be one of the corresponding orbital positions appearing in the Region 2 feeder-link Plan;

d) to use a feeder-link beam area appearing in the Region 2 feeder-link Plan or a feeder-link beam area encompassing two or more feeder-link beam areas appearing in the Region 2 feeder-link Plan in relation to an orbital position which shall be one of the corresponding orbital positions appearing in the Region 2 feeder-link Plan;

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[1] For example, modulation with sound channels frequency-multiplexed within the bandwidth of a television channel, digital modulation of sound and television signals, or other pre-emphasis characteristics.

e) to use a polarization different from that in the Region 2 feeder-link Plan.

2 In all cases, an interim system shall correspond to assignments in the appropriate Region 2 Plan; the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the Region 2 Plan which are to be suspended. During the use of an interim system, the use of the corresponding assignments in the Region 2 Plan is suspended; they shall not be brought into use before the cessation of the use of the interim system. However, the suspended assignments, but not the interim system's assignments, of an administration shall be taken into account when other administrations apply the procedure of Article 4 of Appendix **30** or of Article 4 of Appendix **30A**, as appropriate, in order to modify the Plans, or the procedure of this Annex in order to bring an interim system into use. The assignments of interim systems shall not be taken into account in applying the procedure of Article 6 or Article 7 of Appendix **30** and the procedure of Article 6 or Article 7 of Appendix **30A**.

3 As a specific consequence of § 2 above, Region 2 interim system assignments shall not obtain protection from, or cause harmful interference to, new or modified assignments appearing in the Regions 1 and 3 Plans following the successful application of the procedure of Article 4 of Appendix **30** or of Article 4 of Appendix **30A**, as appropriate, even if the assignment modification procedure is concluded and the assignments become operational within the time-limits specified in § 4 *a)*.

4 When an administration proposes to use an assignment in accordance with § 1, it shall communicate to the Bureau the information listed in Annex 2 to Appendix **30** or in Annex 2 to Appendix **30A**, as appropriate, not earlier than five years but, preferably, not later than twelve months before the date of bringing into use. The administration shall also indicate:

a) the maximum specified period during which the interim assignment is intended to remain in use;

b) the assignments in the Region 2 Plans the use of which will remain suspended for the duration of the use of the corresponding interim assignment;

c) the names of the administrations with which an agreement for the use of the interim assignment has been reached, together with any comment relating to the period of use so agreed and the names of administrations with which an agreement may be required but has not yet been reached.

5 Administrations are considered to be affected as follows:

5.1 For an interim system in the broadcasting-satellite service

a) an administration of Region 2 is considered to be affected if any overall equivalent protection margin of one of its assignments in the Region 2 Plan, calculated in accordance with Annex 5 to Appendix **30** including the cumulative effect of all interim uses during the

maximum specified period of use of the interim system, but excluding the corresponding suspended assignments (§ 4 *b)*), becomes negative or a former negative value is made more negative;

b) an administration of Region 1 or 3 is considered to be affected if it has an assignment which is in conformity with the Regions 1 and 3 Plan contained in Appendix **30** or in respect of which proposed modifications have been published by the Bureau in accordance with the provisions of Article 4 of that Appendix with a necessary bandwidth which falls within the necessary bandwidth of the proposed interim assignment and the appropriate limits of § 3 of Annex 1 to Appendix **30** are exceeded;

c) an administration of Region 1 or 3 is considered to be affected if it has a frequency assignment in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. **9.7** or under Article 7 of Appendix **30** or which has been published in accordance with No. **9.2B** or of § 7.1.3 of Appendix **30** and the appropriate limits of § 6 of Annex 1 to Appendix **30** are exceeded;

d) an administration of Region 1 or 3 is considered to be affected if, although having no frequency assignment in the appropriate Regions 1 and 3 Plan in the channel concerned, it nevertheless would receive on its territory a power flux-density value which exceeds the limits given in § 5 of Annex 1 to Appendix **30** as a result of the proposed interim assignment, or if it has such an assignment for which its associated service area does not cover the whole of the territory of the administration, and in its territory outside that service area the power flux-density from the interim system space station exceeds the above mentioned limits;

e) an administration of Region 2 is considered to be affected if, although having no frequency assignment in the appropriate Region 2 Plan in the channel concerned, it nevertheless would receive on its territory a power flux-density value which exceeds the limits given in § 8 *b)* of Annex 1 to Appendix **30** as a result of the proposed interim assignment, or if it has such an assignment for which its associated service area does not cover the whole of the territory of the administration, and in its territory outside that service area the power flux-density from the interim system space station exceeds the above-mentioned limits;

f) an administration of Region 3 is considered to be affected if it has a frequency assignment to a space station in the broadcasting-satellite service in the band 12.5-12.7 GHz 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*

– has been coordinated or is being coordinated under the provisions of Resolution **33 (Rev. WRC-97)**; *or*

– appears in a Region 3 Plan to be adopted at a future radiocommunication conference, taking account of modifications which may be introduced subsequently in accordance with the Final Acts of that conference,

and the limits of § 3, Annex 1 to Appendix **30** are exceeded.

5.2 For interim feeder-link systems

a) an administration of Region 2 is considered to be affected if any overall equivalent protection margin of one of its assignments in the Plan, calculated in accordance with Annex 3 to Appendix **30A** including the cumulative effect of all interim uses during the maximum specified period of use of the interim system, but excluding the corresponding suspended assignment(s) (§ 4 *b)*), becomes negative or a former negative value is made more negative;

b) an administration in Region 1 or 3 is considered to be affected if it has an assignment for feeder links in the fixed-satellite service (Earth-to-space), any portion of the necessary bandwidth of which falls within the necessary bandwidth of the proposed assignment, which is in conformity with the feeder-link Plan for Regions 1 and 3, or in respect of which proposed modifications to the Plan have already been published by the Bureau in accordance with the provisions of § 4.2.6.1 and 4.2.7 of Article 4 of Appendix **30A** and for which the limits set out in § 5 of Annex 1 to Appendix **30A** are exceeded;

c) an administration in Regions 1, 2 or 3 is considered to be affected if it has a frequency assignment in the fixed-satellite service (space-to-Earth) which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. **9.7** and the appropriate limits of § 1 of Annex 1 to Appendix **30A** are exceeded;

d) an administration in Regions 1, 2 or 3 is considered to be affected if it has a frequency assignment in the band 17.7-17.8 GHz to a terrestrial station, in use or intended to be brought into use within three years of the projected date of bringing into use of the feeder-link earth station, which is located within the coordination area of the feeder-link earth station concerned and the limits of § 2 of Annex 1 to Appendix **30A** are exceeded.

6 The Bureau shall publish in a Special section of its Weekly Circular the information received under § 4, together with the names of the administrations which the Bureau has identified in applying § 5.

7 When the Bureau finds that the suspended assignment of an administration having an interim system is not affected, it shall examine the projected interim system with respect to the interim system of that administration and if there is an incompatibility, it shall request the two administrations concerned to adopt any measures that may enable the new interim system to be operated.

8 The Bureau shall send a telegram to the administrations listed in the Special section of the Weekly Circular drawing their attention to the information it contains and shall send them the results of its calculations.

9 Any administration not listed in the special section which considers that its planned interim assignment may be affected shall so inform the administration responsible for the interim system and the Bureau, and the two administrations shall endeavour to resolve the difficulty before the proposed date of bringing the interim assignment into use.

10 An administration which has not sent its comments either to the administration seeking agreement or to the Bureau within a period of four months following the date of the Weekly Circular referred to in § 6 shall be understood as having agreed to the proposed interim use.

11 On the expiry of four months following the date of publication of the Weekly Circular referred to in § 6, the Bureau shall review the matter, and, depending on the results obtained, shall inform the administration proposing the interim assignment that:

a) it may notify its proposed use under Article 5 of Appendix **30** or Article 5 of Appendix **30A**, as appropriate, if no agreement is required or the required agreement has been obtained from the administrations concerned. In this case the Bureau shall update the Interim List;

b) it may not bring into use its interim system before having obtained the agreement of the administrations affected, either directly or by applying the procedure described in Article 4 of Appendix **30** or Article 4 of Appendix **30A**, as appropriate, as a means of obtaining that agreement.

12 The Bureau shall include all the interim assignments in an Interim List in two parts, one each for the broadcasting-satellite service and the feeder-link assignments, and shall update it in accordance with this Annex. The Interim List shall be published together with the Region 2 Plans but does not constitute part of them.

13 One year prior to the expiry of the interim period, the Bureau shall draw the attention of the administration concerned to this fact and request it to notify in due time the deletion of the assignment from the Master Register and the Interim List.

14 If, notwithstanding the reminders by the Bureau, an administration does not reply to its request sent in application of § 13, the Bureau shall, at the termination of the interim period:

a) enter a symbol in the Remarks Column of the Master Register to indicate the lack of response and that the entry is for information only;

b) not take that assignment into account in the Interim List;

c) inform the administrations concerned and affected of its action.

15 When an administration confirms the termination of the use of the interim assignment, the Bureau shall delete the assignment concerned from the Interim List and the Master Register. Any corresponding assignment in the Plan(s), suspended earlier, may then be brought into use.

16 An administration which considers that its interim system may continue to be used after the expiry of the interim period may extend it by not more than four years and to this effect shall apply the procedure described in this Annex.

17 When an administration applies the procedure in accordance with § 16, but is unable to obtain the agreement of one or more affected administrations, the Bureau shall indicate this situation by inserting an appropriate symbol in the Master Register. Upon receipt of a complaint of harmful interference, the administration shall immediately cease operation of the interim assignment.

18 When an administration, having been informed of a complaint of harmful interference, does not cease transmission within a period of thirty days after the receipt of complaint, the Bureau shall apply the provisions of § 14.

RESOLUTION 44 (Mob-87)

Compatibility of equipment used in the mobile-satellite service[1]

The World Administrative Radio Conference for the Mobile Services (Geneva, 1987),

considering

a) that only a limited number of frequency bands is allocated to the mobile-satellite service;

b) that the ITU-R is studying the preferred technical and operating characteristics for a mobile-satellite system which would have earth stations on ships, land and/or aircraft, all operating within the same system;

c) that there is a need to use efficiently the bands allocated to the mobile-satellite service;

d) that the maritime mobile-satellite service and the aeronautical mobile-satellite service have special requirements with regard to safety,

resolves

that the ITU-R should continue to study, as a matter of urgency, terminal characteristics which are common to the extent practicable, in order to ensure compatibility between the land, maritime, and aeronautical mobile-satellite services,

urges administrations

to encourage the development and manufacture of compatible mobile-satellite user equipment.

[1] WRC-97 made editorial amendments to this Resolution.

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[1]

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that in several different space radiocommunication services there is increasing interest in the use of space systems using non-geostationary-satellite (non-GSO) networks;

b) that, in order to ensure the satisfactory operation of such networks, other networks and other radio services sharing the same frequency bands, taking into account the relevant allocations, there is a need for procedures to regulate the frequency assignments of non-geostationary-satellite networks;

c) that the coordination methods for non-geostationary-satellite networks require specific criteria and calculation methods which are not yet generally available;

d) that, consequently, there is a need for interim procedures to be applied until such time as the coming into force of a suitable permanent procedure;

e) that there is also a need for these interim procedures to be applied in certain bands made available by the present Conference for the purpose of providing feeder links to space stations in the non-geostationary-satellite networks of the mobile-satellite service (MSS),

considering also

f) that any interim procedures must take full account of the status of the allocations to services, both terrestrial and space, in frequency bands which may be used by non-geostationary-satellite networks;

g) that any interim procedures must also take full account of the interests of all countries, including the state of development of their terrestrial and space radiocommunication services,

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* 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.

[1] This Resolution shall apply only to the frequency bands for which specific reference is made to this Resolution in the footnotes to the Table of Frequency Allocations.

recognizing

that the operation of telecommunication systems in the bands subject to this Resolution must be in conformity with the Constitution and Convention of the International Telecommunication Union and the Administrative Regulations in force, in particular their respective preambles and, in this respect:

a) the right of each Member State to decide how or whether to participate in the above systems, and to determine the terms and conditions of access to such systems from its territory;

b) the obligation for entities and organizations providing international or national telecommunication services by non-geostationary-satellite networks to operate at the point of delivery under the legal, financial and regulatory requirements of the Member State in whose territory these services are authorized,

resolves

1 that, pending the entry into force of a permanent procedure, the use of frequency assignments by:

a) non-geostationary-satellite systems in the space services in relation to other non-geostationary-satellite systems, geostationary-satellite systems and terrestrial stations;

b) geostationary-satellite systems in relation to non-geostationary-satellite systems; and

c) terrestrial stations in relation to the earth stations of non-geostationary-satellite networks;

to which this Resolution applies shall be regulated in accordance with the interim procedures and the associated provisions and criteria contained in Annexes 1 and 2 respectively;

2 that the interim procedures Annexed to this Resolution apply in addition to those of Articles **11** and **13** for geostationary-satellite networks and shall replace those of Articles **11** and **13** for non-geostationary-satellite networks in those frequency bands specifically identified by a footnote to the Table of Frequency Allocations in Article **S5/8**;

3 that the interim procedures Annexed to this Resolution shall be applied from 17 November 1995,

invites

1 all administrations concerned in or by the introduction and operation of non-geostationary-satellite systems in the relevant space services to cooperate in the application of these interim procedures;

2 all administrations which acquire experience in the application of the Annexed interim procedures to contribute to the studies of the ITU-R,

instructs the Radiocommunication Bureau

to apply these procedures and to provide the necessary assistance to administrations,

invites the Radiocommunication Study Groups

to study and develop Recommendations on the coordination methods, the necessary orbital data relating to non-geostationary-satellite systems, and the sharing criteria.

ANNEX 1 TO 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

Section A – General information

A.1 The assistance of the Radiocommunication Bureau can be requested in the application of the provisions of this Annex.

A.2 In the absence of specific provisions relating to the evaluation of the interference, the calculation methods and the criteria should be based on relevant ITU-R Recommendations agreed by the administrations concerned, either as a result of Resolution **703 (Rev.WARC-92)** or otherwise. In the event of disagreement on a ITU-R Recommendation or in the absence of such Recommendations, the methods and criteria shall be agreed between the administrations concerned. Such agreements shall be concluded without prejudice to other administrations.

A.3 When applying the provisions of this Resolution for non-geostationary-satellite networks, administrations shall provide the following information in addition to that of Appendix **S4**:

i) Orientation of the satellite transmitting and receiving antenna beams and their radiation pattern.

ii) Type of modulation and multiple access and spectrum mask.

iii) Appropriate information required to calculate the region affected by the MSS space stations as defined in Recommendation ITU-R M.1187.

iv) Maximum and average peak e.i.r.p./4 kHz and e.i.r.p./1 MHz for each beam.

v) Satellite antenna gain $G(\theta_e)$ as a function of elevation angle at a fixed point on the Earth. (To be provided either as part of Appendix **S4** or as a formula to convert existing Appendix **S4** data.)

vi) Spreading loss (for a non-GSO satellite) as a function of elevation angle. (To be determined by equations or provided in graphical form.)

vii) New data elements required to properly characterize non-GSO satellite systems:

N_p: Number of orbital planes.

N_S: Number of satellites in each orbital plane.

Ω_j: Right ascension of the ascending node for the j-th orbital plane, measured counter-clockwise in the equatorial plane from the direction of the vernal equinox to the point where the satellite makes its south-to-north crossing of the equatorial plane ($0° \le \Omega_j < 360°$).

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

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

a: Semi-major axis.

e: Eccentricity ($0 \le e < 1$).

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

In the following, references to Appendix **S4/3** or Appendix **S4/4** information shall be considered to include this additional information, where appropriate.

Section I – Procedures for the advance publication of information on planned satellite networks

Publication of information

1.1 An administration (or one acting on behalf of a group of named administrations) which intends to bring into use a satellite network within a satellite system shall, prior to the coordination procedure described in § 2.1 and 2.2, send to the Bureau, not earlier than six years[2] and preferably not later than two years before the date of bringing into service of each satellite network, the information listed in Appendix **S4**.

1.2 Amendments to the information sent in accordance with the provisions of § 1.1 shall also be sent to the Bureau as soon as they become available. For geostationary-satellite networks and non-geostationary-satellite networks which are subject to Section II, the use of an additional frequency band will require the application of the advance publication procedure for this band.

[2] See also § 5.1.6.

For non-geostationary-satellite networks which are not subject to Section II, the use of an additional frequency band or an extension of the service area will require the application or recommencing respectively of the advance publication procedures for these modifications; see Resolution **48 (WRC-95)**[*].

1.3 On receipt of the complete information sent under § 1.1 and 1.2, the Bureau shall publish it in a special section of its Weekly Circular within three months and shall also, when the Weekly Circular contains such information, so advise all administrations by circular telegram. The circular telegram shall indicate the frequency bands to be used and, in the case of a geostationary satellite, the orbital location of the space station. 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 therefor.

Comments on published information

1.4 If, after studying the information published under § 1.3, any administration is of the opinion that interference which may be unacceptable may be caused to assignments of its existing or planned satellite networks or to assignments to its existing or planned terrestrial stations, it shall, within four months after the date of the Weekly Circular referred to in § 1.3 above, send the administration concerned its comments on the particulars of the interference to its existing or planned satellite networks or to its existing or planned terrestrial stations. A copy of these comments shall also be sent to the Bureau. If no such comments are received from an administration within the period mentioned above, it may be assumed that the administration has no basic objections to the planned satellite network(s) of the system on which details have been published.

1.4A An administration sending information under § 1.1 and 1.2 shall, if requested by an administration receiving information published under § 1.3, provide the technical methods and criteria it proposes to use for the evaluation of the interference.

1.4B An administration receiving information published under § 1.3, may provide to the administration sending information under § 1.1 and 1.2 the technical methods and criteria it proposes to use for the evaluation of the interference.

Resolution of difficulties

1.5 An administration receiving comments sent in accordance with § 1.4 and administrations sending such comments shall endeavour to resolve any difficulties that may arise and shall provide any additional information that may be available.

1.5A In case of difficulties arising, the administration responsible for the planned network shall first explore all possible means of meeting its requirements without considering the possibility of adjustment to stations or networks of other administrations. If no such means can

[*] This Resolution was abrogated by WRC-97.

be found, the administration concerned may then request other administrations, either bilaterally or multilaterally, to mutually help resolve these difficulties.

1.5B An administration receiving a request under § 1.5A shall, in consultation with the requesting administration, explore all possible means of meeting the latter's requirements.

1.5C If, after following the procedure described in § 1.5A and 1.5B, there are unresolved difficulties, the administrations concerned shall jointly make every possible effort to resolve these difficulties by means of mutually acceptable adjustments.

Results of advance publication

1.6 An administration on behalf of which details of planned satellite networks have been published in accordance with the provisions of § 1.1 to 1.3 shall, after the period of four months specified in § 1.4, inform the Bureau whether or not comments provided for in § 1.4 have been received and of the progress made in resolving any difficulties. Additional information on the progress made in resolving any remaining difficulties shall be sent to the Bureau at intervals not exceeding six months prior to the commencement of coordination or notification to the Bureau, as the case may be. The Bureau shall publish this information in the special section of its Weekly Circular.

1.7 When, upon expiry of a period of six years plus the extension provided for in § 5.1.6 after the date of the publication of the special section referred to in § 1.3, the administration responsible for the network has not submitted the Appendix **S4** information, for coordination under § 2.1 or § 2.2 or notification under No. **1488** or Section V of this Annex, as appropriate, the information published under § 1.3 shall be cancelled after the administration concerned has been informed.

Commencement of coordination or notification procedures

1.8 When communicating to the Bureau the information referred to in § 1.1, an administration may, at the same time or later, communicate:

1.8A the information required for the network coordination of a frequency assignment to a station of a satellite network in accordance with the provisions of § 2.6, or

1.8B the information required for notification of a frequency assignment to a station of a satellite network when coordination for that assignment is not required.

1.9 The coordination or notification information, as the case may be, shall be considered as having been received by the Bureau not earlier than six months after the date of receipt of the complete information as indicated under § 1.3.

Section II – Coordination of frequency assignments to a station of a satellite network

Requirement for coordination

2.1 Before an administration (or one acting on behalf of one or more named administrations)[3] notifies to the Bureau or brings into use any frequency assignment to a space station or to an earth station of a non-geostationary-satellite network, it shall effect coordination of the assignment with any other administration:

– whose assignment to a station in a geostationary-satellite network might affect or be affected by the proposed assignment, or

– whose assignment to a station of a non-geostationary-satellite network might affect or be affected by the proposed assignment, or

– whose assignment to a terrestrial station might affect or be affected by the proposed space station assignment.

2.2 Before an administration (or one acting on behalf of one or more named administrations)[3] notifies to the Bureau or brings into use any frequency assignment to a station of a geostationary-satellite network, it shall effect coordination of the assignment with any other administration:

– whose assignment to a station of a non-geostationary-satellite network might affect or be affected by the proposed assignment, or

– whose assignment to a terrestrial station might affect or be affected by the proposed space station assignment.

2.3 Coordination under § 2.1 and 2.2 may be effected for a satellite network using the information relating to the space station, including its service area, and the parameters of one or more typical earth stations which may be located in all or part of the space station service area.

2.4 If a frequency assignment is brought into use before the commencement of the coordination procedure of § 2.1 and 2.2, when this coordination is required, the operation in advance of the receipt by the Bureau of the Appendix **S4** information shall in no way afford any priority of the date.

2.5 Assignments to be taken into account

2.5.1 Frequency assignments to be taken into account in the application of § 2.1 and 2.2 are those with a frequency overlap with the planned assignment, pertaining to the same service or to another service to which the band is allocated with equal rights, or a higher category of allocation (see Nos. **S5.28** to **S5.33** and **S5.43**), and which

[3] Whenever, under this provision, an administration acts on behalf of a group of named administrations, all members of the group retain the right to respond in respect of their own networks or systems.

for space services, are:

2.5.2 in conformity with No. **1503**, and

2.5.3 either recorded in the Master Register, or notified to the Bureau without any coordination in those cases when the provisions of § 2.5.8 apply, or coordinated under the provisions of this Section or of Section II of Article **11**, or received by the Bureau prior to 18 November 1995 for notification in cases where coordination was not required as of the date of receipt of the notice, or

2.5.4 included in the coordination procedure with effect from the date of receipt by the Bureau, in accordance with § 2.6 or No. **1074** or **1074A** of Article **11**, of the complete information as specified in Appendix **S4**;

or, for terrestrial services, are:

2.5.5 recorded in the Master Register with a favourable finding with respect to No. **1240**, or

2.5.6 not notified but in use or planned to be brought into use within the three years following the date of the publication referred to in § 2.7.2.

2.5.7 Coordination of space services (space-to-Earth) with the terrestrial services of an administration is required only if the threshold levels appearing in Annex 2 of this Resolution are exceeded over any part of the territory of this administration.

2.5.8 No coordination under § 2.1 or 2.2 is required:

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

b) when, for a new frequency assignment to a receiving station, the notifying administration states that it accepts the interference resulting from the frequency assignments referred to in § 2.5.1 to 2.5.4;

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

Coordination data

2.6 The administration seeking coordination shall send to the Bureau the information listed in Appendix **S4**.

2.7 On receipt of the complete information referred to in § 2.6, the Bureau shall:

2.7.1 examine this information with respect to its conformity with No. **1503**; the date of its receipt shall be considered as the date from which the assignment will be taken into account for coordination, and

2.7.2 publish in the special section of its weekly circular, within three months, the information received under § 2.6 and the result of the examination under § 2.7.1. 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 therefor, and

2.7.3 to assist administrations in identifying services that might be affected, include in the special section mentioned in § 2.7.2 the names of the administrations having frequency assignments complying with the provisions of § 2.5.1, 2.5.2, 2.5.3 and 2.5.4 for space services and § 2.5.1 and 2.5.5 for terrestrial services.

Examination of coordination data and agreement between administrations

2.8 On receipt of the special section referred to in § 2.7.2, an administration shall promptly examine the matter with regard to:

2.8.1 interference which would be caused to the frequency assignments of its satellite networks or by these assignments to the satellite network for which coordination is sought, or

2.8.2 its planned or existing terrestrial stations which have a frequency overlap with the frequency assignments of the space station for which coordination is sought.

2.9 In so doing, it shall have regard to the proposed date of bringing into use of the assignment for which coordination is sought. It shall then, within four months from the date of the relevant Weekly Circular, notify the administration seeking coordination of its agreement.

2.10 On receipt of the special section referred to in § 2.7.2, and within the same four-month period, an administration in need of assistance may inform the Bureau that it has recorded, existing or planned terrestrial stations that might be affected by the planned satellite network and may request the Bureau to determine the need for coordination by applying the Annex 2 criteria. The Bureau shall inform the administration seeking coordination of this request, indicating the date by which it may be able to provide the results of its analysis. When these results are available, the Bureau shall inform both administrations.

A request under § 2.10 shall be considered as a disagreement, pending the results of the analysis by the Bureau of the need for coordination.

2.11 If an administration does not agree under § 2.9 or has requested assistance from the Bureau under § 2.10, it shall, within the same period, send to the administration seeking coordination the technical details of the networks or information on the terrestrial stations concerned upon which its disagreement is based, including:

2.11.1 in case of a disagreement under § 2.8.1, the characteristics contained in Appendix **S4**, or

2.11.2 in case of a disagreement under § 2.8.2, the characteristics contained in Section C of Appendix **S4** which have not previously been notified to the Bureau,

and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem. A copy of these comments shall also be sent to the Bureau.

2.12 If the administration concerned has notified its disagreement within the same period, but the information on the fixed service stations upon which its disagreement is based cannot be provided, it shall be assumed that reference parameters, as contained in Annex 2, can be used to determine the need for coordination with this administration.

2.13 Administrations with which coordination is sought, as well as the administration seeking coordination, shall make all possible mutual efforts to overcome the difficulties in a manner acceptable to the parties concerned.

2.14 Forty-five days prior to the expiry of the four-month period mentioned in § 2.9, the Bureau shall dispatch a circular telegram to all administrations, bringing the matter to their attention.

2.15 Upon receipt of the circular telegram mentioned in § 2.14, an administration shall acknowledge receipt immediately by telegram. If no acknowledgement is received within thirty days, the Bureau shall dispatch a telegram requesting acknowledgement, to which the receiving administration shall reply within a further period of fifteen days.

2.16 When an administration has not responded to the Bureau within the period of four months referred to in § 2.9, it shall be deemed that this administration has undertaken:

a) that no complaint will be made in respect of any harmful interference affecting the services rendered by its satellite networks referred to in § 2.5.1 to 2.5.4 which may be caused by the use of the assignment to a station of the satellite network for which coordination was requested;

b) that no complaint will be made in respect of any harmful interference affecting the services rendered by its terrestrial stations referred to in § 2.5.1, 2.5.5 and 2.5.6 which may be caused by the use of the assignment to a station of the satellite network for which coordination was requested;

c) that its assignments to a station in a satellite network referred to in § 2.5.1 to 2.5.4 will not cause harmful interference to the satellite network assignment for which coordination was requested;

d) that assignments to terrestrial stations referred to in § 2.5.1 and 2.5.6 will not cause harmful interference to the satellite network assignment for which coordination was requested.

Results of coordination

2.17 An administration which has initiated a coordination procedure under the provisions of § 2.1 to 2.6 shall communicate to the Bureau the names of the administrations with which agreement has been reached. The Bureau shall publish this information in the special section of its weekly circular.

2.18 An administration which has sought coordination, as well as any administration which has complied with the provisions of § 2.8 to 2.16, shall communicate to the Bureau any modifications to the published characteristics of their respective networks or stations that were required to reach agreement on the coordination. The Bureau shall publish this information in accordance with § 2.7.2, indicating that these modifications resulted from the joint efforts of the administrations concerned to reach agreement on the coordination.

Requests to the Bureau for assistance in effecting coordination

2.18.1 If an administration with which coordination is sought has disagreed under § 2.11, but fails to give a decision on the matter or to provide information concerning its own assignments upon which the disagreement is based, within the same four-month period specified in § 2.9, the requesting administration may seek the assistance of the Bureau.

2.18.2 The Bureau, acting on a request under § 2.18.1, shall forthwith send a telegram to the administration concerned requesting it to give an early decision on the matter or to provide the relevant information.

2.18.3 If the administration concerned still does not respond to this request within thirty days of the Bureau's action under § 2.18.2, the conclusions under § 2.16 shall apply.

2.18.4 If there is continuing disagreement, or if any administration involved has requested the assistance of the Bureau, the Bureau shall seek any necessary information to enable it to assess the interference. It shall communicate its conclusions to the administrations involved.

Notification of frequency assignments in the event of continuing disagreement

2.19 In the event of continuing disagreement between an administration seeking to effect coordination and any administration with which coordination has been sought, the administration seeking coordination shall, except in the cases where the assistance of the Bureau has been requested, defer the submission of its notice concerning the proposed assignment by six months from the date of publication of the special section referred to in § 2.7.2, taking into account the provisions of No. **1496**. When the assistance of the Bureau has been requested, the submission of the notice shall be deferred for a further three months.

Section III – Coordination of frequency assignments to earth stations of a non-geostationary-satellite network in relation to terrestrial stations and of a satellite network in relation to other earth stations in the opposite direction of transmission

Requirement for coordination

3.1 Before an administration notifies to the Bureau or brings into use any frequency assignment to a fixed earth station or to typical earth stations in a particular band allocated with equal rights to space and terrestrial radiocommunication services, it shall effect coordination of the assignment with each administration whose territory lies wholly or partly within the coordination area as specified in Annex 2 to this Resolution. The request for coordination may specify all or some of the frequency assignments to the associated space station, but thereafter each assignment shall be dealt with individually.

3.1.1 No coordination under § 3.1 is required:

3.1.2 *a)* when an administration proposes to bring into use an earth station the coordination area of which does not include any of the territory of any other country;

3.1.3 *b)* when an administration proposes to bring into use an assignment to an earth station operating in the opposite direction of transmission, which is located in relation to an earth station outside the coordination area of that earth station;

3.1.4 *c)* when the characteristics of a new or modified assignment are within the limits of those of a frequency assignment which has previously been coordinated;

3.1.5 *d)* when an administration proposes to bring into use a new frequency assignment to a receiving earth station and the notifying administration states that it accepts the interference resulting from existing and future terrestrial station assignments or earth station assignments operating in the opposite direction of transmission. In such case, administrations responsible for the terrestrial stations or the earth stations, are not required to apply the provisions of Section IV or Section III respectively, of this Annex.

Coordination data

3.2 For the purpose of effecting coordination, the administration requesting coordination shall send to each administration concerned under § 3.1 all basic characteristics concerning the proposed frequency assignment as listed in Appendix **S4**, and an indication of the planned date of bringing into use.

Acknowledgement of receipt of coordination data

3.3 An administration with which coordination is sought under § 3.1 shall immediately acknowledge receipt of the coordination data.

Examination of coordination data and agreement between administrations

3.4 On receipt of the coordination data, an administration shall, having regard to the proposed date of bringing into use of the assignment for which coordination was requested, promptly examine the matter with regard to both:

3.4.1 *a)* interference which would affect the service rendered by its terrestrial stations operating in accordance with the Constitution, the Convention and these Regulations, or to be so operated prior to the planned date of bringing into service of the earth station assignment, or within the next three years, whichever is the longer, and

b) interference which would affect the services rendered by its earth stations which are operating, or are planned to be operated in the opposite direction of transmission, prior to the planned date of bringing into service of the earth station assignment, or within the next three years, whichever is the longer. The assignments to be taken into account in this examination are those:

b1 for which the associated space network characteristics have been communicated to the Bureau under § 1.3; and

b2 which are in conformity with No. **1503**; and

b3 either coordinated under No. **1107** or § 3.1 above; or

b4 to be taken into account for coordination with effect from the date of communication of the information referred to in No. **1113** or § 3.2 above; or

b5 recorded in the Master Register with a favourable finding with respect to No. **1505** or § 5.1.2 below; or

b6 recorded in the Master Register with an unfavourable finding with respect to No. **1505** or § 5.1.2 below, and a favourable finding with respect to No. **1509** or § 5.1.4 below; or

b7 recorded in the Master Register in application of No. **1544**, if that frequency assignment has not in fact caused harmful interference to any other previously recorded frequency assignment which is in conformity with No. **1503**;

3.4.2 *a)* interference which would be caused to reception at an earth station by the service rendered by its terrestrial stations operating in accordance with the Constitution, the Convention and these Regulations, or to be so operated prior to the planned date of bringing into service of the earth station assignment, or within the next three years, whichever is the longer;

b) interference which would be caused to reception at an earth station by the service rendered by its earth stations in the opposite direction of transmission, covered under § 3.4.1 *b)*, b1 to b7, which are operating, or are to be operated prior to the planned date of bringing into service of the earth station assignment, or within the next three years, whichever is the longer.

3.5 The administration with which coordination is sought shall, within four months from dispatch of the coordination data:

3.5.1 notify the administration requesting coordination of its agreement with a copy to the Bureau, indicating, where appropriate, the part of the allocated frequency band containing the coordinated frequency assignments; or

3.5.2 send to that administration a request for inclusion in coordination of the terrestrial stations or the earth stations in the opposite direction of transmission mentioned in § 3.4.1 *a)*, 3.4.1 *b)*, 3.4.2 *a)* and 3.4.2 *b)*; or

3.5.3 notify that administration of its disagreement.

3.6 In the cases mentioned in § 3.5.2 and 3.5.3, the administration with which coordination is sought shall send to the administration requesting coordination a diagram drawn to an appropriate scale indicating the location of those terrestrial stations or earth stations in the opposite direction of transmission which are or will be within the coordination area, together with all other relevant basic characteristics using Appendix **S4** and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem.

3.7 When the administration with which coordination is sought sends to the administration seeking coordination the information required in the case of § 3.5.3, a copy thereof shall also be sent to the Bureau.

a) The Bureau shall consider as notifications in accordance with Section I of Article **12** only that information relating to existing terrestrial stations, or to those to be brought into use within the next three months.

b) The Bureau shall consider as notifications in accordance with Section I of Article **13** only that information relating to existing earth stations, or to those to be brought into use within the next three years.

3.7.1 When an agreement on coordination is reached as a consequence of § 3.5 to 3.7, the administration responsible for the terrestrial stations or the earth stations in the opposite direction of transmission may send to the Bureau the information concerning those stations covered by the agreement which are intended to be notified in accordance with Section I of Article **12** or Section I of Article **13**, as appropriate. The Bureau shall consider as notifications in accordance with those Sections only that information relating to existing stations or to those to be brought into use within the next three years.

3.7.2 The periods referred to in § 3.4.1 and 3.4.2 may be extended by agreement between the administrations concerned in order to take planned terrestrial and space networks into account. Coordination between earth stations may commence five and a half years before bringing these stations into use.

Requests to the Bureau for assistance in effecting coordination

3.7.3 An administration seeking coordination may request the Bureau to endeavour to effect coordination in those cases where:

3.7.4 *a)* an administration with which coordination is sought under § 3.1 fails to acknowledge receipt, under § 3.3, within forty-five days of dispatch of the coordination data referred to in § 3.2; or

3.7.5 *b)* an administration has acknowledged receipt under § 3.3, but fails to give a decision within four months from dispatch of the coordination data under § 3.2; or

3.7.6 *c)* there is disagreement, as to the acceptable interference, between the administration seeking coordination and an administration with which coordination is sought; or

3.7.7 *d)* coordination is not possible for any other reason.

3.7.8 In making its request, the administration shall furnish the necessary information to enable the Bureau to endeavour to effect such coordination.

Action to be taken by the Bureau

3.7.9 When the Bureau receives a request under § 3.7.4, it shall forthwith send a telegram to the administration concerned requesting immediate acknowledgement.

3.7.10 When the Bureau receives an acknowledgement following its action under § 3.7.9, or when the Bureau receives a request under § 3.7.5, it shall forthwith send a telegram to the administration concerned requesting an early decision in the matter.

3.7.11 When the Bureau receives a request under § 3.7.7, it shall endeavour to effect coordination in accordance with the provisions of § 3.1. When the Bureau receives no acknowledgement to its request for coordination within a period of thirty days, it shall act in accordance with § 3.7.9.

3.7.12 Where necessary, as part of the procedure under § 3.7.3 to 3.7.8, the Bureau shall assess the interference. In any case, the Bureau shall inform the administrations concerned of the results obtained.

3.7.13 The Bureau may request additional information which it may require to assess the interference to the services concerned.

3.7.14 If an administration fails to reply within thirty days of dispatch of the Bureau's telegram requesting an acknowledgement sent under § 3.7.9, or fails to give a decision in the matter within thirty days of dispatch of the Bureau's telegram of request under § 3.7.10, it shall be deemed that the administration with which coordination was sought has undertaken:

3.7.15 *a)* that no complaint will be made in respect of any harmful interference affecting the services rendered by its terrestrial stations or its earth stations with regard to operation in the opposite direction of transmission which may be caused by the use of the assignment for which coordination was requested;

3.7.16 *b)* that its terrestrial stations or its earth stations operating in the opposite direction of transmission will not cause harmful interference to the frequency assignment for which coordination was requested.

Notification of frequency assignments in the event of continuing disagreement

3.8 In the event of continuing disagreement between an administration seeking coordination and an administration with which coordination has been sought, the administration seeking coordination shall, except in the cases where the assistance of the Bureau has been requested, defer the submission of its notice concerning the proposed assignment by six months from the date of the request for coordination, taking into account the provisions of No. **1496**. When the assistance of the Bureau has been requested, the submission of the notice shall be deferred for a further three months.

Section IV – Coordination of frequency assignments to terrestrial stations for transmission in relation to earth stations of a non-geostationary-satellite network

Requirement for coordination

4.1 Before an administration notifies to the Bureau, or brings into use any frequency assignment to a terrestrial station for transmission within the coordination area, as specified in Annex 2 to this Resolution, of an earth station of a non-geostationary satellite network, in a band

allocated with equal rights to terrestrial radiocommunication services and space radiocommunication services (space-to-Earth), it shall effect coordination of the proposed assignment with the administration responsible for the earth stations with respect to the frequency assignments:

4.1.1 for which the associated space network characteristics have been communicated to the Bureau under § 1.3; and

4.1.2 which are in conformity with No. **1503**; and

4.1.3 either coordinated under No. **1107** or § 3.1 above; or

4.1.4 to be taken into account for coordination with effect from the date of communication of the information referred to in No. **1113** or § 3.2 above; or

4.1.5 recorded in the Master Register with a favourable finding with respect to No. **1505** or § 5.1.2 below; or

4.1.6 recorded in the Master Register with an unfavourable finding with respect to No. **1505** or § 5.1.2 below, and a favourable finding with respect to No. **1509** or § 5.1.4 below; or

4.1.7 recorded in the Master Register with an unfavourable finding with respect to No. **1505** or § 5.1.2 below and No. **1509** or § 5.1.4 below, the notifying administration having stated that it accepts the interference resulting from the existing terrestrial stations located within the coordination area of the earth station on the date of its recording.

4.1.8 No coordination under § 4.1 is required when an administration proposes:

4.1.9 *a)* to bring into use a terrestrial station located outside the coordination area of an earth station;

4.1.10 *b)* to change the characteristics of an existing assignment in such a way as to remain within the envelope of the characteristics of this assignment.

4.1.11 *c)* to bring into use a terrestrial station within the coordination area of an earth station, provided that the proposed terrestrial station assignment is outside any part of a frequency band coordinated under § 3.5.1 for reception by that earth station.

Coordination data

4.2 For the purpose of effecting coordination, the administration requesting coordination shall send to each administration concerned under § 4.1 all pertinent information. The request for coordination may specify all or some of the frequency assignments expected to be used within the next three years by stations of a terrestrial network wholly or partly within the coordination area of the earth stations. Thereafter each assignment shall be dealt with individually.

Acknowledgement of receipt of coordination data

4.3 An administration with which coordination is sought under § 4.1 shall immediately acknowledge receipt of the coordination data.

Examination of coordination data and agreement between administrations

4.4 On receipt of the coordination data, the administration with which coordination is sought shall promptly examine the matter with regard to interference which would affect the services rendered by its earth stations covered by § 4.1 to 4.1.7, which are operating or are to be operated within the next three years.

4.5 The administration with which coordination is sought shall, within an overall period of four months from dispatch of the coordination data, either notify the administration requesting coordination of its agreement to the proposed assignment or, if this is not possible, indicate the reasons for its objection and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem.

4.6 Requests to the Bureau for assistance in effecting coordination

4.6.1 An administration seeking coordination may request the Bureau to endeavour to effect coordination in those cases where:

4.6.2 *a)* an administration with which coordination is sought under § 4.1 fails to acknowledge receipt under § 4.3 within thirty days of dispatch of the coordination data referred to in § 4.2; or

4.6.3 *b)* an administration has acknowledged receipt under § 4.3, but fails to give a decision within four months of dispatch of the coordination data; or

4.6.4 *c)* there is disagreement, as to the acceptable interference, between the administration seeking coordination and an administration with which coordination is sought; or

4.6.5 *d)* coordination is not possible for any other reason.

4.6.6 In making its request, the administration shall furnish the necessary information to enable the Bureau to endeavour to effect such coordination.

4.7 Action to be taken by the Bureau

4.7.1 When the Bureau receives a request under § 4.6.2, it shall forthwith send a telegram to the administration concerned requesting immediate acknowledgement.

4.7.2 When the Bureau receives an acknowledgement following its action under § 4.7.1, or where the Bureau receives a request under § 4.6.3, it shall forthwith send a telegram to the administration concerned requesting an early decision in the matter.

4.7.3 When the Bureau receives a request under § 4.6.5, it shall endeavour to effect coordination in accordance with the provisions of § 4.1. When the Bureau receives no acknowledgement of its request for coordination within three months, it shall act in accordance with § 4.7.1.

4.7.4 Where necessary, as part of the procedure under § 4.6.1 to 4.6.5, the Bureau shall assess the interference. In any case, the Bureau shall inform the administrations concerned of the results obtained.

4.7.5 The Bureau may request additional information which it may require to assess the interference to the services concerned.

4.7.6 If an administration fails to reply within thirty days of dispatch of the Bureau's telegram sent under § 4.7.1 requesting an acknowledgement, or fails to give a decision in the matter within thirty days of dispatch of the Bureau's telegram of request sent under § 4.7.2, it shall be deemed that the administration with which coordination was sought has undertaken that no complaint will be made in respect of any harmful interference which may be caused by the terrestrial station being coordinated to the service rendered by its earth station.

Notification of frequency assignments in the event of continuing disagreement

4.8 In the event of continuing disagreement between an administration seeking coordination and an administration with which coordination has been sought, the administration seeking coordination shall, except in the cases where the assistance of the Bureau has been requested, defer the submission of its notice concerning the proposed assignment by six months from the date of the request for coordination, taking into account the provisions of Nos. **1230** and **1496**. When the assistance of the Bureau has been requested, the submission of the notice shall be deferred for a further three months.

Section V – Notification of frequency assignments

Notification of assignments to space stations and earth stations

5.1 An administration shall, for the purpose of notifying an assignment to the Bureau, apply the provisions of Article **13**. When applying the provisions of Article **13** to frequency assignment notices relating to space stations and earth stations covered by this Resolution, the Bureau shall:

5.1.1 in applying No. **1504**, also examine the notice with respect to its conformity with the provisions of § 2.1, 2.2 and 2.5.8 relating to coordination of the use of the frequency assignment with the other administrations concerned;

5.1.2 in applying No. **1505**, also examine the notice with respect to its conformity with the provisions of § 3.1 and 3.1.1 to 3.1.3 relating to coordination of the use of the frequency assignment with the other administrations concerned;

5.1.3 in applying No. **1506**, also examine the notice with respect to the probability of harmful interference when the coordination under § 2.1 or 2.2 has not been successfully effected;

5.1.4 in applying No. **1509**, also examine the notice with respect to the probability of harmful interference when the coordination under § 3.1 has not been successfully effected;

5.1.5 not apply Nos. **1515** and **1516**;

5.1.6 apply No. **1550** with respect to the date of publication of the special section of the Weekly Circular referred to in § 1.3.

5.2 The examination under § 5.1.3 or 5.1.4 shall take into account the frequency assignments for transmission or reception already recorded in the Master Register.

Notification of assignments to terrestrial stations

5.3 An administration shall, for the purpose of notifying an assignment to the Bureau, apply the provisions of Article **12**. When applying the provisions of Article **12** the Bureau shall, in application of No. **1353**, examine frequency assignment notices relating to terrestrial stations covered by this Resolution with respect to their conformity with the provisions of § 4.1 relating to coordination of the use of the frequency assignment with the other administrations concerned.

ANNEX 2 TO RESOLUTION 46 (Rev.WRC-97)

A2.1 Coordination thresholds for sharing between MSS (space-to-Earth) and terrestrial services in the same frequency bands and between non-GSO MSS feeder links (space-to-Earth) and terrestrial services in the same frequency bands

A2.1.1 Below 1 GHz*

A2.1.1.1 In the bands 137-138 MHz and 400.15-401 MHz, coordination of a space station of the MSS (space-to-Earth) with respect to terrestrial services (except aeronautical mobile (OR) service networks operated by the administrations listed in Nos. **S5.204** and **S5.206** as of 1 November 1996) is required only if the power flux-density produced by this space station exceeds −125 dB(W/m^2/4 kHz) at the Earth's surface.

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* These provisions apply only to the MSS.

A2.1.1.2 In the band 137-138 MHz, coordination of a space station of the MSS (space-to-Earth) with respect to the aeronautical mobile (OR) service is required only if the power flux-density produced by this space station at the Earth's surface exceeds:

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

– –140 dB(W/m^2/4 kHz) for networks for which complete Appendix **S4/3** coordination information has been received by the Bureau after 1 November 1996 for the administrations referred to in § A2.1.1.1 above.

A2.1.1.3 In the band 137-138 MHz, coordination is also required for a space station on a replacement satellite of a MSS network for which complete Appendix **3** coordination information has been received by the Bureau prior to 1 November 1996 and the power flux-density exceeds –125 dB(W/m^2/4 kHz) at the Earth's surface for the administrations referred to in § A2.1.1.1 above.

A2.1.2 Between 1 and 3 GHz

A2.1.2.1 Objectives

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

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

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

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

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

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

A2.1.2.2 General considerations

A2.1.2.2.1 Method for calculating the value of FDP

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

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

– technical characteristics of digital FS station;

– technical characteristics of non-GSO MSS constellation.

The FDP is calculated:

– by simulating the proposed MSS constellation using the information given in § A.3 of Resolution **46 (WARC-92)**;

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

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

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

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

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

– by the following formula:

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

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

where:

I_i: interference noise power level (W)

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

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

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

T: FS station receiving system effective noise temperature (*T* should be calculated by the following formula: $10 \log T = NF + 10 \log T_0$ where *NF* (dB) is the receiver noise figure given in Annex 1 and T_0 should be assumed as 290 K)

B: reference bandwidth = 1 MHz.

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

A2.1.2.2.2 Characteristics of reference systems in the fixed service

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

A2.1.2.2.2.1 Characteristics of reference digital point-to-point systems

Three different digital systems are described in the following table:

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

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

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

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

Antenna pattern:

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

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

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

where:

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

φ: off-axis angle (degrees)

D: antenna diameter

λ: wavelength expressed in the same unit as D

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

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

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

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

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

A2.1.2.2.2.2 Characteristics of reference analogue point-to-point systems

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

Antenna pattern: Use antenna pattern of § A2.1.2.2.2.1.

A.2.1.2.2.2.3 Characteristics of reference point-to-multipoint systems

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

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

Antenna pattern:

For the outstation antenna pattern, the reference pattern described in § A2.1.2.2.2.1 is to be used.

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

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

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

where:

G_0: maximum gain in the horizontal plane (dBi)

θ: radiation angle above the horizontal plane (degrees)

φ_3 (degrees) is given by:

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

where:

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

A2.1.2.3 Determination of the need for coordination between MSS space stations (space-to-Earth) and terrestrial stations

A2.1.2.3.1 Method for the determination of the need for coordination between MSS space stations (space-to-Earth) and other terrestrial services sharing the same frequency band in the 1 to 3 GHz range

Coordination of assignments for transmitting space stations of the mobile-satellite service with respect to terrestrial services is not required if the power flux-density (pfd) produced at the Earth's surface or the fractional degradation in performance (FDP) of a station in the fixed service does not exceed the threshold values shown in the following table.

Frequency band (MHz)	Terrestrial service to be protected	Coordination threshold values				
		GSO space stations		Non-GSO space stations		
		pfd (per space station) calculation factors (NOTE 2)		pfd (per space station) calculation factors (NOTE 2)		% FDP (in 1 MHz) (NOTE 1)
		P	***r*** dB/ degrees	***P***	***r*** dB/ degrees	
1 492-1 525	Analogue fixed service telephony (NOTE 5)	–146 dB(W/m^2) in 4 kHz and –128 dB(W/m^2) in 1 MHz	0.5	–146 dB(W/m^2) in 4 kHz and –128 dB(W/m^2) in 1 MHz	0.5	
	All other cases (NOTE 4)	–128 dB(W/m^2) in 1 MHz	0.5	–128 dB(W/m^2) in 1 MHz	0.5	25
1 525-1 530	Analogue fixed service telephony (NOTE 5)	–146 dB(W/m^2) in 4 kHz and –128 dB(W/m^2) in 1 MHz	0.5	–146 dB(W/m^2) in 4 kHz and –128 dB(W/m^2) in 1 MHz	0.5	
	All other cases	–128 dB(W/m^2) in 1 MHz	0.5	–128 dB(W/m^2) in 1 MHz	0.5	25
2 160-2 200 (NOTE 3)	Analogue fixed service telephony (NOTE 5)	–146 dB(W/m^2) in 4 kHz and –128 dB(W/m^2) in 1 MHz	0.5	–141 dB(W/m^2) in 4 kHz and –123 dB (W/m^2) in 1 MHz (NOTE 6)	0.5	
	All other cases	–128 dB(W/m^2) in 1 MHz	0.5	–123 dB(W/m^2) in 1 MHz (NOTE 6)	0.5	25
2 483.5-2 500	All cases	–146 dB(W/m^2) in 4 kHz and –128 dB(W/m^2) in 1 MHz	0.5	–144 dB(W/m^2) in 4 kHz and –126 dB(W/m^2) in 1 MHz (NOTE 7)	0.65	
2 500-2 520	Analogue fixed service telephony (NOTE 5)	–146 dB(W/m^2) in 4 kHz and –128 dB(W/m^2) in 1 MHz	0.5	–146 dB(W/m^2) in 4 kHz and –128 dB(W/m^2) in 1 MHz	0.5	
	All other cases	–128 dB(W/m^2) in 1 MHz	0.5	–128 dB (W/m^2) in 1 MHz	0.5	25
2 520-2 535	Analogue fixed service telephony (NOTE 5)	–154 dB(W/m^2) in 4 kHz and –136 dB(W/m^2) in 1 MHz	0.75	–146 dB(W/m^2) in 4 kHz and –128 dB(W/m^2) in 1 MHz	0.5	
	All other cases	–136 dB(W/m^2) in 1 MHz	0.75	–128 dB(W/m^2) in 1 MHz	0.5	25

NOTE 1 – The calculation of FDP is contained in § A2.1.2.2.1, using the reference FSM parameters contained in § A2.1.2.2.2.1 and A2.1.2.2.2.3. The use of FDP threshold is limited to the case of digital FSM systems.

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

P for $0° \leq \delta \leq 5°$

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

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

where δ is the angle of arrival (degrees).

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

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

NOTE 4 – Exceptions for the band 1 492-1 525 MHz are as follows:

4.1 For the land mobile service on the territory of Japan (No. **S5.348A**): –150 dB(W/m^2) in any 4 kHz at all angles of arrival is applicable to all satellite space-to-Earth emissions.

4.2 For the aeronautical mobile service for telemetry (No. **S5.343**), the requirement for coordination is determined by frequency overlap (No. **S5.348**).

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

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

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

A2.1.2.3.2 A system-specific methodology (SSM) to be used in determining the need for detailed coordination of non-GSO MSS (space-to-Earth) systems with FS systems

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

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

A2.1.3 Above 3 GHz

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

A2.2 Hard limits

A2.2.1 Sharing between feeder links of the non-GSO MSS (space-to-Earth) and terrestrial services in the same frequency bands

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

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

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

Power flux-density limits between 17.7 GHz and 27.5 GHz.

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

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

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

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

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

A2.2.2 Power flux-density limits produced by non-GSO MSS feeder links with respect to the GSO orbit

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

A2.2.3 Power flux-density limits produced by the non-GSO FSS in the 20-30 GHz band

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

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

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

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

However, the following values shall apply provisionally to emissions of space stations on non-geostationary satellites in networks operating with a large number of satellites, that is systems with more than 100 satellites (see Resolution **131 (WRC-97)**):

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

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

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

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

A2.2.4 Power limits for terrestrial stations

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

A2.2.5 Power limits for earth stations

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

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

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

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

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

A2.3 Coordination areas for mobile earth stations operating below 3 GHz and earth stations providing feeder links for non-GSO satellites operating in the mobile-satellite service and for non-GSO FSS earth stations

A2.3.1 Objectives

In order to apply the provisions of Sections III and IV, § 3.1 and 4.1 of the Annex 1 to Resolution **46 (Rev.WRC-97)**, this Section specifies the coordination area (see No. **165**) for mobile earth stations as well as earth stations providing feeder links for non-geostationary-satellite networks operating in the mobile-satellite service. In both cases, the coordination contour (see No. **166**) associated with the coordination area is drawn to scale on an appropriate map in order to depict the coordination area and the extent to which it overlaps the territory of administrations that may be affected. Tables 1-3 specify coordination distances (see No. **167**) for certain frequency sharing situations and frequency bands in which the provisions of Resolution **46 (Rev.WRC-97)** are applied. Table 4 applies to non-GSO FSS earth stations.

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

the earth station location. Coordination distances for feeder-link earth stations operating below 1 GHz are specified in Table 1. Coordination distances for feeder-link earth stations operating above 5 GHz are specified in Table 3 with respect to stations in terrestrial services and, where applicable, earth stations of other satellite networks operating in the opposite direction of transmission. Coordination distances for non-GSO FSS earth stations are specified in Table 4.

A2.3.2 General considerations

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

– predetermined distances;

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

Neither of these distances indicate required separation distances.

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

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

TABLE 1

Earth stations operating at frequencies below 1 GHz

Frequency sharing situation		Coordination distance (In sharing situations involving services allocated with equal rights)
Frequency band and earth station for which coordination area is determined	**Other service or station**	
148-149.9 MHz ground-based (mobile)	Ground-based stations	As determined using equation (1) and Fig. 1 of Recommendation ITU-R M.1185. In this case, the coordination distance is calculated by the administration of the terrestrial station using the parameters of its terrestrial stations and the most up-to-date relevant parameters published by the Bureau for the earth station
149.9-150.05 MHz ground-based (mobile) 399.9-400.05 MHz ground-based (mobile)	Radionavigation-satellite service	The coordination distance is calculated by the administration of the mobile-satellite service earth station using the parameters of its earth stations and the most up-to-date relevant parameters published by the Bureau for the radionavigation-satellite service earth station
400.15-401 MHz ground-based	Meteorological aids (radiosonde)	580 km
All bands below 1 GHz ground-based	Mobile (aircraft)	500 km
All bands below 1 GHz aircraft (mobile)	Ground-based stations	500 km
400.15-401 MHz aircraft (mobile)	Meteorological aids (radiosonde)	1 080 km
All bands below 1 GHz aircraft (mobile)	Mobile (aircraft)	1 000 km
454-456 MHz 459-460 MHz ground-based	Ground-based stations	500 km

TABLE 2

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

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

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

TABLE 3

Non-GSO MSS feeder-link earth stations

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

TABLE 4

Non-GSO FSS earth stations

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

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 of the Plenipotentiary Conference (Kyoto, 1994) 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. **9.2B**, or for which the request for modifications of the Region 2 Plan under Article 4, § 4.2.1 *b)* of Appendices **30** and **30A** 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 **30** and **30A** 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 **30** and **30A**, or for which the submission of information of Annex 2 of Appendix **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 **30B**) 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 **30** and **30A** or for application of Section III of Article 6 of Appendix **30B** as covered by *resolves* 1 above submitted to the Bureau shall be cancelled. Any modifications of the Plans (Appendices **30** and **30A**) shall lapse and any recording in the MIFR as well as recordings in the Appendix **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 **9** or **11** of the Radio Regulations or Appendices **30**, **30A** or **30B**, as applicable, and, in particular, do not affect the requirement to coordinate under those provisions (Appendices **30**, **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. **9.7**, **9.11**, **9.12**, **9.12A** and **9.13**, 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 **30** and **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 **30** and **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 **30** and **30A** shall be subject to these procedures.

3 Any submission of information under Annex 2 of Appendix **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 **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. **9.1**, 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 **30** and **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 **30** and the relevant provisions of Article 4 of Appendix **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 **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 **30** and **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 **30B** under § 3 above, the network shall also be deleted from the Appendix **30B** List, if applicable.

12 Before the Bureau extends the date of bringing into use under No. **11.44**, 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. **11.41** 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 **30** and **30A**

e) Reference to the request for coordination (not applicable for Appendices **30** and **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 of the Plenipotentiary Conference, (Kyoto, 1994) 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. **9.5D** 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 30A and Article 11 of Appendix 30 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 **30/30A** 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 **30** and Article 9A of Appendix **30A** and in the Annexes to Appendices **30/30A**;

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 **30A** and Article 11 of Appendix **30** 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 **30** 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 **30** and **30A** 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 **30A** and Article 11 of Appendix **30**;

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 **30A** and Notes 5 to 8 in section 11.2 of Article 11 of Appendix **30**;

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 **30** and section 5 of Annex 1 to Appendix **30A** 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. **9.36**, **9.36.2**, **9.41** and **9.42**;

b) Section D of Annex 2A to Appendix **4**;

c) No. **9.7** (GSO/GSO) in Table 5-1 of Appendix **5**;

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. **9.36**, **9.36.2**, **9.41** and **9.42**;

b) Section D of Annex 2A to Appendix **4**;

c) No. **9.7** (GSO/GSO) in Table 5-1 of Appendix **5**;

3 that, when the Bureau, under No. **11.32**, 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. **9.7** (GSO/GSO) in Table 5-1 of Appendix **5**, 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. **9.41**, in determining the need for coordination by applying the provisions of No. **9.7** (GSO/GSO) in Table 5-1 of Appendix **5** (§ 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 (AP4/II and AP4/III), radio astronomy notices (AP4/IV) and API (AP4/V and AP4/VI) and due diligence information (Resolution **49 (WRC-97)**) for satellite networks and earth stations submitted to the Radiocommunication Bureau pursuant to Articles **9** and **11** 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;

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[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 Radiocommunication Bureau and administrations shall apply the provisions of Nos. **9.2** and **9.5B**, 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. **9.2** 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 Radiocommunication 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. **11.44** 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. **9.1**;

i) that No. **11.44B** 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. **11.44C** to **11.44I**;

j) that none of the specific circumstances listed in Nos. **11.44C** to **11.44I** 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. **11.44** 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 **4** 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 **4** information shall be excluded from the cost-recovery procedures;

4 that the provisions contained in Nos. **11.44B** to **11.44I** 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↓ limits apply

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that WRC-97 adopted, in Article **22**, 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↓ 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. **9.7A** and **9.7B** and associated provisions in Articles **9** (Nos. **9.7A**, **9.7B**, **9.7A.1** and **9.7B.1**, and **9.7A.2** and **9.7B.2**), **11** (Nos. **11.32A** and **11.32A.1**), and **22** and Appendices **4** and **5**, 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. **9.17** and **9.17A**;

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 Radiocommunication 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. **9.7A** 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. **9.7B** 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. **9.7B** 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. **22.2** 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. **9.7A** 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. **9.7A** or No. **9.7B** as from the date of receipt of complete coordination information of the associated GSO FSS satellite network under No. **9.7**, 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. **9.7A** or **9.7B** 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. **9.27**, any administration with which coordination may need to be effected in accordance with Nos. **9.7A** or **9.7B** in cases covered by *resolves* 2 and 3.

ANNEX 1 TO RESOLUTION 58 (WRC-2000)

Appendix 4 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 **21** and **22** 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 **22-1A, 22-1B, 22-1C, 22-1D, 22-2** and **22-3** of Article **22**, 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 **4**) to permit the Bureau to make a finding in compliance with the limits in Tables **22-1A, 22-1B, 22-1C, 22-1D, 22-2** and **22-3**, as established by WRC-2000;

3 that, as of 22 November 1997, in the frequency bands specified in Tables **22-4A** (including Table **22-4A1), 22-4B** and **22-4C**, 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 **4** to meeting the single-entry additional operational equivalent power flux-density, $epfd_{\downarrow}$, limits in Table **22-4A1**, as established by WRC-2000;

5 that, in the frequency bands specified in Table **22-1D**, which are allocated to the BSS and subject to the Plan of Appendix **30**, 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. **5.441**; **5.484A**; **5.487A**; **5.488**; **5.491**; **5.502**; **5.503**; **5.516**; **5.520**; **9.7A** to **9.7B**; **9.11A** to **9.16**; **9.35.1**; **11.32A** to **11.33**; Table **21-4** and its associated footnotes in Article **21**; Nos. **22.5B** to **22.5K**; Nos. **22.26** to **22.39**; Annexes 2A and 2B to Appendix **4** and Table 5-1 of Appendix **5**,

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 **22** (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 **22-1A**, **22-1B**, **22-1C**, **22-1D**, **22-2** and **22-3**, as adopted by WRC-2000.

RESOLUTION 63

Relating to the protection of radiocommunication services against interference caused by radiation from industrial, scientific and medical (ISM) equipment[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that ISM equipment generates and uses locally radio frequency energy, whereby outward radiation cannot always be avoided;

b) that there is an increasing amount of ISM equipment working on various frequencies throughout the spectrum;

c) that in some cases a considerable part of the energy may be radiated by ISM equipment outside its working frequency;

d) that some radio services, especially those using low field strengths, may suffer interference caused by radiation from ISM equipment, a risk which is unacceptable particularly in the case of radionavigation or other safety services;

e) that, in order to limit the risks of interference to specified parts of the spectrum:

i) the preceding Radio Conferences of Atlantic City, 1947, and Geneva, 1959, have designated some frequency bands within which the radiocommunication services must accept harmful interference produced by ISM equipment;

ii) this Conference has accepted an increase in the number of bands to be designated for ISM equipment, but only on the condition that limits of radiation from such equipment be specified within the bands newly designated for worldwide use and outside all the bands designated for ISM equipment,

resolves

that, to ensure that radiocommunication services are adequately protected, studies are urgently required on the limits to be imposed on the radiation from ISM equipment in the entire radio spectrum, particularly in the newly designated bands,

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[1] WRC-97 made editorial amendments to this Resolution.

invites the ITU-R

1 to continue, in collaboration with the International Special Committee on Radio Interference (CISPR) and the International Electrotechnical Committee (IEC), its studies relating to radiation from ISM equipment in the entire radio spectrum in order to ensure adequate protection of radiocommunication services;

2 to specify as soon as possible, in the form of Recommendations, the limits to be imposed on radiation from ISM equipment inside and outside the bands designated for their use in the Radio Regulations.

Priority should be given to the studies which would permit the formulation of a Recommendation relating to the frequency bands, newly designated for use by ISM equipment by this Conference, which are listed below:

6 765-6 795 kHz

433.05-434.79 MHz

61-61.5 GHz

122-123 GHz

244-246 GHz

invites the next competent world radiocommunication conference

to resolve the problem of interference from ISM equipment to radiocommunication services taking into account the ITU-R Recommendations.

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 **3*** or Appendix **4** information had been received by the Radiocommunication 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 **30** 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)*,

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* *Note by the Secretariat:* Edition of 1990, revised in 1994.

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 7 current

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that Appendix **7** 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 **7**;

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 **7**; 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 **7**;

b) that there is a need for future WRCs to keep Appendix **7** 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 **7**);

2 to maintain the relevant ITU-R texts in a format which would facilitate the future revision of Appendix **7**;

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 **7** 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 **7** 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 **7** 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 **7** 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 **22**, 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 (BSS) networks in parts of the frequency range 10.7-30 GHz;

b) that this Conference has revised Article **22** 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 **22**, along with the aggregate limits in Tables 1A to 1D as contained in Annex 1 to this Resolution, 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. **9.12**;

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. **22.5K**);

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. **22.5K)**,

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↓ 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/m²))**	**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. **9.7A** and **9.7B**.

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/(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|

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. **9.7A** and **9.7B**.

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 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]
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. **9.7A** and **9.7B**.

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 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. **5.486**) 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. **5.489**) 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 **30**;

e) that protection of the FSS in Region 2 from the FSS in that Region is assured either by Article **9** (Nos. **9.7** or **9.12**) or Article **22**;

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 **21**;

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. **5.488** 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 Radiocommunication 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	dB(W/(m^2 · MHz))	for $0° \le \theta \le 5°$
$-124 + 0.5\ (\theta - 5)$	dB(W/(m^2 · MHz))	for $5° < \theta \le 25°$
-114	dB(W/(m^2 · 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 22 are exceeded

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference has adopted in Article **22** single-entry operational limits (see Tables **22-4A** through **22-4C)** and single-entry additional operational limits (see Table **22-4A1**) 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. **22.5H** and **22.5I**, 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. **22.2**;

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 **15**, 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 22

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↓, interference from non-GSO FSS systems in excess of the operational limits given in Tables **22-4A**, **22-4B** and **22-4C** and/or the additional operational limits given in Table **22-4A1** (excess epfd↓ 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. **16.3**.

4 Administrations shall cooperate in the detection and elimination of excess epfd↓ interference.

5 Where practicable, and subject to agreement between the administrations concerned, the case of excess epfd↓ interference may be dealt with directly between their operating organizations.

6 When a case of excess epfd↓ interference to a receiving GSO earth station associated with a transmitting space station is reported, and such excess epfd↓ interference cannot be accepted by the affected administration, the affected administration should first attempt to identify the source of the excess epfd↓ interference.

7 If the administration having jurisdiction over the receiving earth station has difficulty in determining the source or characteristics of the excess epfd↓ 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 the Radiocommunication 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 International Frequency 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 **22-4A**, **22-4A1**, **22-4B** or **22-4C**, 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 **22-4A**, **22-4A1**, **22-4B** or **22-4C**, 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. **15.21**.

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. **22.2** and **22.5I**. 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↓ 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 **13**; 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. **11.30**, **11.31** and **11.31.2**, 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. **11.30**, **11.31** and **11.31.2**, rules of procedure to be followed in order to be in compliance with the principles in No. **0.3**;

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. **0.3** 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 **30** and **30A** 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. **11.48**, 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. **0.3** 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. **0.3** 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. **11.44** 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. **4.4** of the Radio Regulations 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 **18** 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. **9.2B** and **9.38** in Article **9**, § 4.2.8 of Appendix **30**, § 4.1.5 and 4.2.8 of Appendix **30A** and the title of Article 6 of Appendix **30B**:

"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. **21.16.11** and **21.16.12** 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 **21-4** of Article **21** for the band 37.5-40 GHz;

e) that No. **5.551AA** 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 **21-4** 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. **21.16.11** and **21.16.12**;

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 **21-4** minus 12 dB,

urges administrations

1 to meet the requirements of No. **5.551AA**;

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 **21-4** 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 **21-4** 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 105 (Orb-88)

Improvement of the quality of certain allotments in Part A of the fixed-satellite service Plan[1]

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that the delegations of the administrations participating in this Conference have made intensive efforts to achieve the goals identified in the agenda of the Conference;

b) that the Conference has made intensive use of the ITU computer facilities and associated software to develop an Allotment Plan for the fixed-satellite service in the frequency bands identified for the Plan;

c) that a Plan has been developed which guarantees one coverage for each administration (Part A of the Plan) and accommodates existing systems (Part B of the Plan);

d) that, in the case of a small number of allotments in the Plan, the reference value of 26 dB has not been achieved for the *C*/*I* ratio,

noting

that in spite of all efforts made by the Conference, some allotments in Part A of the Plan are still below the reference value for *C*/*I*,

noting further

that the evaluation of some solutions for raising the value of *C*/*I* would be facilitated by appropriate consultations after the Conference between administrations working together in a spirit of cooperation to find equitable solutions,

recognizing

the right of each administration to have a value of *C*/*I* of 26 dB for its allotment,

believing

that further cooperation among administrations, and the application of technical aspects to particular situations, could improve the allotments in *considering c)* above, given the progress made in this field,

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[1] WRC-97 made editorial amendments to this Resolution.

resolves

1 that, following the Conference, an administration which has an allotment with a value of *C*/*I* lower than 26 dB, and administrations whose allotments may have an impact on that allotment, should make every effort to reach agreement on measures to improve the quality of that allotment;

2 that, with the agreement of the administrations concerned, consideration could be given to slight adjustments to the nominal orbital position of other satellites on condition that all agreed protection criteria are observed,

invites administrations

to implement the provision of this Resolution in the spirit of cooperation which characterizes the relations between Member States,

calls upon

the Sectors of the ITU to provide technical advice, if requested by the administrations concerned, to facilitate mutually satisfactory solutions.

RESOLUTION 111 (Orb-88)

Planning of the fixed-satellite service in the bands 18.1-18.3 GHz, 18.3-20.2 GHz and 27-30 GHz[1]

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that WARC Orb-85 in its Report to WARC Orb-88, requested the ITU-R to study the technical characteristics of the fixed-satellite service in the bands 18.1-18.3 GHz, 18.3-20.2 GHz and 27-30 GHz with a view to a decision on the future planning of these bands for the fixed-satellite service being taken by a future competent conference;

b) that the ITU-R concluded that it would be extremely unwise for these bands to be subject to planning at this time and that further study would be necessary,

recognizing

1 that these bands have not been exploited extensively due to technical and economic reasons, although they potentially have great capacity;

2 that the required satellite orbital spacing may be reduced, thus resulting in easier coordination between satellite networks because narrower satellite antenna beamwidths can be achieved than in the lower frequency bands;

3 that different performance criteria may well be necessary from those which currently exist for frequency bands below 15 GHz, since the propagation characteristics are different,

resolves

that the bands 18.1-18.3 GHz, 18.3-20.2 GHz and 27-30 GHz shall not be included in frequency bands identified for planning at this time,

invites the ITU-R

to continue its studies into the technical characteristics of the bands 18.1-18.3 GHz, 18.3-20.2 GHz and 27-30 GHz until a decision is taken by a future competent conference.

[1] WRC-97 made editorial amendments to this Resolution.

RESOLUTION 114 (WRC-95)

Use of the band 5 091-5 150 MHz by the fixed-satellite service (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite service)

The World Radiocommunication Conference (Geneva, 1995),

considering

a) the current allocation of the frequency band 5 000-5 250 MHz to the aeronautical radionavigation service;

b) the requirements of both the aeronautical radionavigation and the fixed-satellite (Earth-to-space) (limited to feeder links of non-geostationary (non-GSO) mobile-satellite systems) services in the above-mentioned band,

recognizing

a) that precedence must be given to the microwave landing system (MLS) in accordance with No. **5.444** of the Radio Regulations and to other international standard systems of the aeronautical radionavigation service in the frequency band 5 000-5 150 MHz;

b) that, in accordance with Annex 10 of the Convention of the International Civil Aviation Organization (ICAO), it may be necessary to use the frequency band 5 091-5 150 MHz for the MLS if its requirements cannot be satisfied in the frequency band 5 030-5 091 MHz;

c) that the fixed-satellite service providing feeder links for non-GSO mobile-satellite services will need access to the frequency band 5 091-5 150 MHz in the short term, in order to accommodate already identified requirements,

noting

a) the necessary evolution of the current MLS and of other international standard systems in the aeronautical radionavigation service implementation plans;

b) the small number of fixed-satellite service stations to be considered,

resolves

1 that the provisions of this Resolution and of Nos. **5.444** and **5.444A** shall enter into force on 18 November 1995;

2 that administrations authorizing stations providing feeder links for non-GSO mobile-satellite systems in the frequency band 5 091-5 150 MHz shall ensure that they do not cause harmful interference to stations of the aeronautical radionavigation service;

3 that the allocation to the aeronautical radionavigation service and the fixed-satellite service in the frequency band 5 091-5 150 MHz should be reviewed at WRC-01*,

urges administrations

1 when authorizing stations of the aeronautical radionavigation service, to assign frequencies giving priority to the band below 5 091 MHz;

2 when assigning frequencies in the band 5 091-5 150 MHz before 1 January 2010 to stations of the aeronautical radionavigation service or to stations of the fixed-satellite service providing feeder links of the non-GSO mobile-satellite service (Earth-to-space), to take all practicable steps to avoid mutual interference between them,

instructs ITU-R

1 to study the technical and operational issues relating to sharing of this band between the aeronautical radionavigation service and the fixed-satellite service providing feeder links of the non-GSO mobile-satellite service (Earth-to-space);

2 to bring the results of these studies to the attention of WRC-01*,

invites

1 ICAO to further review, within the same time-frame, detailed spectrum requirements and planning for international standard aeronautical radionavigation systems in the above-mentioned band;

2 all members of the Radiocommunication Sector, and especially ICAO, to participate actively in such studies,

requests the Secretary-General

to bring this Resolution to the attention of ICAO.

* *Note by the Secretariat:* This Conference will be held in 2003.

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 **1**, modified No. **11.24** and added No. **11.26** 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. **11.24/1228** 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. **5.552** 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. **5.537A** and **5.543A** 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. **5.340** 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 **9** 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. **5.464**;

b) that the power flux-density limits given in Table **21-4** of Article **21** 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 **21-4** of Article **21** may give rise to excessive interference to the fixed service;

d) that WRC-97 adopted provisional power flux-density limits as specified in No. **5.462A** which are lower than those shown in Table **21-4** of Article **21** 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. **5.462A**,

resolves

to invite a future competent world radiocommunication conference to review No. **5.462A**, taking into account Recommendation ITU-R F.1502, and to take appropriate action.

RESOLUTION 125 (WRC-97)

Frequency sharing in the bands 1 610.6-1 613.8 MHz and 1 660-1 660.5 MHz between the mobile-satellite service and the radio astronomy service

The World Radiocommunication Conference (Geneva, 1997),

with a view

to enabling the mobile-satellite service (MSS) and the radio astronomy service to make the most efficient use of frequency bands allocated to them, having due regard to the other services to which those bands are also allocated,

considering

a) that the bands 1 610.6-1 613.8 MHz and 1 660-1 660.5 MHz are allocated to the radio astronomy service and the MSS (Earth-to-space) on a co-primary basis;

b) that No. **5.372** states that "Harmful interference shall not be caused to stations of the radio astronomy service using the band 1 610.6-1 613.8 MHz by stations of the radiodetermination-satellite and mobile-satellite services (No. **29.13** applies)"; and that Article **29** also points out that emissions from space or airborne stations can be particularly serious sources of interference to the radio astronomy service;

c) that the nature of objects studied by the radio astronomy service in the bands 1 610.6-1 613.8 MHz and 1 660-1 660.5 MHz demands maximum flexibility in the planning of observation frequencies;

d) that, in the bands 1 610.6-1 613.8 MHz and 1 660-1 660.5 MHz, which are shared between the radio astronomy service and the MSS, operational constraints are necessary for MSS mobile earth stations;

e) that a former ITU-R Recommendation relating to sharing between the MSS and the radio astronomy service in the band 1 660-1 660.5 MHz noted that further studies were required, particularly in the areas of propagation models and assumptions used for the determination of separation distances;

f) that Recommendation ITU-R M.1316 may be used in order to facilitate coordination between mobile earth stations and radio astronomy stations in the bands 1 610.6-1 613.8 MHz and 1 660-1 660.5 MHz;

g) that no experience has been gained up to now with the use of the Recommendation mentioned in *considering f)*;

h) that the threshold levels of interference detrimental to the radio astronomy service are given in Recommendation ITU-R RA.769-1,

resolves

that a future competent conference should evaluate frequency sharing in the bands 1 610.6-1 613.8 MHz and 1 660-1 660.5 MHz between the MSS and the radio astronomy service, based upon the experience gained with the use of ITU-R M.1316 and other relevant ITU-R Recommendations,

invites ITU-R

to submit a report to that future conference on evaluating the effectiveness of Recommendations aiming to facilitate sharing between the MSS and the radio astronomy service,

urges administrations

to participate actively in this evaluation.

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. **5.551G**,

resolves

that, notwithstanding any further studies, the power flux-density limits in No. **5.551G** 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. **5.551G**;

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. **5.551G** 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 132 (WRC-97)

Use of the bands 18.8-19.3 GHz and 28.6-29.1 GHz by networks operating in the fixed-satellite service

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that, by the former Resolution **118 (WRC-95)**[*], WRC-95 recommended that this Conference review the results of studies carried out by ITU-R relating to the use of the frequency bands 20/30 GHz;

b) that it also recommended that this Conference take appropriate action, including adjustments to spectrum allocations, for the harmonious development of geostationary-satellite orbit (GSO) and non-geostationary-satellite orbit (non-GSO) systems and terrestrial services in the same bands;

c) that it has reviewed the above studies, and has taken appropriate action in relation to the use of the frequency bands 18.8-18.9 GHz and 28.6-28.7 GHz as indicated in No. **5.523A**;

d) that, in its Resolution **118 (WRC-95)**[*], WRC-95 considered:

– that the development of GSO and non-GSO systems in the bands 18.8-19.3 GHz and 28.6-29.1 GHz entails major global investment and, consequently, their reciprocal coordination needs the firm commitment of all parties concerned on the basis of application of Resolution **46 (Rev.WRC-97)**;

– that this Conference considered the non-application of No. **22.2**/**2613** in the bands 18.8-19.3 GHz and 28.6-29.1 GHz in light of the spectrum requirements for non-GSO fixed-satellite service (FSS) systems;

e) that WRC-95 adopted in *resolves* 1 to 5 of Resolution **118 (WRC-95)**[*] the procedures applicable to the frequency bands 18.9-19.3 GHz and 28.7-29.1 GHz only;

f) that, in the light of *considering d)* and *e)* above, GSO and non-GSO FSS systems referred to in **5.523A** are being developed in the bands 18.8-19.3 GHz and 28.6-29.1 GHz;

g) that **5.523A** will enter into force on the date indicated in Article **59**;

h) that this Conference decided to delete Resolution **118 (WRC-95)**[*], as of 22 November 1997,

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[*] This Resolution was abrogated by WRC-97.

noting

that the band 18.8-19.3 GHz is heavily used by the fixed service and there is a need to continue the use of this band in many countries,

resolves

1 that, as of 18 November 1995, the provisions of Resolution **46 (Rev.WRC-95)** (Resolution **46 (Rev.WRC-97)**/No. **9.11A** as of 22 November 1997) shall apply and No. **22.2** shall not apply in the bands 18.8-19.3 GHz and 28.6-29.1 GHz, to frequency assignments of GSO and non-GSO FSS systems;

2 that should modifications arise to frequency assignments of non-GSO FSS systems which were notified before 18 November 1995, when coordination was not required, then no coordination is required when the characteristics of the modified frequency assignment are within the limits of those of the original notification,

instructs the Radiocommunication Bureau

to apply the provisions of No. **5.523A**, in the bands 18.8-19.3 GHz and 28.6-29.1 GHz, as from 22 November 1997.

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 22

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 **22**;

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 **22**,

resolves

that misapplication of the single-entry limits in Article **22**, 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 **22-1**, **22-2** and **22-3** of Article **22**,

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 **22** 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)

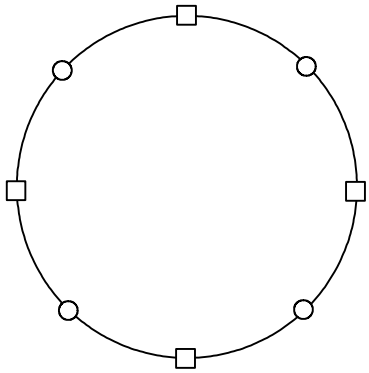
Process to be followed by the Radiocommunication Bureau in developing and implementing procedures to avoid misapplication of non-GSO FSS single-entry limits in Article 22

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.

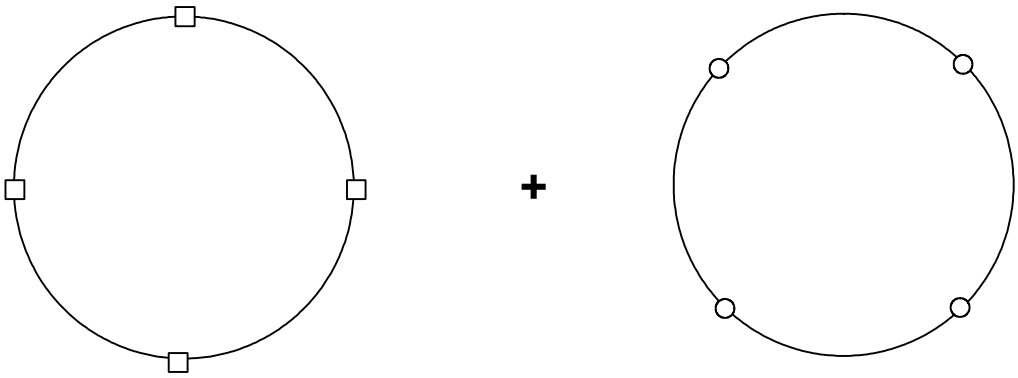
2 For the purpose of determining if misapplication of non-GSO FSS single-entry limits has occurred or will occur, it is necessary for the regulatory solutions to focus not just on "the splitting of systems", but on the "combining of systems" as well. While it is necessary to avoid the misapplication 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.

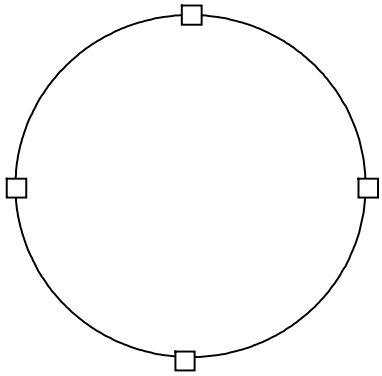


After splitting: When broken into two (or more) parts, each part system meets single-entry limits.

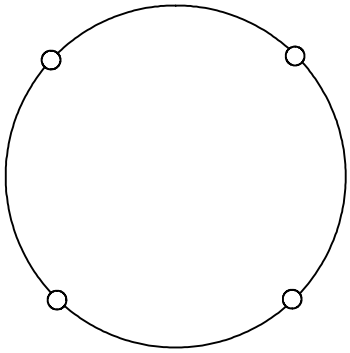


Example of combining

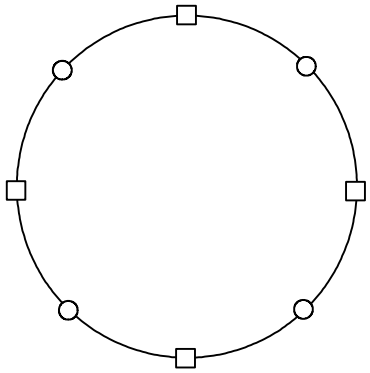
At filing stage (before combining): XYZ Ltd. owns system A. System A meets single-entry limits.



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 **22** 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 **22**, 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 **22** includes single-entry validation (Tables **22-1A** to **22-1D**, **22-2** and **22-3**), single-entry operational (Tables **22-4A**, **22-4B** and **22-4C**) and, for certain antenna sizes, single-entry additional operational (Table **22-4A1**) 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 Radiocommunication Bureau, under Nos. **9.35** and **11.31**;

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 **4**, 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 **22-1A**, **22-1B**, **22-1C**, **22-1D**, **22-2** and **22-3**;

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. **22.5H** and **22.5I**, 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 **22-4A** to **22-4C** 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 **22-4A**, **22-4A1**, **22-4B** and **22-4C**;

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 $epfd_{\downarrow}$ 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 **22-1A** to **22-1D** and **22-4A1**;

4 to develop a methodology for the generation of values of $epfd_{\uparrow}$ 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 **22-2**;

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. **9.11A**, 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 **30** and **30A** 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 205 (Rev.Mob-87)

Protection of the band 406-406.1 MHz allocated to the mobile-satellite service[1]

The World Administrative Radio Conference for the Mobile Services, Geneva, 1987,

considering

a) that WARC-79 allocated the band 406-406.1 MHz to the mobile-satellite service in the Earth-to-space direction;

b) that Nos. **5.266** and **5.267** limit the use of the band 406-406.1 MHz to low-power satellite emergency position-indicating radiobeacons (EPIRBs);

c) that WARC Mob-83 made provision in the Radio Regulations for the introduction and development of a global distress and safety system;

d) that the use of satellite EPIRBs is an essential element of this system;

e) that, like any frequency band reserved for a distress and safety system, the band 406-406.1 MHz is entitled to full protection against all harmful interference;

f) that WARC Mob-83 adopted Recommendation **604 (Rev.Mob-83)** which recommends that the ITU-R continue its studies on the technical and operational questions for EPIRBs, including those using the frequencies in the band 406-406.1 MHz;

g) that the ITU-R has initiated a study of the compatibility between satellite EPIRBs in the band 406-406.1 MHz and services using adjacent bands,

considering further

h) that some administrations have developed and implemented an operational low-altitude, near-polar orbiting satellite system (COSPAS-SARSAT) operating in the band 406-406.1 MHz to provide alerting and to aid in the locating of distress incidents;

i) that the International Maritime Organization (IMO) has decided that EPIRBs operating in the COSPAS-SARSAT system will form part of the Global Maritime Distress and Safety System (GMDSS);

j) that observations of the use of frequencies in the band 406-406.1 MHz show that they are being used by stations other than those authorized by No. **5.266**, and that these stations

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[1] WRC-97 made editorial amendments to this Resolution.

have caused harmful interference to the mobile-satellite service, and particularly to the reception of satellite EPIRB signals by the COSPAS-SARSAT system;

k) that in the future, new satellite systems which may be either geostationary or non-geostationary may be introduced in this band,

recognizing

that it is essential for the protection of human life and property that bands allocated exclusively to a service for distress and safety purposes be kept free from harmful interference,

resolves

to instruct the Radiocommunication Bureau

to organize monitoring programmes in the band 406-406.1 MHz in order to identify the source of any unauthorized emission in that band,

to urge administrations

1 to take part in monitoring programmes requested by the Bureau in accordance with No. **16.5**, in the band 406-406.1 MHz, with a view to identifying and locating stations of services other than those authorized in the band;

2 to ensure that stations other than those operated under No. **5.266** abstain from using frequencies in the band 406-406.1 MHz;

3 to take the appropriate measures to eliminate harmful interference caused to the distress and safety system,

invites the ITU-R

to continue on an urgent basis its study of compatibility between satellite EPIRBs in the band 406-406.1 MHz and services using adjacent bands.

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. **23.2**;

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. **4.4**, **5.128**, **5.129**, **5.137** and **4.13** to **4.15**; 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. **4.4** and **4.13**;

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. **23.2**;

6 to take all necessary steps in such cases of contravention of No. **23.2** 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 4 063 kHz and 27 500 kHz and to the aeronautical mobile (R) service between 2 850 kHz and 22 000 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 209 (Mob-87)

Study and implementation of a global land and maritime distress and safety system

The World Administrative Radio Conference for the Mobile Services, Geneva, 1987,

considering

a) that the basic characteristics of the Global Maritime Distress and Safety System (GMDSS) have been developed by the International Maritime Organization (IMO) to meet the specific needs of the maritime mobile and maritime mobile-satellite services;

b) that stations of the land mobile and land mobile-satellite services may use the frequencies and procedures of the GMDSS in sparsely populated, uninhabited or remote areas for distress and safety purposes;

c) that further development of the communication facilities in the GMDSS would enable the system also to meet the specific needs of the land mobile and land mobile-satellite services for distress and safety,

noting

that the ITU-R made a considerable contribution to the development of the GMDSS by carrying out appropriate technical and operational studies,

noting further

that WARC Mob-83 decided that the stations of the land mobile service in sparsely populated and remote areas may be authorized to use the frequencies of the then Future Global Maritime Distress and Safety System on condition that no harmful interference was caused to other distress and safety communications,

recognizing

a) that this Conference has adopted provisions to facilitate implementation of the GMDSS;

b) that administrative, technical and operational studies concerning the land mobile and land mobile-satellite services need to be conducted before detailed provisions relating to the distress and safety requirements of these services can be incorporated into the Radio Regulations,

resolves

that a future competent conference be invited to include, as necessary, provisions in Chapter **VII** to ensure adequate distress and safety communications in sparsely populated, uninhabited or remote areas,

invites the ITU-R

to study the requirements for distress and safety communications in sparsely populated, uninhabited or remote areas by the land mobile and land mobile-satellite services, including the technical and operational characteristics of equipment which is simple to operate and inexpensive for use in the global land and maritime distress and safety system,

invites administrations

1 actively to contribute to and participate in the work of the ITU-R;

2 to take all legislative or other appropriate measures for the implementation of such a system;

3 to permit the appropriate equipment to be used within the areas under their national jurisdiction,

invites the Council

to take the necessary steps to place this matter on the agenda of the next competent conference,

instructs the Secretary-General

to communicate this Resolution to IMO and the International Civil Aviation Organization (ICAO).

RESOLUTION 212 (Rev.WRC-97)

Implementation of International Mobile Telecommunications-2000 (IMT-2000)*

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that ITU-R has recommended the 1-3 GHz band as the most suitable for IMT-2000;

b) that ITU-R has recommended approximately 60 MHz for use by personal stations and approximately 170 MHz for use by mobile stations;

c) that ITU-R has recognized that space techniques are an integral part of IMT-2000;

d) that, in No. **5.388**, this Conference has identified bands to accommodate this future service,

considering further

a) that ITU-R has not completed its studies regarding duplexing methods, modulation techniques, channelling arrangements, signalling or communication protocols;

b) that no worldwide intersystem numbering plan currently exists that would facilitate worldwide roaming,

noting

a) that the implementation of the terrestrial component of IMT-2000 in the bands 1 885-2 025 MHz and 2 110-2 200 MHz is expected to commence around the year 2000, subject to market and technical considerations;

b) that the availability of the satellite component of IMT-2000 in the bands 1 980-2 010 MHz and 2 170-2 200 MHz simultaneously with the terrestrial component of IMT-2000 in the bands identified in No. **5.388** would improve the overall implementation and the attractiveness of IMT-2000 to both developed and developing countries,

invites administrations

to give due consideration to the accommodation of other services currently operating in these bands when implementing IMT-2000,

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* IMT-2000 was previously known as Future Public Land Mobile Telecommunication Systems (FPLMTS).

invites ITU-R

to continue its studies with a view to developing suitable and acceptable technical characteristics for IMT-2000 that will facilitate worldwide use and roaming, and ensure that IMT-2000 can also meet the telecommunication needs of the developing countries and rural areas,

invites ITU-T

a) to complete its studies of signalling and communication protocols;

b) to develop a common worldwide intersystem numbering plan and associated network capabilities that will facilitate worldwide roaming,

resolves

that administrations which implement IMT-2000:

a) should make the necessary frequencies available for system development;

b) should use those frequencies when IMT-2000 is implemented;

c) should use the relevant international technical characteristics, as identified by ITU-R and ITU-T Recommendations.

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 215 (Rev.WRC-97)

Coordination process among mobile-satellite systems and efficient use of the allocations to the mobile-satellite service in the 1-3 GHz range

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that space-to-Earth transmissions of mobile-satellite systems are constrained to limit their power flux-density over areas where the frequency band is shared with terrestrial systems;

b) that a number of proposed mobile-satellite systems can provide a good service to users within the power flux-density limits given in Annex 2 to Resolution **46 (Rev.WRC-97)**/ Annex 1 to Appendix **5**;

c) that when maximum communication capacity is achieved by systems in the mobile-satellite service (MSS) a major portion of the interference into each of these systems will come from the other mobile-satellite systems sharing the frequency band, and, consequently, if one system starts to transmit at higher power, all others need to do the same in order to overcome mutual interference;

d) that ITU-R is studying the efficient use of the radio spectrum and frequency sharing within the MSS, that Recommendations ITU-R M.1186 and ITU-R M.1187 are a basis for further study, and that additional preliminary texts are available or can be provided by administrations on this matter;

e) that, in a codirectional, co-frequency and co-coverage sharing environment, capacities of systems using spread-spectrum multiple-access techniques are affected by technical and operational characteristics of other MSS systems using similar multiple-access techniques;

f) that in many parts of the world and in certain frequency bands in the 1-3 GHz range, significant congestion already exists due to use by other terrestrial and space services;

g) the need to make most efficient use of frequencies in the MSS allocations,

recognizing

that, as a means to ensure that the frequency bands allocated to the MSS can be used in an efficient manner, there is an urgent demand for:

a) criteria to be established by ITU-R to be used in determining the need to coordinate between mobile-satellite systems; and

b) detailed methods of interference calculation to be used by administrations in the coordination process;

c) ITU-R studies which should not impede the timely deployment of any MSS systems,

resolves to invite ITU-R

1 to continue its studies on this subject and develop, as a matter of urgency, criteria for determining the need to coordinate and calculation methods for determining levels of interference, as well as the required protection ratios between MSS networks;

2 to study, as a matter of urgency, the use of technically and operationally feasible techniques to allow for improvements in spectrum efficiency in MSS systems,

further resolves

1 that ITU-R studies should be focused on the technical and operational characteristics of systems using spread-spectrum multiple-access techniques that can allow co-frequency, co-coverage, codirectional sharing but which involve cooperation among systems' operators to maximize the efficient use of spectrum by multiple MSS systems using such access techniques;

2 that administrations responsible for the introduction of mobile-satellite systems are urged to implement, as practicable, the latest available technologies to improve spectrum efficiency consistent with the requirement to offer viable MSS services;

3 to recommend that administrations be encouraged to use the most advanced technology available when preparing to implement their global MSS systems in the 1-3 GHz range so that they may operate, if necessary, in different frequency bands in different regions, in accordance with the MSS allocations in the 1-3 GHz range decided by this Conference.

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 217 (WRC-97)

Implementation of wind profiler radars

The World Radiocommunication Conference (Geneva, 1997),

having noted

a request to ITU from the Secretary-General of the World Meteorological Organization (WMO), in May 1989, for advice and assistance in the identification of appropriate frequencies near 50 MHz, 400 MHz and 1 000 MHz in order to accommodate allocations and assignments for wind profiler radars,

considering

a) that wind profiler radars are vertically-directed Doppler radars exhibiting characteristics similar to radiolocation systems;

b) that wind profiler radars are important meteorological systems used to measure wind direction and speed as a function of altitude;

c) that it is necessary to use frequencies in different ranges in order to have options for different performance and technical characteristics;

d) that, in order to conduct measurements up to a height of 30 km, it is necessary to allocate frequency bands for these radars in the general vicinity of 50 MHz (3 to 30 km), 400 MHz (500 m to about 10 km) and 1 000 MHz (100 m to 3 km);

e) that some administrations have either already deployed, or plan to expand their use of, wind profiler radars in operational networks for studies of the atmosphere and to support weather monitoring, forecasting and warning programmes;

f) that the Radiocommunication Study Groups have studied the technical and sharing considerations between wind profiler radars and other services allocated in bands near 50 MHz, 400 MHz and 1 000 MHz,

considering further

a) that some administrations have addressed this matter nationally by assigning frequencies for use by wind profiler radars in existing radiolocation bands or on a non-interference basis in other bands;

b) the work of the Voluntary Group of Experts on the Allocation and Improved Use of the Radio Frequency Spectrum and Simplification of the Radio Regulations supports increased flexibility in the allocation of frequency spectrum,

noting in particular

a) that wind profiler radars operating in the meteorological aids service in the band 400.15-406 MHz interfere with satellite emergency position-indicating radio beacons operating in the mobile-satellite service in the band 406-406.1 MHz under No. **5.266**;

b) that in accordance with No. **5.267**, any emission capable of causing harmful interference to the authorized uses of the band 406-406.1 MHz is prohibited,

resolves

1 to urge administrations to implement wind profiler radars as radiolocation service systems in the following bands, having due regard to the potential for incompatibility with other services and assignments to stations in these services, thereby taking due account of the principle of geographical separation, in particular with regard to neighbouring countries, and keeping in mind the category of service of each of these services:

46-68 MHz in accordance with No. **5.162A**

440-450 MHz

470-494 MHz in accordance with No. **5.291A**

904-928 MHz in Region 2 only

1 270-1 295 MHz

1 300-1 375 MHz;

2 that, in case compatibility between wind profiler radars and other radio applications operating in the band 440-450 MHz or 470-494 MHz cannot be achieved, the bands 420-435 MHz or 438-440 MHz could be considered for use;

3 to urge administrations to implement wind profiler radars in accordance with Recommendations ITU-R M.1226, ITU-R M.1085-1 and ITU-R M.1227 for the frequency bands around 50 MHz, 400 MHz and 1 000 MHz, respectively;

4 to urge administrations not to implement wind profiler radars in the band 400.15-406 MHz;

5 to urge administrations currently operating wind profiler radars in the band 400.15-406 MHz to discontinue them as soon as possible,

instructs the Secretary-General

to bring this Resolution to the attention of the International Civil Aviation Organization (ICAO), International Maritime Organization (IMO) and WMO.

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. **5.388** 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. **1.66A** 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. **5.388** 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. **5.388A**, 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 (θ – 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:

$G(\psi) = G_m - 3(\psi/\psi_b)^2$ dBi for $0° \le \psi \le \psi_1$

$G(\psi) = G_m + L_N$ dBi for $\psi_1 < \psi \le \psi_2$

$G(\psi) = X - 60 \log(\psi)$ dBi for $\psi_2 < \psi \le \psi_3$

$G(\psi) = L_F$ dBi for $\psi_3 < \psi \le 90°$

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

$\psi_1 = \psi_b \sqrt{-L_N / 3}$ degrees

$\psi_2 = 3.745\ \psi_b$ degrees

$X = G_m + L_N + 60 \log(\psi_2)$ dBi

$\psi_3 = 10^{(X - L_F)/60}$ degrees

The 3 dB beamwidth ($2\psi_b$) is again estimated by:

$(\psi_b)^2 = 7\,442/(10^{0.1 G_m})$ 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. **5.353A** 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. **5.357A** 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 **44** 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. **5.353A** or **5.357A** 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 **44**;

d) that Table 15-2 of Appendix **15** 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 **32** and **33**, in the bands where No. **5.353A** applies, and for AMS(R)S communications within priority categories 1 to 6 of Article **44** in the bands where No. **5.357A** 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 **32** and **33**, and for AMS(R)S communications within priority categories 1 to 6 of Article **44**; 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. **5.388** 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. **5.388** 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. **5.384A** 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. **5.384A** 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. **5.317A**, **5.384A** and **5.388** 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. **5.317A**, **5.384A** and **5.388**, 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. **5.384A** 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. **5.384A** and **5.388** 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. **5.317A**, 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. **5.388** 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. **5.353A** and **5.357A**,

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. **5.403** and **5.420**;

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. **5.384A** 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. **5.342**, 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. **5.342**;

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. **5.343**;

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. **5.343**) under the provisions of No. **5.344**;

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 **5**;

i) that there is a need to review the pfd values in Appendix **5** 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. **9.11A**;

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. **5.377**;

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 **17** (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 **17** (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 **11** 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 **11**.

RESOLUTION 310 (Rev.WRC-97)

Frequency provisions for development and future implementation of ship movement telemetry, telecommand and data exchange systems

The World Radiocommunication Conference (Geneva, 1997),

considering

a) the need to specify radio frequencies which may be used by the maritime mobile service on a worldwide basis for ship movement requirements including transmission of electronic nautical chart data corrections, using digital automated data exchange, telemetry and telecommand techniques;

b) the developments now in progress in different portions of the frequency spectrum which will require common frequency bands in the future for efficient frequency utilization;

c) the importance of these systems in the safe and efficient operations of ships;

d) the advantages to port authorities for safe and efficient port management and operations,

noting

a) that ITU-R is considering this matter, particularly within its Question ITU-R 55/8;

b) that further operational and technical information is needed in deciding the most effective frequency utilization and sharing criteria;

c) that the International Maritime Organization (IMO) has identified a need for data exchange, using digital transmission techniques, between shore and ship for ship position and movement data, correction data of radionavigation systems and electronic nautical charts,

resolves

that a future competent world radiocommunication conference should review possible frequency provisions in the light of additional studies,

requests administrations

to review the requirements relating to future ship movement telemetry, telecommand and data exchange systems and submit relevant results to ITU-R,

invites ITU-R

to examine and advise on modulation techniques such as spread spectrum, frequency bands, bandwidths and data formats in coordination with administrations developing and testing these digital transmission systems,

invites the Council

to include this Resolution in the agenda of a forthcoming competent world radiocommunication conference,

instructs the Secretary-General

to communicate this Resolution to IMO and the International Hydrographic Organization (IHO).

RESOLUTION 312 (Rev.WRC-97)

Calling procedures for HF A1A and A1B Morse telegraphy

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that there is a need for more effective utilization of the radio frequency spectrum and of the time of operational personnel on board ships;

b) that it is desirable to continue to improve the effectiveness of calling in the HF A1A and A1B Morse telegraphy bands;

c) that the WMARC-74, adopted a new calling procedure for the HF A1A Morse telegraphy bands (Article **52** and Appendix **17** (Part B, Section IV));

d) that the effectiveness of the new calling procedure requires agreement between administrations with respect to the groups specified in Appendix **17** (Part B, Section IV) in accordance with a planned distribution of coast stations on a regional and traffic basis;

e) that the administrations at WMARC-74 agreed to the Distribution Plan of Coast Stations (annexed to this Resolution) arranged by countries and areas into four groups to ensure a better distribution of calls,

invites

administrations which are providing an international public correspondence service to indicate for publication in the List of Coast Stations the periods of service during which watch will be maintained on the common, and if necessary the group, channel or channels,

invites further

administrations which wish to enter into a group in the Distribution Plan, or administrations included in the Plan wishing to make a modification in the Plan, to coordinate as far as possible their proposed changes with other interested and affected administrations which are designated in the group concerned. An administration which has decided to enter into a group or change from a designated group in the Distribution Plan shall inform the Secretary-General of its decision and it shall be published in the Annex to the List of Coast Stations,

instructs the Secretary-General

to update, as necessary, the Distribution Plan annexed to the List of Coast Stations.

ANNEX TO RESOLUTION 312 (Rev.WRC-97)

Distribution Plan for group channels HF A1A Morse coast stations by countries and areas[1]

Group 1		Group 2		Group 3		Group 4	
AGL	MAU	ALG	GRC	ALS	MOZ	AFS	POR
AZE	MDG	ATN	HKG	ARG	MRA	ALB	PTC
AZR	MRT	ARS W[4]	HNG	BRM	MRC	ARS E[8]	RUS AN
B	NCG	BEL	HOL	CAN CL[7]	NIG	AUS	RUS EO
BAH	NCL	BEN	I	CAN E[7]	NOR	BUL	RUS NW
BER	OCE	BRB	KOR	CAN NE[7]	NRU	CHN[9]	RUS SW
BGD	OMA	CBG	LBN	CHN	PAK	COD	RUS W
BHR	PHL	CHR	MEX	DNK	RUS EO	E	SEN
CAN W[2]	PTR	CKH	MRT	EST	RUS NW	FJI	SEY
CAN NW[2]	REU	CLM	NCL	FIN	RUS SW	GEO	SLM
CHL	ROU	CLN	OCE	GEO	RUS W	GNE	SMA
CNR	RUS AS	CME	PNR	GHA	S	IND E	SRL
CTI	SNG	COG	POL	GNB	SVN	INS	SUR
DJI	STP	CPV	PRG	GUI	TRD	IRQ	SYR
EQA	SUI	CTR	PRU	GUM	TUR	J	TGO
ERI	TKM	CUB	REU	GUY	UKR	JOR	TUN
ETH	UKR	CYP	RUS NW	HRV	USA W	KWT	UKR
F	USA E[3]	CZE	RUS EO	HWA	VEN	LVA	URG
G	VUT	DOM	SDN	IRN	YUG	LTU	VTN
IND W		EGY	SVK	ISL		MAU	YEM
IRL		F	THA	JMC		MDA	
ISR		FLK	USA SO[6]	LBY		MLA	
KEN		G[5]	VUT	LTU		MLT	
KRE		GAB	YEM	LVA		NZL	
LBR		GMB		MDR		PNG	

1 The meaning of the symbols is given in Tables “Areas” and “Standard Defined Areas” of the Preface to the BR IFIC.

2 Canada (West Coast and Western Arctic).

3 United States (East Coast).

4 Saudi Arabia (West).

5 22 MHz only.

6 United States (Gulf of Mexico Coast).

7 Canada (East Coast and Eastern Arctic).

8 Saudi Arabia (East).

9 China (Province of Taiwan).

RESOLUTION 331 (Rev.WRC-97)

Transition to the Global Maritime Distress and Safety System (GMDSS) and continuation of the distress and safety provisions in Appendix 13

The World Radiocommunication Conference (Geneva, 1997),

noting

that the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, prescribes that all ships subject to this Convention shall be fitted for the Global Maritime Distress and Safety System (GMDSS) by 1 February 1999,

noting further

a) that a number of administrations have taken steps to implement the GMDSS also for classes of vessels not subject to SOLAS, 1974, as amended;

b) that an increasing number of vessels not subject to SOLAS, 1974, as amended, are making use of the techniques and frequencies of the GMDSS prescribed in Chapter **VII**;

c) that some administrations and vessels, not subject to SOLAS, 1974, as amended, may wish to continue to use provisions of Appendix **13** for distress and safety communications for some time after 1 February 1999;

d) that it would be costly for administrations to maintain in parallel for an excessive period of time shore-based facilities necessary to support both the old and new distress and safety systems;

e) that there may be a need to continue existing shore-based distress and safety services for a certain period after 1 February 1999 so that vessels not subject to SOLAS, 1974, as amended and not yet using the techniques and frequencies of the GMDSS will be able to obtain assistance from these services until such time as they are able to participate in the GMDSS;

f) that separate provisions of the existing Radio Regulations designate VHF channel 16 and the frequency 2 182 kHz as the international channels for general calling by radiotelephony;

g) that the International Maritime Organization (IMO) has already decided for GMDSS vessels that:

– listening watches on 2 182 kHz will no longer be mandatory after 1 February 1999;

– listening watches on VHF channel 16 will be continued and that a final date for the cessation of mandatory watchkeeping on channel 16 is yet to be determined;

h) that the Radio Regulations require GMDSS ships to keep watch on the appropriate digital selective calling (DSC) distress frequencies;

i) that the Radio Regulations establish that ship stations should, when practicable, keep watch on VHF channel 13;

j) that several administrations have established Vessel Traffic Service (VTS) systems and require their ships to keep watch on local VTS channels;

k) that ships that are required by SOLAS to carry a radio station are being equipped with DSC, but the majority of vessels that carry a radio station on a voluntary basis might not have DSC equipment;

l) that similarly, many administrations have established distress and safety service based on DSC watchkeeping, but the majority of port stations, pilot stations and other operational coast stations have not been equipped with DSC facilities;

m) that for the reasons listed above, it will remain necessary for some stations in the maritime mobile service to call each other by radiotelephony in certain situations,

considering

a) that the operation of the GMDSS described in Chapter **VII** and the present distress and safety system described in Appendix **13** differ in many crucial aspects, such as means and methods of alerting, communication facilities available, announcement and transmission of maritime safety information, etc.;

b) that operation of the two systems in parallel for a long period would cause ever-increasing difficulties and incompatibilities between ships operating in the two different systems and may thus seriously degrade safety at sea in general;

c) that the GMDSS overcomes the deficiencies of the aural watch-keeping on maritime distress and calling frequencies on which the distress and safety system described in Appendix **13** relies, by replacing these watches by automatic watch, i.e. digital selective calling and satellite communication systems,

resolves

1 that, until such time as voice calling has become obsolete, VHF channel 16 and the frequency 2 182 kHz may be used as voice-calling channels;

2 to urge all administrations to assist in enhancing safety at sea by:

– encouraging all ships to make use of the GMDSS as soon as possible;

– encouraging, where appropriate, establishment of suitable shore-based facilities for GMDSS, either on an individual basis or in cooperation with other relevant parties in the area;

3 that administrations may, taking account of all aspects involved, such as:

– decisions by IMO on aural watch on 2 182 kHz and VHF channel 16;

– the GMDSS radio systems available in the area concerned;

– the compatibility problems mentioned in *considering a)* and *b)* above;

– the density and classes of ships normally in the area;

– the geographical nature of the area and general navigational conditions within the area;

– other adequate measures taken to ensure safety communications for ships sailing in the area,

at a time after 1 February 1999, when the development on transition to the GMDSS and the prevailing conditions in the area makes it reasonable to do so, release their ship stations and coast stations within the area concerned from the obligations described in Appendix **13** on listening watch on 2 182 kHz or VHF channel 16 or both;

when doing so, administrations should:

– inform IMO of their decisions and submit to IMO details on the area concerned;

– inform the Secretary-General on the necessary details for inclusion in the List of Coast Stations,

resolves further

that the Secretary-General should ensure that such arrangements and details regarding the area concerned be indicated in relevant maritime publications,

invites the next world radiocommunication conference

to include the review of this Resolution, Appendix **13** and Chapter **VII** on the agenda of WRC-01*,

instructs the Secretary-General

to communicate this Resolution to IMO and the International Civil Aviation Organization (ICAO),

invites the Radiocommunication Study Group 8

to review the operational and procedural incompatibilities between the old and new systems with a view to presenting the information to WRC-01*.

* *Note by the Secretariat:* This Conference will be held in 2003.

RESOLUTION 339 (Rev.WRC-97)

Coordination of NAVTEX services

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the International Maritime Organization (IMO) has established a Coordinating Panel on NAVTEX to, *inter alia*, coordinate the operational aspects of NAVTEX services, such as allocation of transmitter identification character (B1) and time schedules, in the planning stages for transmissions on the frequencies 490 kHz, 518 kHz or 4 209.5 kHz;

b) that coordination in the frequencies 490 kHz, 518 kHz and 4 209.5 kHz is essentially operational;

c) that Article **14A*** was deleted by WRC-95 with effect from 18 November 1995;

d) that the frequency band around 518 kHz is also allocated to the aeronautical radionavigation service on a primary basis;

e) that WRC-95 resolved in its Resolution **23 (WRC-95)** that, with effect from 18 November 1995, the Radiocommunication Bureau shall not examine with respect to Nos. **1241*** to **1245***, and shall not apply the related provisions to, frequency assignment notices in the non-planned bands below 28 000 kHz,

resolves

to invite administrations to apply the procedures established by IMO, taking into account the IMO NAVTEX Manual, for coordinating the use of the frequencies 490 kHz, 518 kHz and 4 209.5 kHz,

instructs the Secretary-General

1 to invite IMO to provide ITU with information on a regular basis on operational coordination for NAVTEX services on the frequencies 490 kHz, 518 kHz and 4 209.5 kHz;

2 to publish this information in the List of Coast Stations (see No. **20.7**).

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* *Note by the Secretariat:* Edition of 1990, revised in 1994.

RESOLUTION 340 (WRC-97)

Need for additional search and rescue information in databases

The World Radiocommunication Conference (Geneva, 1997),

noting

a) that the provisions of No. **20.16** of Article **20** require administrations to notify the Radiocommunication Bureau of ship station characteristics contained in the List of Ship Stations (List V), which currently includes: name of ship, call sign, selective call number, country, auxiliary installations, class of ship, nature of service, hours of service, telegraph transmission frequency bands, telephone transmission frequency bands, accounting authority, and remarks (e.g. Inmarsat terminal number, MMSI);

b) that the provisions of No. **20.15**, however, give the Bureau authority to change the content and form of this information in consultation with administrations; and

c) that administrations and the International Maritime Organization (IMO) have expressed a need for additional information to be included in search and rescue databases, including:

– vessel identification number (IMO number or national registration number);

– name, address and telephone number and, if applicable, telefax number of emergency contact person ashore;

– alternative 24-hour emergency telephone number;

– capacity for persons on board (passengers and crew),

resolves

to instruct the Director of the Radiocommunication Bureau to begin consultations with administrations with a view to incorporating the information contained in the Annex to this Resolution in the ITU maritime services database,

invites

administrations to consider also the incorporation of that information in their national databases,

instructs the Secretary-General

to communicate this Resolution to the IMO.

ANNEX TO RESOLUTION 340 (WRC-97)

Registration database for the Global Maritime Distress and Safety System

(See Article **32**)

1 All identities used by the Global Maritime Distress and Safety System (GMDSS) for identifying vessels in distress shall be registered in accordance with this Annex. Administrations or organizations responsible for assigning these identities shall make suitable arrangements for ensuring that registrations of these identities are made and maintained. Administrations shall notify this information to the Bureau in accordance with No. **20.16**.

2 Means shall be provided by the Bureau and administrations maintaining national databases to allow rescue coordination centres immediate access to this database on a 24-hour per day, 7-day per week basis.

3 Each registration database should include the following information:

3.1 vessel name;

3.2 maritime mobile service identity (MMSI);

3.3 call sign;

3.4 emergency position indicating radiobeacons (EPIRB) identification code (if applicable);

3.5 country (vessel flag State; may be derived from MMSI and call sign);

3.6 vessel identification number (IMO number or national registration number);

3.7 brief ship description (type);

3.8 name, address, telephone and (if applicable) telefax number of emergency contact person ashore;

3.9 alternative 24-hour emergency telephone number;

3.10 capacity for persons on board (passengers and crew);

3.11 ship's radio installation (Inmarsat A, B, C, M, VHF digital selective calling (DSC), etc.); and

3.12 Inmarsat ship earth station identities (if applicable).

RESOLUTION 341 (WRC-97)

UHF frequencies used in the maritime mobile service for on-board communication

The World Radiocommunication Conference (Geneva, 1997),

considering

that WRC-97 has adopted the introduction of channel spacing of 12.5 kHz for maritime UHF on-board communications, to be used on a voluntary basis,

noting

that Recommendation ITU-R M.1174 contains the characteristics of equipment used for on-board communications in the bands between 450 MHz and 470 MHz,

resolves to invite ITU-R

to modify this Recommendation by including also the characteristics of the equipment using the new 12.5 kHz channel spacing,

urges administrations

to submit contributions to ITU-R,

instructs the Secretary-General

to communicate this Resolution to the International Maritime Organization.

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 **18**;

b) Recommendation **318 (Mob-87)**, particularly *noting b)* and *c)* thereof;

c) that Appendix **18** 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 **18** 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 **18** 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 **18**, 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 **18**;

2 that, as soon as the ITU-R studies are complete, a future competent conference should consider any necessary changes to Appendix **18** 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 **18**;

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 343 (WRC-97)

Maritime certification for personnel of ship stations and ship earth stations for which a radio installation is not compulsory

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that WRC-97 has considered the question of certification for personnel of ship stations and ship earth stations within the Global Maritime Distress and Safety System (GMDSS);

b) that GMDSS will be fully implemented on 1 February 1999 by ships subject to an international agreement;

c) that ships not subject to an international agreement have begun to adopt GMDSS systems and techniques;

d) that use of GMDSS equipment should be accompanied by appropriate training and certification;

e) that the Radio Regulations stipulate that the service of every ship radio station working on frequencies assigned for international use shall be performed by operators holding a certificate;

f) that the present certificates described in Article **47** may be too demanding for radio operators of ship stations and ship earth stations on board ships for which a radio installation is not compulsory,

noting

that a number of administrations currently issue radio operator certificates specially designed for the non-compulsory sector,

resolves

that administrations wishing to implement special certification for the non-compulsory sector should implement the certificates contained in the Annex to this Resolution,

invites ITU-R

to develop a Recommendation describing these certificates,

instructs the Secretary-General

to bring this Resolution to the attention of the International Maritime Organization (IMO).

ANNEX TO RESOLUTION 343 (WRC-97)

Examination syllabus for radio operator's certificates appropriate to vessels using the frequencies and techniques of the Global Maritime Distress and Safety System on a non-compulsory basis

Introduction

The introduction of the Global Maritime Distress and Safety System (GMDSS) in February 1992 made it necessary to harmonize the examination requirements for certificates for professional radio operators. Harmonized examination procedures for the general operator's Certificate and restricted operator's Certificate, based on the syllabuses described in Article **47**, have already been introduced for maritime radio operators performing radiocommunication duties on board vessels subject to the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended. The GMDSS will be fully implemented on 1 February 1999 for vessels subject to SOLAS, 1974, as amended.

For vessels not subject to SOLAS, 1974, as amended, and which install radiocommunication equipment on a voluntary basis, there are significant advantages to also using the GMDSS. However, it was foreseen by some administrations that such vessels would use some, but not all, of the frequencies and techniques of the GMDSS and that radio personnel on board such vessels would not need the same level of certification as radio personnel on board vessels which use all of the frequencies and techniques of the GMDSS on a compulsory basis. A syllabus has been developed which provides the flexibility for a depth of study, level of knowledge, and length of course appropriate to meet the certification requirements of radio personnel on board vessels which use some of the frequencies and techniques of the GMDSS on a non-compulsory basis. The syllabus also provides for certification in the use of satellite equipment where appropriate.

This Annex describes the syllabus developed to meet the certification requirements referred to above, and which are implemented in a number of countries under the title "Long Range Certificate" and "Short Range Certificate". The Short Range Certificate should at least contain those elements of the syllabus which are relevant to sea area A1.

Examination syllabus

The examination should consist of theoretical and practical tests and should include at least:

A General knowledge of radiocommunications in the maritime mobile service

A.1 The general principles and basic features of the maritime mobile service.

B Detailed practical knowledge and ability to use radio equipment

B.1 The VHF radio installation. Use of VHF equipment in practice.

B.2 The MF/HF radio installation. Use of MF/HF equipment in practice.

B.3 Purpose and use of digital selective calling (DSC) facilities and techniques.

C Operational procedures of the GMDSS and detailed practical operation of GMDSS subsystems and equipment

C.1 Basic introduction to GMDSS procedures.

C.2 Distress, urgency and safety communication procedures in the GMDSS.

C.3 Distress, urgency and safety communication procedures by radiotelephony in the old distress and safety system.

C.4 Protection of distress frequencies.

C.5 Maritime safety information (MSI) systems in the GMDSS.

C.6 Alerting and locating signals in the GMDSS.

D Operational procedures and regulations for radiotelephone communications

D.1 Ability to exchange communications relevant to the safety of life at sea.

D.2 Regulations, obligatory procedures and practices.

D.3 Practical and theoretical knowledge of radiotelephone procedures.

D.4 Use of the international phonetic alphabet and, where appropriate, parts of the IMO Standard Marine Communication Phrases.

E Optional examination module for the maritime mobile-satellite service for vessels not subject to a compulsory fit

E.1 The general principles and basic features of the maritime mobile-satellite service.

E.2 Operational procedures and detailed practical operation of ship earth stations in the GMDSS.

RESOLUTION 344 (WRC-97)

Exhaustion of the maritime mobile service identity numbering resource

The World Radiocommunication Conference (Geneva, 1997),

noting

a) that ships not required to carry Global Maritime Distress and Safety System (GMDSS) equipment may do so, for safety purposes;

b) that digital selective calling equipment on such ships for VHF radio, and/or Inmarsat ship earth station equipment requires the assignment of a unique maritime mobile service identity (MMSI);

c) that not all administrations assign these identities to users of digital selective calling-equipped VHF radios on such ships, from the numbers intended for use by vessels sailing and communicating only with domestic coast stations,

considering

a) that VHF digital selective calling distress alerts require valid identities for use by search and rescue authorities;

b) that Recommendation ITU-R M.585 contains guidance for the assignment of MMSIs, including to non-compulsory ships which communicate only with domestic radio stations; and

c) that Recommendation ITU-R M.585 was derived from ITU-T Recommendation E.210,

recognizing

a) that even domestic ships which install Inmarsat will require the assignment of MMSI numbers from those numbers reserved for ships communicating worldwide, further depleting the resource;

b) that future growth of Inmarsat B, C and M mobile earth station use by non-compulsory ships is not, however, expected to deplete the resource;

c) that growth projections of Inmarsat systems by non-compulsory ships could nevertheless change,

noting further

that ITU-R can monitor the status of the MMSI resource by monitoring the available spare maritime identification digits (first three digits of the MMSI),

instructs the Director of the Radiocommunication Bureau

to monitor the status of the MMSI resource, and to report to each world radiocommunication conference on the anticipated reserve capacity and expected exhaustion of the resource,

resolves to invite ITU-T and ITU-R

1 to keep under review the Recommendations for assigning MMSIs, with a view to identifying alternative resources before the resources are exhausted;

2 to consult each other when addressing changes to any of the Recommendations affecting the MMSI numbering resources;

3 to complete studies on an urgent basis when a future world radiocommunication conference identifies the impending exhaustion of the MMSI resource,

instructs the Secretary-General

to communicate this Resolution to the International Maritime Organization.

RESOLUTION 345 (WRC-97)

Operation of Global Maritime Distress and Safety System equipment on and assignment of maritime mobile service identities to non-compulsory fitted vessels

The World Radiocommunication Conference (Geneva, 1997),

noting

a) that ships not required by international agreement to carry Global Maritime Distress and Safety System (GMDSS) equipment could elect to do so for safety purposes;

b) that such vessels may only carry VHF digital selective calling (DSC) equipment;

c) that some administrations may not require operators on such vessels to have appropriate training, certification or licence;

d) that not all administrations assign and register identities to users of VHF DSC equipment on such ships,

considering

that VHF DSC false distress alerts are a problem for rescue coordination centres, particularly when incorrect identities are used, or when the radio is operated by persons untrained in its use,

recognizing

that administrations have different training requirements for users of VHF DSC equipment,

resolves

1 to invite ITU-R to consider DSC standards and operating procedures in order to simplify operation of this equipment;

2 to invite ITU-T and ITU-R to review the process for assigning maritime mobile service identities for simplifying the process, taking into account cases of new installation, sale of the vessel or transfer of the equipment to a new ship;

3 to invite ITU-T and ITU-R to undertake studies to ensure the registration and continuous accessibility and availability of identities to rescue authorities,

instructs the Secretary-General

to communicate this Resolution to the International Maritime Organization for consideration and comments.

RESOLUTION 346 (WRC-97)

Protection of distress and safety communications on the frequencies 12 290 kHz and 16 420 kHz from harmful interference caused by these frequencies if also used for non-safety calling

The World Radiocommunication Conference (Geneva, 1997),

noting

a) that the frequencies 4 125 kHz, 6 215 kHz, 12 290 kHz and 16 420 kHz are used for distress and safety communications as well as for non-safety calling by ships in radiotelephony in accordance with the provisions of Article **31** and No. **52.221** respectively;

b) that considerable worldwide interference to distress and safety communications is experienced, especially on the frequencies 12 290 kHz and 16 420 kHz, due to ships being unable to monitor these frequencies before calling,

noting further

a) that the recommended agenda for WRC-01* includes an agenda item 2.4 for review of the channel arrangements in the HF bands for the maritime mobile service, taking into account the use of new digital technology;

b) that consideration of this item by WRC-01* may result in assigning the frequencies 12 290 kHz and 16 420 kHz exclusively for distress and safety communications,

recognizing

that it is of vital importance for the safety of life at sea that distress and safety communications can be carried out without being hampered by harmful interference,

resolves

1 to urge administrations:

1.1 to move, where appropriate, their coast station calling frequencies from the channels 1221 and 1621 to any other suitable HF channel;

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* *Note by the Secretariat:* This Conference will be held in 2003.

1.2 to request ships under their jurisdiction to refrain from using the frequencies 12 290 kHz and 16 420 kHz for non-safety calling;

2 to recommend that WRC-01* consider this subject,

instructs the Secretary-General

to bring this Resolution to the attention of the International Maritime Organization.

* *Note by the Secretariat:* This Conference will be held in 2003.

RESOLUTION 347 (WRC-97)

Use of digital telecommunication technologies in the MF and HF bands by the maritime mobile service

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that amendments to Article **52** have been adopted by WRC-97 to provide for the use of digital telecommunication technology in the maritime HF telephony and A1A Morse bands;

b) that there may be a need for consequential changes in Appendix **17** to reflect provisions made at this Conference for the use of digital telecommunications in the maritime HF telephony bands,

considering further

a) that it would be desirable to extend the use of digital telecommunication technology to the maritime HF A1A Morse telegraphy bands as well;

b) that these bands are significantly underutilized at present;

c) that the requirement for use of new digital technologies in the maritime mobile service is growing rapidly,

noting

a) that Resolution **720 (WRC-95)*** of WRC-95 sets forth a preliminary agenda for WRC-99 that includes item 2.4 "Review of the channel arrangements in HF bands for the maritime mobile service, taking into account the use of new digital technology";

b) that use of the maritime HF A1A Morse radiotelegraphy bands is steadily diminishing with the result that administrations are already beginning to use these bands for digital telecommunication systems on a non-interference basis,

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* This Resolution was abrogated by the WRC-97.

resolves

to recommend that WRC-01* make changes to Appendix **17** and Article **52,** as needed,

instructs the Secretary-General

to bring this Resolution to the attention of the International Maritime Organization.

* *Note by the Secretariat:* This Conference will be held in 2003.

RESOLUTION 348 (WRC-97)

Studies required to provide priority to distress communications originated by shore-based search and rescue authorities

The World Radiocommunication Conference (Geneva, 1997),

noting

a) that Article **53** provides priority for distress and safety communications which involves immediate access to the space segment;

b) that distress and safety communications from shore-based search and rescue authorities will also be given priority access to the space segment;

c) that when ships are communicating using their ship earth stations, these priority requests are not able to be completed without manual intervention using a manual procedure to clear all traffic to and from the ship,

considering

a) that persons on board ships in distress or involved with a distress case may wish to use the ship earth station to notify friends, family and business associates on shore;

b) that this could cause priority requests from rescue authorities to receive a busy signal;

c) that unacceptable delays may be encountered in clearing all traffic to and from the ships manually,

recognizing

a) that life and property may be lost if rapid access is not provided for distress related communications originated by the rescue authority;

b) that the International Maritime Organization (IMO) has considered this problem and decided that provisions are necessary for giving priority to shore-originated distress communications;

c) that Inmarsat is currently studying how to provide such priority communications,

resolves to invite

1 ITU-R to monitor the status of these studies and to develop suitable Recommendations;

2 IMO to develop requirements for priority communications for distress-related communications originated by shore-based search and rescue authorities and to submit these requirements to the next competent world radiocommunication conference,

further invites the Council

to place this Resolution on the agenda of a future competent world radiocommunication conference,

instructs the Secretary-General

to communicate this Resolution to IMO and the International Civil Aviation Organization for appropriate action and comment.

RESOLUTION 349 (WRC-97)

Operational procedures for cancelling false distress alerts in the Global Maritime Distress and Safety System

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the 1974 International Convention for the Safety of Life at Sea (SOLAS), as amended, prescribes that ships subject to that Convention shall be fitted with Global Maritime Distress and Safety System (GMDSS) equipment as appropriate;

b) that non-SOLAS vessels are also being equipped with GMDSS equipment;

c) that the transmission and relay of false distress alerts is a significant problem within the GMDSS,

noting

that the International Maritime Organization (IMO) has developed similar operational procedures to cancel false distress alerts,

resolves

1 to urge administrations to take all necessary measures to avoid false distress alerts and to minimize the unnecessary burden on rescue organizations which occurs;

2 to urge administrations to encourage the correct use of GMDSS equipment, with particular attention to appropriate training;

3 to urge administrations to implement the operational procedures contained in the Annex to this Resolution;

4 that administrations should take any consequential appropriate action in this respect,

instructs the Secretary-General

to bring this Resolution to the attention of IMO.

ANNEX TO RESOLUTION 349 (WRC-97)

Cancelling of false distress alerts

If a distress alert is inadvertently transmitted, the following steps shall be taken to cancel the distress alert.

1 VHF digital selective calling

1) Reset the equipment immediately;

2) Set to channel 16; and

3) Transmit a broadcast message to "All Stations" giving the ship's name, call sign and maritime mobile service identity (MMSI), and cancel the false distress alert.

2 MF digital selective calling

1) Reset the equipment immediately;

2) Tune for radiotelephony transmission on 2 182 kHz; and

3) Transmit a broadcast message to "All Stations" giving the ship's name, call sign and MMSI, and cancel the false alert.

3 HF digital selective calling

1) Reset the equipment immediately;

2) Tune for radiotelephony on the distress and safety frequency in each band in which a false distress alert was transmitted (see Appendix **15**); and

3) Transmit a broadcast message to "All Stations" giving the ship's name, call sign and MMSI, and cancel the false alert on the distress and safety frequency in each band in which the false distress alert was transmitted.

4 Inmarsat ship earth station

Notify the appropriate rescue coordination centre that the alert is cancelled by sending a distress priority message by way of the same coast earth station through which the false distress alert was sent. Provide ship name, call sign and Inmarsat identity with the cancelled alert message.

5 Emergency position indicating radiobeacon (EPIRB)

If for any reason an EPIRB is activated inadvertently, contact the appropriate rescue coordination centre through a coast station or land earth station and cancel the distress alert.

6 General

Notwithstanding the above, ships may use additional appropriate means available to them to inform the appropriate authorities that a false distress alert has been transmitted and should be cancelled.

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 405

Relating to the use of frequencies of the aeronautical mobile (R) service[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that WARC-Aer2 adopted and developed a new Frequency Allotment Plan for the use of HF channels for the aeronautical mobile (R) service (Appendix **27**);

b) that air operations are subject to continuous changes;

c) that these changes require attention by the administrations concerned; but

d) that, in seeking to satisfy new communication requirements, no decision should be taken that will prevent or handicap the coordinated utilization of those high frequency aeronautical mobile (R) band allotments as prescribed in the Plan;

e) that the families of frequencies allotted to the major world air route areas (MWARAs), regional and domestic air route areas (RDARAs) and sub-areas and VOLMET areas have been chosen considering propagation conditions which allow for the selection of the most suitable frequencies for the distances involved;

f) that specific steps should be taken to ensure that the correct order of frequency is used;

g) that it is essential to distribute the communication traffic load as uniformly as possible over the frequencies available;

h) that frequencies have been allotted for worldwide use,

resolves

that administrations, individually or in collaboration, take the necessary steps:

1 to make as great a use as possible of higher frequencies in order to lessen the load on the HF aeronautical mobile (R) bands;

2 to make as great a use as possible of antennae of appropriate directivity and efficiency in order to minimize the possibilities of mutual interference within an area or between areas;

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[1] WRC-97 made editorial amendments to this Resolution.

3 to coordinate the use of families of frequencies necessary for a given route segment in accordance with the technical principles in Appendix **27** and in the light of the propagation data available, to ensure that the most appropriate frequencies are used with an aircraft at a given distance from the aeronautical station providing service over the route segment concerned;

4 to improve operating techniques and procedures and to use equipment which will make it possible to attain the highest possible efficiency in handling air-ground HF communications;

5 to collect precise data on the operation of their HF communication systems, particularly data having a bearing on technical and operating standards, so as to facilitate re-examination of the Plan;

6 to establish, through regional arrangements, the best method of providing the communications required for any new long-distance international or regional air operation which is not or cannot be accommodated within the system of MWARA and RDARA, in such a manner as not to cause harmful interference to the utilization of frequencies as prescribed in the Plan.

RESOLUTION 506 (Rev.WRC-97)

Use by space stations in the broadcasting-satellite service operating in the 12 GHz frequency bands allocated to the broadcasting-satellite service of the geostationary-satellite orbit and no other

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that a Plan designating frequency assignments in the above-mentioned frequency bands and positions in the geostationary-satellite orbit was adopted by WARC SAT-77 for Regions 1 and 3;

b) that a similar Plan for Region 2 was adopted by the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2 (Geneva, 1983);

c) that the Plans referred to in *considering a)* and *b)* above were consolidated in Appendix **30** at WARC Orb-85;

d) that the Plans in Appendices **30** and **30A** for Regions 1 and 3 have been modified by this Conference,

e) that the operation of the broadcasting-satellite service in the frequency bands concerned in orbits other than the geostationary-satellite orbit might be incompatible with the Plans referred to in *considering a), b)* and *d)* above,

resolves

that administrations shall ensure that their space stations in the broadcasting-satellite service in these frequency bands are operated in the geostationary-satellite orbit and no other.

RESOLUTION 507

Relating to the establishment of agreements and associated plans for the broadcasting-satellite service

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that it is important to make the best possible use of the geostationary-satellite orbit and of the frequency bands allocated to the broadcasting-satellite service;

b) that the great number of receiving installations using such directional antennae as could be set up for a broadcasting-satellite service may be an obstacle to changing the location of space stations in that service on the geostationary-satellite orbit, as of the date of their being brought into use;

c) that satellite broadcasts may create harmful interference over a large area of the Earth's surface;

d) that the other services with allocations in the same band need to use the band before the broadcasting-satellite service is set up,

resolves

1 that stations in the broadcasting-satellite service shall be established and operated in accordance with agreements and associated plans adopted by world or regional administrative conferences, and/or world or regional radiocommunication conferences, as the case may be, in which all the administrations concerned and the administrations whose services are liable to be affected may participate;

2 that during the period before the entry into force of such agreements and associated plans the administrations and the Radiocommunication Bureau shall apply the procedure contained in Resolution **33 (Rev.WRC-97)**,

invites the Council

to keep under review the question of world radiocommunication conferences, and/or regional radiocommunication conferences, as required, with a view to fixing suitable dates, places and agenda.

RESOLUTION 517 (Rev.WRC-97)

Transition from double-sideband to single-sideband or other spectrum-efficient modulation techniques in the high-frequency bands between 5 900 kHz and 26 100 kHz allocated to the broadcasting service

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the high-frequency (HF) bands allocated to the broadcasting service between 5 900 kHz and 26 100 kHz are severely congested;

b) that single-sideband (SSB) techniques allow more efficient utilization of the frequency spectrum than double-sideband (DSB) techniques;

c) that SSB techniques enable reception quality to be improved;

d) that Recommendation **515 (Rev.WRC-97)** encourages the accelerated design and manufacture of SSB transmitters and receivers;

e) Appendix **11** concerning the SSB system specification in the HF broadcasting services;

f) that rapid developments are taking place in digital sound broadcasting technologies;

g) that digital modulation or other spectrum-efficient modulation techniques are expected to provide the means to achieve the optimum balance between sound quality, circuit reliability and bandwidth;

h) that digitally modulated emissions can, in general, provide more efficient coverage than amplitude-modulated transmissions by using fewer simultaneous frequencies and less power;

i) that the lifetime of a transmitter is at least twenty years;

j) that it is economically unattractive, using current technology, to convert existing conventional DSB broadcasting systems to SSB operation;

k) that some DSB transmitters have been used with digital modulation techniques without transmitter modifications;

l) that the lifetime of a receiver is of the order of ten years;

m) that ITU-R is carrying out urgent studies on the development of broadcasting digital modulation emissions in the bands allocated to the broadcasting service below 30 MHz;

n) that other spectrum-efficient modulation techniques may be developed in the future,

resolves

1 that the procedure in the Annex to this Resolution shall be used for the purpose of ensuring an orderly transition from DSB to SSB or other spectrum-efficient modulation techniques recommended by ITU-R in the HF bands between 5 900 kHz and 26 100 kHz allocated to the broadcasting service;

2 that the final date for the cessation of DSB emissions specified in the Annex to this Resolution shall be periodically reviewed by competent future world radiocommunication conferences in the light of the latest available complete statistics on the worldwide distribution of SSB and other spectrum-efficient modulation technique transmitters and receivers, as called for in Resolution **537 (WRC-97)**,

instructs the Director of the Radiocommunication Bureau

to compile and maintain the statistics referred to in *resolves* 2, to make these statistics available to administrations and to submit summaries thereof to competent future world radiocommunication conferences,

invites ITU-R

to continue its studies on digital techniques in HF broadcasting as a matter of urgency with a view to the development of this technology for future use,

invites administrations

to assist the Director of the Radiocommunication Bureau by providing the relevant statistical data and to participate in ITU-R studies on matters relating to the development and introduction of digitally modulated transmissions in the HF bands between 5 900 kHz and 26 100 kHz allocated to the broadcasting service.

ANNEX TO RESOLUTION 517 (Rev.WRC-97)

Procedure for the transition from double-sideband to single-sideband or other spectrum-efficient modulation techniques in the high-frequency bands between 5 900 kHz and 26 100 kHz allocated to the broadcasting service

1 The early introduction of SSB or other spectrum-efficient modulation techniques recommended by ITU-R is encouraged.

2 All DSB emissions shall cease not later than 31 December 2015, at 2359 hours UTC.

3 SSB emissions shall comply with the characteristics specified in Appendix **11**.

4 Other spectrum-efficient modulation techniques, including digital, shall comply with the characteristics to be recommended by ITU-R.

5 After 31 December 2015, 2359 hours UTC, SSB emissions shall comply with the characteristics specified in Appendix **11** which, *inter alia*, require a carrier reduction of 12 dB relative to peak envelope power.

6 Until 31 December 2015, 2359 hours UTC, SSB emissions intended for reception by DSB receivers with envelope demodulation, in the bands currently used under Article **12**, shall have a carrier reduction of 6 dB relative to peak envelope power.

7 SSB emissions with a carrier reduction of 12 dB relative to peak envelope power can also be introduced in the spectrum allocated for the type of emission described in § 6 above.

8 Other spectrum-efficient modulation techniques recommended by ITU-R, including digital, can also be introduced in the HF bands between 5 900 kHz and 26 100 kHz allocated to the broadcasting service.

9 Until 31 December 2015, 2359 hours UTC, whenever an administration replaces a DSB emission by an emission using SSB or other spectrum-efficient modulation techniques, including digital, it shall ensure that the level of interference is not greater than that caused by the original DSB emission.

RESOLUTION 525 (WARC-92)

Introduction of high-definition television (HDTV) systems of the broadcasting-satellite service (BSS) in the band 21.4-22.0 GHz in Regions 1 and 3[1]

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

a) that WRC-92 has reallocated the band 21.4-22.0 GHz in Regions 1 and 3 to the BSS to be implemented after 1 April 2007;

b) that until 1 April 2007 the existing services operating in the band 21.4-22.0 GHz in Regions 1 and 3 in accordance with the Table of Frequency Allocations are therefore entitled to continue operating without harmful interference from other services;

c) that it is nevertheless desirable to facilitate the introduction of experimental HDTV systems in this band before 1 April 2007 without affecting the continued operation of existing services;

d) that it also may be possible to introduce operational HDTV systems in this band before 1 April 2007 without affecting the continued operation of existing services;

e) that after 1 April 2007 the introduction of HDTV systems in this band must be regulated in a flexible and equitable manner until such time as a future competent world radiocommunication conference has adopted definitive provisions for this purpose in accordance with Resolution **507**;

f) that procedures are required for the three sets of circumstances envisaged in *considerings c)*, *d)* and *e)* above,

resolves

to adopt the interim procedures contained in the Annex hereto with effect from 1 April 1992,

invites all administrations

to comply with the above procedures,

instructs the Radiocommunication Bureau

to apply the above procedures.

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[1] WRC-97 made editorial amendments to this Resolution.

ANNEX TO RESOLUTION 525 (WARC-92)

Interim procedures for the introduction of BSS (HDTV) systems in the band 21.4-22.0 GHz in Regions 1 and 3

Section I – General provisions

1 It shall be understood that prior to 1 April 2007 all existing services in the band 21.4-22.0 GHz in Regions 1 and 3 operating in accordance with the Table of Frequency Allocations shall be entitled to continue to operate. After that date they may continue to operate, but they shall neither cause harmful interference to BSS (HDTV) systems nor be entitled to claim protection from such systems. It shall be understood that the introduction of an operational BSS (HDTV) system in the band 21.4-22.0 GHz in Regions 1 and 3 should be regulated by an interim procedure in a flexible and equitable manner until the date to be decided by a future competent conference.

Section II – Interim procedure relating to experimental BSS (HDTV) systems introduced before 1 April 2007

2 For the purpose of introducing experimental BSS (HDTV) systems in the band 21.4-22.0 GHz in Regions 1 and 3 before 1 April 2007 under the provisions of Article **27**, the procedures contained in Resolution **33 (Rev.WRC-97)** shall be applied.

Section III – Interim procedure relating to operational BSS (HDTV) systems introduced before 1 April 2007

3 For the purpose of introducing operational BSS (HDTV) systems in the band 21.4-22.0 GHz in Regions 1 and 3 before 1 April 2007, the procedure contained in Resolution **33 (Rev.WRC-97)** shall be applied, if the power flux-density at the Earth's surface produced by emissions from a space station, on the territory of any other country, exceeds:

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

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

– values to be derived by linear interpolation between these limits for angles of arrival between 5° and 25° above the horizontal plane.

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

4 If the power flux-density at the Earth's surface produced by emissions from a space station does not exceed these limits, the procedure in Sections B and C of Resolution **33 (Rev.WRC-97)** only shall be applied.

Section IV – Interim procedure relating to BSS (HDTV) systems introduced after 1 April 2007

5 For the purpose of introducing and operating BSS (HDTV) systems in the band 21.4-22.0 GHz in Regions 1 and 3 after 1 April 2007, and before a future conference has taken decisions on definitive procedures, the procedure in Sections B and C of Resolution **33 (Rev.WRC-97)** shall be applied.

6 For the purpose of this Section, BSS (HDTV) systems introduced under provisions of Sections II and III of this Resolution shall be taken into account.

7 Administrations shall, to the maximum extent possible, seek to ensure that operational BSS (HDTV) systems introduced in the band 21.4-22.0 GHz in Regions 1 and 3 under Sections III or IV of this Resolution have characteristics which take into account the studies of the ITU-R for the preparation of a future competent world radiocommunication conference.

RESOLUTION 526 (WARC-92)

Future adoption of procedures to ensure flexibility in the use of the frequency band allocated to the broadcasting-satellite service (BSS) for wide RF-band high-definition television (HDTV) and to the associated feeder links[1]

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

a) that WARC-92 has added an allocation to the BSS in the bands 21.4-22.0 GHz in Regions 1 and 3 and 17.3-17.8 GHz in Region 2 for use by wide RF-band HDTV;

b) that considerable further technological development of wide RF-band HDTV is expected before it can be introduced for general operational use;

c) that this Conference has adopted interim provisions to be applied during the period before 1 April 2007 to regulate the introduction of experimental or operational BSS (HDTV) systems (see Resolution **525 (WARC-92)**);

d) that in the longer term regulatory provisions designed to ensure flexible and equitable use of the BSS (HDTV) and associated feeder-link allocations will be necessary to replace these interim provisions,

resolves to urge all administrations

to study the development of future regulatory provisions for BSS (HDTV) to ensure flexibility in the use of the bands 21.4-22.0 GHz in Regions 1 and 3 and 17.3-17.8 GHz in Region 2, having regard to the interests of all countries and the state of technical development of this new service,

instructs the Secretary-General

to bring this Resolution to the attention of the Council with a view to placing an appropriate item on the agenda of a future world radiocommunication conference.

[1] WRC-97 made editorial amendments to this Resolution.

RESOLUTION 527 (WARC-92)

Terrestrial VHF digital sound broadcasting[1]

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

a) that advances in technology have made available digital sound broadcasting systems of high quality;

b) that such digital sound broadcasting systems will offer a considerably higher sound quality as well as additional system characteristics which the present FM broadcasting system does not possess;

c) that digital sound broadcasting can, in addition to possessing the properties mentioned above, permit greater spectrum efficiency than conventional FM sound broadcasting;

d) that digital sound broadcasting systems require less effective radiated power;

e) that the bands 87.5-108 MHz in Region 1, 88-108 MHz in Region 2 and 87-108 MHz in Region 3 are generally widely used for high-powered FM sound broadcasting service, except in some countries;

f) that several European countries are considering the implementation of digital sound broadcasting on an interim basis in the VHF bands allocated to the broadcasting service, while ensuring the protection of assignments in the relevant broadcasting Plans in force,

resolves to invite the ITU-R

in order to harmonize the implementation of terrestrial digital sound broadcasting:

1 to undertake, as a matter of urgency, the relevant technical studies associated with the introduction of terrestrial digital sound broadcasting, focusing primarily on the VHF broadcasting bands;

2 in particular, to consider the system characteristics and propagation phenomena in relation to developing compatibility criteria in the same and adjacent bands, including protection of the safety services,

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[1] WRC-97 made editorial amendments to this Resolution.

invites the Telecommunication Development Bureau

to include among its priorities the definition of a project relating to the study by the ITU-R of exceptional severe propagation phenomena in the regions of concern to developing countries,

instructs the Secretary-General

to bring this Resolution to the attention of the Council with a view to placing on the agenda of a competent radiocommunication conference the subject of terrestrial VHF digital sound broadcasting for Region 1 countries and interested countries in Region 3,

invites administrations

to contribute actively to the relevant ITU-R studies.

RESOLUTION 528 (WARC-92)

Introduction of the broadcasting-satellite service (sound) systems and complementary terrestrial broadcasting in the bands allocated to these services within the range 1-3 GHz[1]

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

a) that WRC-92 has made frequency allocations to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting;

b) that it is necessary to ensure that the introduction of the broadcasting-satellite service (sound) and complementary terrestrial broadcasting proceeds in a flexible and equitable manner;

c) that efficient use of the spectrum will be enhanced by a worldwide allocation;

d) that a worldwide allocation may cause difficulties to some countries in relation to their existing services;

e) that future planning may limit the effect on other services,

resolves

1 that a competent conference should be convened, preferably not later than 1998, for the planning of the broadcasting-satellite service (sound) in the bands allocated to this service in the range 1-3 GHz; and the development of procedures for the coordinated use of complementary terrestrial broadcasting;

2 that this Conference should review criteria for sharing with other services;

3 that in the interim period, broadcasting-satellite systems may only be introduced within the upper 25 MHz of the appropriate band in accordance with Resolution **33 (Rev.WRC-97)**. The complementary terrestrial service may be introduced during this interim period subject to coordination with administrations whose services may be affected;

4 that the calculation methods and the interference criteria to be employed in evaluating the interference should be based upon relevant ITU-R Recommendations agreed by the administrations concerned as a result of Resolution **703 (Rev.WARC-92)** or otherwise,

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[1] WRC-97 made editorial amendments to this Resolution.

invites the ITU-R

to conduct the necessary studies prior to the Conference,

instructs the Secretary-General

to bring this Resolution to the attention of the Council to consider including in the agenda of a radiocommunication conference to be held preferably not later than the year 1998 the matters addressed above.

RESOLUTION 532 (WRC-97)

Review and possible revision of the 1997 broadcasting-satellite service Plans for Regions 1 and 3

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that WRC-97 has adopted a revision of the broadcasting-satellite service (BSS) Plans for Regions 1 and 3 providing capacity for all new countries in accordance with Resolutions **524 (WARC-92)*** and **531 (WRC-95)***;

b) that certain countries requested that a replanning be undertaken in order to increase the Plan capacity so as to provide a channel capacity large enough to permit the economical development of a broadcasting-satellite system;

c) the increasing number of applications under Article 4 of Appendices **30** and **30A** for modifications involving additions to the Plans;

d) the rights of all Member States to equitable access to the spectrum allocated to satellite broadcasting, and that Article 44 of the Constitution provides, *inter alia*, that "Members shall bear in mind that radio frequencies and the geostationary-satellite orbit are limited natural resources and that they must be used rationally, efficiently and economically, in conformity with the provisions of the Radio Regulations, so that countries or groups of countries may have equitable access to both",

resolves

1 that an Inter-conference Representative Group (IRG) shall be established in accordance with Annex 2;

2 that the Director of the Radiocommunication Bureau shall present the results of the IRG's studies to the WRC-99 regarding the feasibility of increasing the minimum assigned capacity for countries in Regions 1 and 3 to around ten analogue-equivalent channels, based on the planning principles in Annex 1;

3 that WRC-99 should consider the results of the above studies and, if the conclusion is that such replanning is feasible, initiate an appropriate revision for completion no later than 2001,

invites ITU-R

to study, as a matter of urgency, the technical possibilities for increasing the minimum capacity assigned to all Region 1 and 3 countries in the Plans for Regions 1 and 3 contained in Appendices **30** and **30A**, in cooperation with the IRG and in accordance with the principles set out in Annex 1,

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* This Resolution was abrogated by WRC-2000.

invites the Council to recommend to the 1998 Plenipotentiary Conference

to consider convening a world radiocommunication conference no later than 2001 to revise those parts of the Plans in Appendices **30** and **30A** applying to Regions 1 and 3, subject to consideration by WRC-99 of the results of the studies carried out by the IRG,

instructs the Secretary-General

to bring this Resolution to the attention of the Council, with a view to undertaking, at competent conferences, a review of the studies and, if necessary, a revision of the relevant parts of Appendices **30** and **30A** and associated provisions of the Radio Regulations.

ANNEX 1 TO RESOLUTION 532 (WRC-97)

Principles for the review and possible revision of the 1997 broadcasting-satellite service Plans for Regions 1 and 3

WRC-97 reviewed the planning principles proposed by several administrations and those adopted by WRC-95 in Resolution **531 (WRC-95)**[*], and agreed to establish an IRG to carry out studies in accordance with the principles given below.

These principles are to be used in assessing the possibilities for meeting the objectives in this Resolution.

1 Provide, for all countries, a minimum capacity equivalent to around ten analogue channels while maintaining the same proportionality adopted by WARC SAT-77.

2 Planning is to be based mainly on national coverage.

3 Protect notified assignments which are in conformity with Appendices **30** and **30A**, which have been brought into use and for which the date of bringing into use has been confirmed to the Bureau.

4 In order to avoid obsolescence of the Plans, caused by technical assumptions becoming out of date, ensure that the Plans are established with a view to achieving long-term flexibility.

5 Leaving capacity for future additional requirements.

6 Consider, for planning, whether a complete digital approach may be appropriate in the future and, if so, provide for the simultaneous operation of analogue and digital systems, if necessary during a defined time-scale.

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[*] This Resolution was abrogated by WRC-2000.

7 Ensure that the integrity of the Region 2 Plan and its associated provisions is preserved, by providing the same protection to the assignments contained in those Plans 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 currently provided under the Radio Regulations.

8 Ensure compatibility between the BSS in Regions 1 and 3 and services having allocations in the planned bands in all three Regions.

ANNEX 2 TO RESOLUTION 532 (WRC-97)

Inter-conference representative group

WRC-97 has resolved that an IRG be established to study the feasibility of increasing the minimum capacity for countries in Regions 1 and 3 to around the equivalent of ten analogue channels in accordance with the principles set out in Annex 1.

The IRG should be structured to consist of:

– a supervisory policy group open to participation by all Member States, but endeavouring to ensure adequate representation of administrations from all ITU Regions;

– the Bureau, assisted by a group of technical experts (GTE) and working under the guidance of the supervisory policy group. Members of the GTE should be drawn from all Member States and Sector Members on the basis of technical expertise.

Joint Working Party 10-11S is encouraged to contribute to the studies requested of ITU-R, as appropriate.

Requests for additional studies by the IRG

1 *Annex 7 of Appendix* **30**

The IRG is requested to examine Annex 7 in the light of its studies for possible revision of the BSS Plans and with respect to the decisions taken by WRC-97, such as the reduction of downlink e.i.r.p. Its advice on the relevance of that Annex in providing protection to all services sharing the Plan bands, and particularly the Region 2 BSS Plan, should be reported to WRC-99.

2 *Avoidance of monopolization of the BSS resource*

The IRG is requested to consider concerns identified by WRC-97: modifications of the Plans for additional requirements or subregional systems should not lead to monopolization of the use of the bands by a country or a group of countries. Advice on how to address these concerns should be reported to WRC-99.

RES532-4

Requests for studies by ITU-R

ITU-R is requested to study and provide advice to the IRG on the following subjects.

1 Appropriate technical criteria for the studies addressing the following:

– digital-to-digital protection ratios;

– digital-to-analogue protection ratios;

– analogue-to-digital protection ratios;

– digital emission masks;

and associated calculation methods.

2 A possible reduction in e.i.r.p. and related carrier-to-noise (*C/N)* ratio and link budget margins, as a means of alleviating BSS/terrestrial compatibility constraints.

3 Appropriate feeder-link e.i.r.p. and receiver noise temperature.

4 Comparison of alternative polarization options.

5 The suitability of the minimum earth receive elevation angles used by WARC SAT-77.

Request to ITU

ITU is requested to provide the necessary assistance to facilitate the active participation of developing countries, especially the least developed countries, in both the supervisory policy group and the GTE of the IRG.

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 30 and 30A to the Radio Regulations

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that this Conference revised the Appendix **30** 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 **30A** 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 **30** and **30A**;

[1] Hereinafter within this Resolution the Appendix **30** Regions 1 and 3 Plan is referred to as the "R1/R3 downlink Plan" and the Appendix **30** Regions 1 and 3 List is referred as the "R1/R3 downlink List". Similarly, the Appendix **30A** Regions 1 and 3 feeder-link Plans are referred to as the "R1/R3 feeder-link Plans" and the Appendix **30A** Regions 1 and 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 **30** 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 **30A** 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 **30** and **30A** 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 **30** and **30A** 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 **30** 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.

[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 **30** and **30A** 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 **30** and **30A** 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 (AP30/E or AP30A/E), using the revised Appendices **30** and **30A** 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 **30** and **30A** 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 **30** and Notes 5 and 6 in § 9A.2 of Article 9A of Appendix **30A** 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 **30** and Article 9A of Appendix **30A** for:

– protection from fixed-satellite service assignments already published. The Bureau shall review all relevant Special Sections of the series (for example, AP30/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 535 (WRC-97)

Information needed for the application of Article 12 of the Radio Regulations

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that WRC-97 adopted Article **12** as a simple and flexible seasonal planning procedure for high-frequency broadcasting (HFBC) based on coordination;

b) that Article **12** responds to the intent of Resolution **508*** and Resolution **523 (WARC-92)***;

c) that Article **12** makes reference to the Rules of Procedure,

considering further

that appropriate Rules of Procedure are to be developed by the Radiocommunication Bureau and adopted by the Radio Regulations Board,

instructs the Director of the Radiocommunication Bureau

to consider the information contained in the Annex to this Resolution in developing the Rules of Procedure,

urges administrations

1 to support the Director of the Radiocommunication Bureau in the preparation of these Rules of Procedure and in the development and testing of any accompanying computer software;

2 to submit their schedules in a common electronic format to be defined in the Rules of Procedure,

requests the Secretary-General

to consider provision of the necessary funding to enable developing countries to participate fully in the application of Article **12** and relevant radiocommunications seminars.

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* This Resolution was abrogated by WRC-97.

ANNEX TO RESOLUTION 535 (WRC-97)

This Annex responds to the need for information in the application of Article **12**; the flowchart in Description 2 provides an overview of the Procedure.

1 Software development

The Procedure will require a number of user-friendly software modules to be developed, tested and supplied to administrations by the Bureau. This will ensure that the same software modules are used by administrations and the Bureau for the analysis of the schedules.

The Bureau should:

– develop the aforementioned software with assistance from administrations;

– distribute the software, together with user instructions and relevant documentation;

– organize training in the use of the software;

– monitor the functional performance of the software and, if required, make necessary modifications.

2 Software modules

Data capture of requirements

A new module will be required that permits the capture of all data elements detailed in Description 3. This module should also contain validation routines that prevent inconsistent data being captured and sent to the Bureau for processing.

Propagation calculation

This new module should calculate the field strength and other necessary data at all relevant test points as described in Descriptions 1 and 4.

It should also include an option that allows administrations to select the optimum frequency bands for their requirements.

The output format of the data and the medium should be such as to allow easy publication and distribution of the results to all administrations.

The results of these calculations should be displayable in a graphical format.

Compatibility analysis

This module should use the output of the propagation calculation to provide a technical analysis of a requirement both alone and in the presence of other requirements as in Description 4. This analysis would be used in the coordination process.

The values for the parameters given in Description 4 should be user selectable, but in the absence of other values the recommended default values should be used.

The results of this analysis should be capable of being displayed in a graphical format for a defined service area as in Description 4.

Data query

This module should enable the user to perform typical data query functions.

DESCRIPTION 1

Selection of suitable frequency band(s)

General

In order to assist broadcasters and administrations in the preparation of their HF broadcasting requirements, the Bureau will prepare and distribute suitable computer software. This should be easy to use and the output should be easy to understand.

User input data

The user should be able to enter:

– the name of the transmitting station (for reference purposes);

– the geographic coordinates of the transmitting station;

– the transmitter power;

– the bands which are available for use;

– hours of transmission;

– sunspot number;

– months during which a service is required;

– the available antenna types, together with the relevant directions of maximum radiation;

– the required coverage area specified as a set of CIRAF zones and quadrants (or by means of relevant geographic information).

It is desirable that the software should be able to store the above information, once it has been entered correctly, and provide the user with an easy means of recalling any previously entered information.

Methodology and data

The software should use:

– Recommendation ITU-R BS.705 for the calculation of antenna patterns;

– Recommendation ITU-R P.533 for the prediction of wanted field-strength values;

– Recommendation ITU-R P.842 for the calculation of reliability values.

The set of 911 test points (agreed at WARC HFBC-87) should be used, supplemented where necessary with test points based on a geographic grid.

The software should calculate the field strength values and the fading margins at each test point inside the required service area for each of the frequency bands declared to be available, taking account of the relevant transmitting antenna characteristics for each frequency band. The desired RF signal-to-noise ratio should be user selectable with a default value of 34 dB.

The dates for which calculations are made should be user selectable, the default values being:

– 0.5 month after the start of the season;

– mid-point of the season;

– 0.5 month before the end of the season.

The times for which calculations are made should be user selectable, the default values being:

– 30 min past the hour in which the requirement starts;

– 30 min past each successive hour until the hour in which the requirement stops.

Software output data

For rapid assessment of suitable bands, the software should calculate:

– the basic service reliability for each available band and for the relevant test points from the set of 911 test points;

– the basic area reliability for each available band and for the relevant test points from the set of 911 test points.

In order to provide information about the geographic distribution of wanted signal values within the required service area, additional results should be available from the software:

– a listing should be available giving, for each of the available bands, the basic circuit reliability (BCR) for each of the test points (from the set of 911 test points) inside the required service area.

In some cases, a graphical display of the BCR values throughout the required service area may be desirable. These values should be calculated at test points at 2° intervals of latitude and longitude throughout the required service area.

The BCR values should be displayed graphically as a set of coloured or hatched "pixels" scaled in steps of 10%. It should be noted that:

– reliability values relate to the use of a single frequency band;

– reliability values are a function of the desired RF signal-to-noise ratio (user selectable);

– the field-strength values should be calculated by the supplied software on the user's own computer hardware. The software supplied should calculate the relevant reliability values based on these field-strength values and the user-supplied desired RF signal-to-noise values.

DESCRIPTION 2

Time sequence for the Procedure

In the sequence outlined below, the start date for a given schedule period is defined as D and the end date for the same schedule period is defined as E.

Date	Action
D – 4 months	Closing date for administrations to send their schedules[1] to the Radiocommunication Bureau (Bureau), preferably by electronic mail or on 3.5" diskette (720 kbytes or 1.44 Mbytes). Schedule data will be made available via TIES as soon as it has been processed.
D – 2 months	Bureau to send to administrations a consolidated schedule (the Tentative Schedule) together with a complete compatibility analysis[2].
D – 2 weeks	Closing date for receipt of amendments from administrations to correct errors and other changes resulting from the coordination process to ensure that this information appears in the Schedule for date D.
D	Bureau to issue the High Frequency Broadcasting Schedule and compatibility analysis.
D to E	Administrations to correct errors and coordinate in-season changes of requirements, sending information to the Bureau as it becomes available. Bureau to issue updates of the Schedule and compatibility analysis at intervals of two months.
E	Closing date for receipt of final operational schedules from administrations to Bureau. No input is needed if there have been no changes to the information previously sent.
E + 1 month	Bureau to send to administrations the final consolidated schedule (the Final Schedule) together with a compatibility analysis.

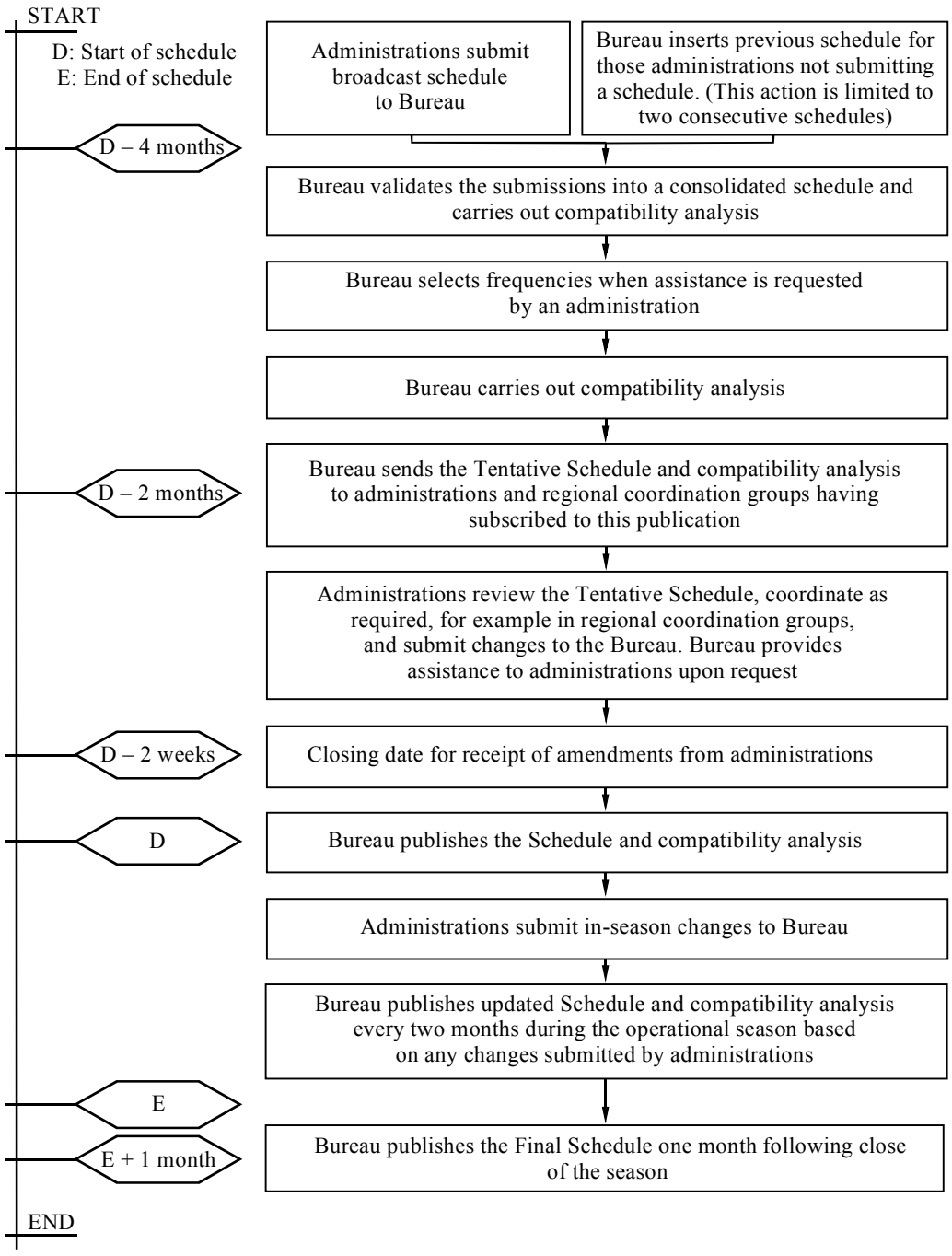
Figure 1 shows, in flow chart form, the time sequence for the Procedure.

[1] See Description 3.

[2] See Description 4. The schedules and the results of the analyses should be available on CD-ROM and in TIES.

FIGURE 1

Time sequence for the Procedure



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DESCRIPTION 3

Specification of input data for a requirement

The fields needed for a given requirement and their specifications are:

– frequency in kHz, up to 5-digit integer;

– start time, as 4-digit integer;

– stop time, as 4-digit integer;

– target service area, as a set of up to 12 CIRAF zones and quadrants up to a maximum of 30 characters;

– site code, a 3-character code from a list of codes, or a site name and its geographic coordinates;

– power in kW, up to 4-digit integer;

– azimuth of maximum radiation;

– slew angle, up to 2-digit integer representing the difference between the azimuth of maximum radiation and the direction of unslewed radiation;

– antenna code, up to 3-digit integer from a list of values, or a full antenna description, as given in Recommendation ITU-R BS.705;

– days of operation;

– start date, in the case that the requirement starts after the start of the schedule;

– stop date, in the case that the requirement stops before the end of the schedule;

– modulation choice, to specify if the requirement is to use double-side band (DSB) or single-side band (SSB) (see Recommendation ITU-R BS.640). This field may be used to identify any other type of modulation when this has been defined for use by HFBC in an ITU-R Recommendation;

– administration code;

– broadcasting organization code;

– identification number;

– identification of synchronization with other requirements.

DESCRIPTION 4

Compatibility analysis

General

In order to assess the performance of each requirement in the presence of noise and of the potential interference from other requirements using the same or adjacent channels, it is necessary to calculate the relevant reliability values. To this end, the Bureau will prepare suitable software, taking account of user requirements in terms of desired signal-to-noise and signal-to-interference ratios.

Input data

The schedule for a given season - this may be either an initial consolidated schedule (to permit assessment of those requirements which need coordination) or the High Frequency Broadcasting Schedule (to permit assessment of the likely performance of requirements during the relevant season).

Methodology and data

The software should use:

– Recommendation ITU-R BS.705 for the calculation of antenna patterns;

– Recommendation ITU-R P.533 for the prediction of the wanted field strength values at each test point for each wanted requirement;

– Recommendation ITU-R P.533 for the prediction of the potentially interfering field-strength values from all other co-channel or adjacent channel requirements at each test point for each wanted requirement;

– Recommendations **517 (HFBC-87)** and ITU-R BS.560 for adjacent channel RF protection ratios;

– Recommendation ITU-R P.842 for the calculation of reliability values.

The set of 911 test points (agreed at WARC HFBC-87) should be used, supplemented where necessary with test points based on a geographic grid.

The software should calculate the wanted and unwanted field-strength values and the fading margins at each test point inside the required service area.

The desired RF signal-to-noise and RF protection ratios should be user selectable, the default values being 34 dB and 17 dB (co-channel case), respectively. The latter values should be used by the Bureau for its compatibility analyses.

The dates for which a compatibility analysis is made should be user selectable, the default values being:

– 0.5 month after the start of the season;

– mid-point of the season;

– 0.5 month before the end of the season.

These default values should be used by the Bureau for its compatibility analyses.

The times for which a compatibility analysis is made should be user selectable, the default values being:

– 30 min past the hour in which the requirement starts;

– 30 min past each successive hour until the hour in which the requirement ends.

These default values should be used by the Bureau for its compatibility analyses.

Software output data

For rapid assessment of the performance of a requirement, the software should calculate:

– the overall service reliability for the relevant test points from the set of 911 test points;

– the overall area reliability for the relevant test points from the set of 911 test points.

In order to provide information about the geographic distribution of wanted and unwanted signal values for a given requirement, additional results should be available from the software:

– a listing should be available giving the overall circuit reliability for each of the relevant test points from the set of 911 test points.

In some cases, a graphical display of the coverage achieved throughout a required service area may be desirable. These values will need to be calculated by the user (with the supplied software and on the user's own computer hardware) at test points at 2° intervals of latitude and longitude throughout the required service area. The values should be displayed graphically as a set of coloured or hatched pixels in steps of 10%. It should be noted that:

– reliability values relate to the use of a single frequency;

– reliability values are a function of the desired RF signal-to-noise and RF protection ratios (both user selectable);

– the field-strength values for the test points (from the set of 911 test points) inside the required service area should be calculated by the Bureau. The software supplied should calculate the relevant reliability values based on these pre-calculated field strength values and the user-supplied desired signal-to-noise and signal-to-interference values;

– the field-strength values for the test points at 2° intervals should be calculated using the supplied software on the user's own computer hardware. The software supplied should calculate the relevant reliability values based on these field strength values and the user-supplied desired signal-to-noise and signal-to-interference values.

RESOLUTION 536 (WRC-97)

Operation of broadcasting satellites serving other countries

The World Radiocommunication Conference (Geneva, 1997),

considering

a) the institutional nature of the ITU which is founded on an agreement between its Member States;

b) the treaty status of the Plans in Appendices **30** and **30A**;

c) that these Plans were established on the basis of planning principles which included, *inter alia*, that the Plans should be based mainly on national coverage;

d) the increasing number of applications under Article 4 of Appendices **30** and **30A** for modifications to the Plans, leading to many multinational systems;

e) that No. **23.13** requires that "In devising the characteristics of a space station in the broadcasting-satellite service, all technical means available shall be used to reduce, to the maximum, the radiation over the territory of other countries unless an agreement has been previously reached with such countries",

recognizing

a) that current technology provides opportunities to implement broadcasting-satellite systems with service areas that exceed national coverage;

b) that several such systems have been implemented and others are being planned;

c) that successful Appendices **30** and **30A** Article 4 coordination of such systems does not in any way imply licensing authorization to provide a service within the territory of a Member States,

resolves

that, in addition to observing No. **23.13**, and before providing satellite broadcasting services to other administrations, administrations originating the services should obtain the agreement of those other administrations.

RESOLUTION 537 (WRC-97)

Survey of HF broadcasting transmitter and receiver statistics as called for in Resolution 517 (Rev.WRC-97)

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that Resolution **517 (Rev.WRC-97)** provides for the replacement, by 31 December 2015, of double-sideband (DSB) emissions in the HF bands between 5 900 kHz and 26 100 kHz allocated to the broadcasting service;

b) that Resolution **517 (Rev.WRC-97)** resolves that the date in *considering a)* shall be periodically reviewed by competent future world radiocommunication conferences in the light of the latest available complete statistics on the worldwide distribution of single-sideband (SSB) and other spectrum-efficient modulation technique transmitters and receivers;

c) that ITU-R is studying Question ITU-R 217/10 "Digital Broadcasting at Frequencies Below 30 MHz" and Question ITU-R 224-1/3 "The Prediction of System Performance and Reliability for Digital Modulation Techniques at HF",

noting

a) that Recommendation **515 (Rev.WRC-97)** recommended that new transmitters installed after 31 December 1990 be capable of operating in SSB mode;

b) that Recommendation **515 (Rev.WRC-97)** invited administrations to encourage receiver manufacturers to begin producing low-cost receivers capable of receiving DSB and SSB broadcasting emissions by 31 December 1990,

recognizing

a) that there is insufficient information on the availability and use of HF broadcasting SSB transmitters and receivers;

b) that broadcasters, unlike most users of other radiocommunication services, have no control over the receivers used by their listeners;

c) that activity is continuing on the development of digital modulation systems for recommendation by ITU-R,

resolves

that the first survey of transmitter and receiver statistics called for in Resolution **517 (Rev.WRC-97)** should be conducted as a matter of urgency, such that its results will be available to WRC-01* for consideration.

* *Note by the Secretariat:* This Conference will be held in 2003.

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. **5.418** 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. **9.11**;

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 Radiocommunication 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 **4** 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	dB(W/(m^2 · MHz))	for $0° \le \theta \le 5°$
$-128 + 0.75\ (\theta - 5)$	dB(W/(m^2 · MHz))	for $5° < \theta \le 25°$
-113	dB(W/(m^2 · 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 **4** 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. **5.418A**, **5.418B** and **5.418C**, as well as No. **5.418**, 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. **5.418A**, **5.418B** and **5.418C**;

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 **4** 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 30 and 30A and in the associated provisions of Articles 9 and 11

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 **30** and **30A**, respectively;

b) that this Conference has adopted revisions to the sharing criteria contained in Annex 1 to Appendix **30** 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 **30A** and replaced it with the method contained in Appendix **7**;

d) that this Conference has modified the criteria in § 1 of Annex 4 to Appendix **30A** 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 **30** 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 **30** 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 **30** and **30A** 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 **30** and **30A**, and the associated provisions in Articles **9** and **11** 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 **30** and **30A**;

b) the need to protect existing and future terrestrial and space services and systems,

noting

that the Radiocommunication 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 **30** 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 · 27 MHz)) and -160 dB(W/(m^2 · 4 kHz)) criteria appearing in the third paragraph of § 6 of Annex 1 to Appendix **30**;

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 **30** and Annexes 1 and 4 to Appendix **30A**, 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 **30** and **30A** 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 **30** and **30A**, including related modifications to Articles **9** and **11** and the associated Appendix **5**,

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 **30** 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 30[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° ≤ θ < 0.054°
–137.46 + 17.74 log θ dB(W/(m^2 · 27 MHz))	for 0.054° ≤ θ < 3.67°
–141.56 + 25 log θ dB(W/(m^2 · 27 MHz))	for 3.67° ≤ θ < 11.54°
–115 dB(W/(m^2 · 27 MHz))	for 11.54° ≤ θ

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 **30** and Appendix **30A** 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 $0° \le \theta < 0.054°$
$-137.46 + 17.74 \log \theta$ dB(W/(m^2 · 27 MHz))	for $0.054° \le \theta < 3.67°$
$-141.56 + 25 \log \theta$ dB(W/(m^2 · 27 MHz))	for $3.67° \le \theta < 16.69°$
-111 dB(W/(m^2 · 27 MHz))	for $16.69° \le \theta$

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 $0° \le \theta < 0.054°$
$-137.46 + 17.74 \log \theta$ dB(W/(m^2 · 27 MHz))	for $0.054° \le \theta < 3.67°$
$-141.56 + 25 \log \theta$ dB(W/(m^2 · 27 MHz))	for $3.67° \le \theta < 11.54°$
-115 dB(W/(m^2 · 27 MHz))	for $11.54° \le \theta$

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 30 and 30A

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 **30** and **30A**;

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 **30** and **30A** 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 **30** and **30A** 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 30 and 30A 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 **30** and **30A**;

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 **30** and Article 9A of Appendix **30A**,

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 **30** and **30A** 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 **30** (Recommendation ITU-R BO.1445)
R13TSS	Figure 9 and § 3.13.3 in Annex 5 of Appendix **30**
R123FR	Figure 11 and § 3.13.3 in Annex 5 of Appendix **30**

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 **30**
MODRES	Figure 7*bis* and § 3.7.2 in Annex 5 of Appendix **30** (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 **30** 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 **30** 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 **30** 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

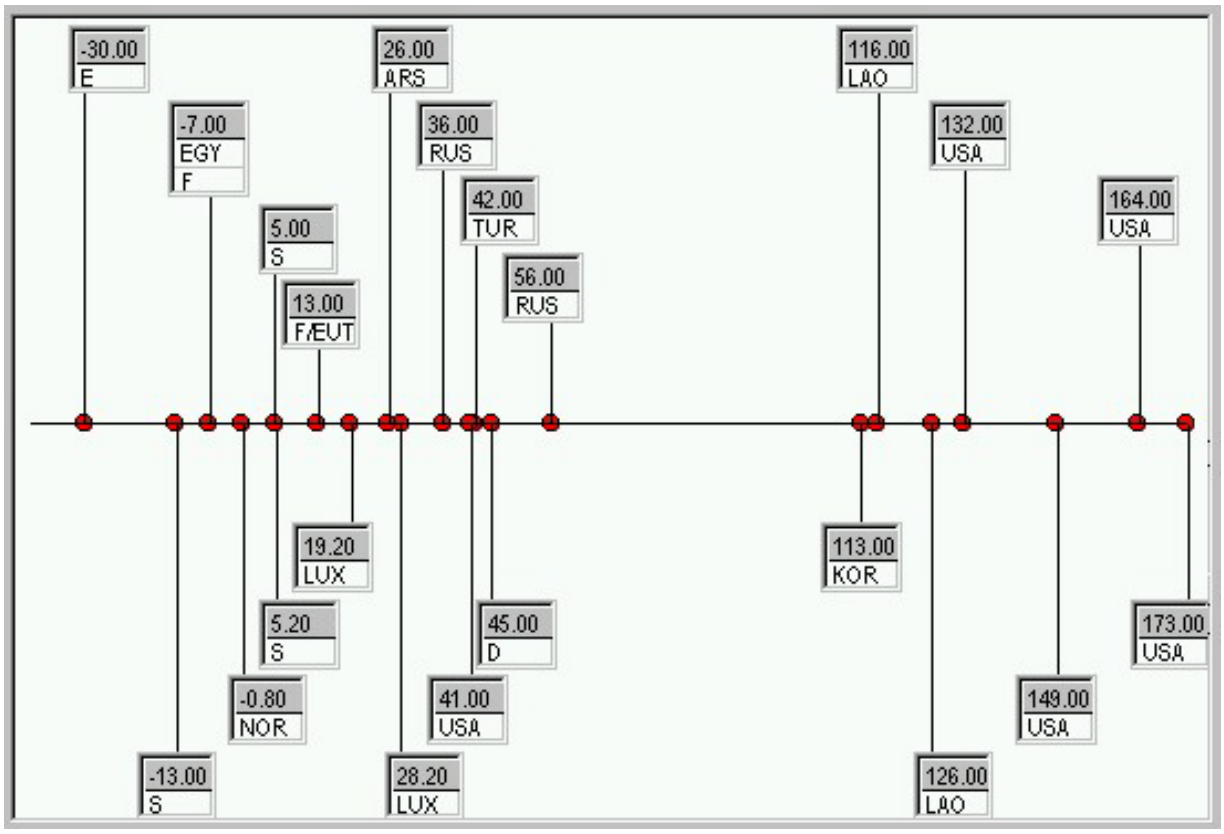
1 The Administrations of Egypt and France declared a bilateral temporary agreement with respect to the coordination of the satellite network NILESAT-1S for a specified period until 1 January 2002. The mentioned Administrations have also requested the Radiocommunication Bureau to group at 7° W for this 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 **30** (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)



RES542-01

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	D33N11S1	-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	D33N11S2	-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 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	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	
-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	
-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		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	
-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		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	
-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		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	
-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		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	
-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		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		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		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
-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
-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

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
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		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		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		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		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		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		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		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		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		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		
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		
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		
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 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
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		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		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		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		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		-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		-0.6																				
E	-30.00	HI33D3B2	max																					-7.5		-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		-10.7		-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		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		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		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		-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		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		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																

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 *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 of Appendix **30A**
R123FR	Figure C and § 3.7.3 in Annex 3 of Appendix **30A**
MODRSS	Figure B (curves A′, B′ and C) and § 3.7.3 in Annex 3 of Appendix **30** (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 **30A**
MODTES	Figure A (Curves A′ and B′) and § 3.5.3 in Annex 3 of Appendix **30A** (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 **30A** 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 **30A** 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, the 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.

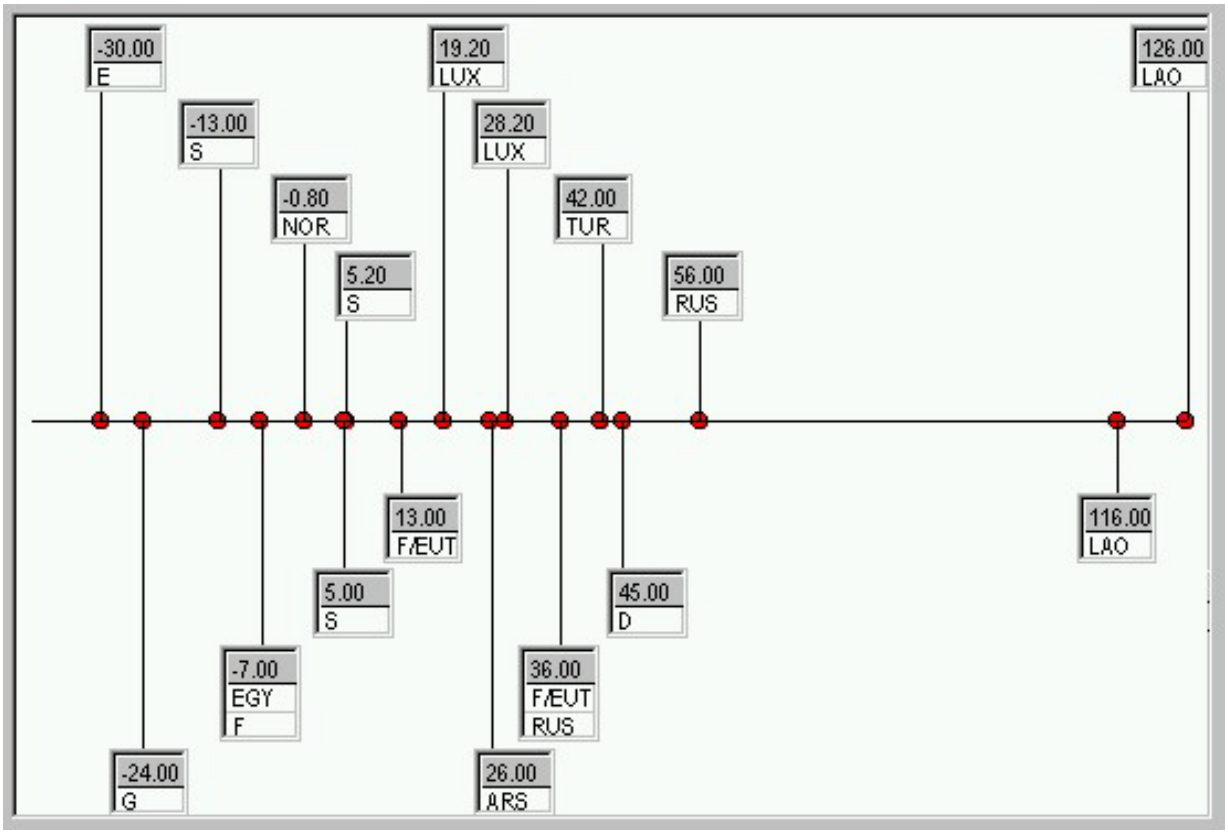
6 EUTELSAT declared that the EUTELSAT B-36E satellite network is using specific feeder-link earth stations not located in the region of the service area that is subject to the coordination with the terrestrial services located in the territory of Egypt. The use of any additional feeder-link earth station, 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 **30A** (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)

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	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

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	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

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	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

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	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

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	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 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	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 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	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			
-0.80	NOR	BIFROS22	CL		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
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	
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
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	
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
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	
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
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	
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
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
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		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	
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		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	
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
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

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 602 (Mob-87)

Data transmission from maritime radiobeacons for differential radionavigation systems

The World Administrative Radio Conference for the Mobile Services (Geneva, 1987),

considering

a) that No. **5.73**/**466** of the Radio Regulations (edition of 1990, revised in 1994) provides for the transmission of supplementary navigational information using narrow-band techniques, on condition that the prime function of the beacon is not significantly degraded[1];

b) that the International Maritime Organization (IMO) has identified a need for data exchange between shore and ship in the case of radionavigation systems (e.g., Omega, GPS, Loran-C) operating in the differential mode;

c) that Resolution 3 of the Regional Administrative Conference for the Planning of the Maritime Radionavigation Service (Radiobeacons) in the European Maritime Area (Geneva, 1985) (EMA) invited this Conference to consider the various aspects of the use of maritime radiobeacons to transmit data to ships using either minimum shift keying (MSK) or frequency shift keying (FSK) techniques, and to choose between these two techniques;

d) that ITU-R studies have shown that, for continuous data transmission, it is necessary to use a second carrier, offset from the main carrier by 300 Hz or more, to prevent interference to certain types of automatic radio direction finders, regardless of whether MSK or FSK modulation is chosen;

e) that these studies have shown that MSK modulation has advantages over FSK modulation because of its improved spectral efficiency;

f) that the EMA Conference decided that radiobeacons in the European Maritime Area would be channelled in multiples of 500 Hz;

g) that if FSK or MSK modulation with an offset of 300 Hz or more is encoded on to a radiobeacon signal in the European Maritime Area, then the digital modulation signal will be contained partly in the channel adjacent to the radiobeacon channel, particularly in the case of high-speed data transmission;

h) that many administrations prefer the use of MSK modulation;

i) that the satellite system data corrections have to be transmitted on a continuous basis,

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[1] *Note by the Secretariat*: WRC-97 modified No. **5.73** (formerly No. **466**) and specified the relevant conditions differently.

resolves

1 that the frequency for continuous data transmission to ships using FSK or MSK modulation on maritime radiobeacons should be offset from the radiobeacon main carrier frequency by an amount sufficient to ensure that no harmful interference is caused to automatic radio direction finders;

2 that the ITU-R should continue to study the technical factors, including a standard coding format, modulation method, necessary bandwidth, protection ratios and frequency offsets, such that the prime function of the radiobeacon is not significantly degraded, and make Recommendations;

3 that channelling plans for maritime radiobeacons should accommodate the transmission of data to ships using frequency offset techniques,

invites the Radio Regulations Board

to consider this Resolution in preparing its technical standards and rules of procedure,

invites

the Member States in the European Maritime Area to consider convening a competent regional radiocommunication conference concerning a possible revision of the Regional Agreement (Geneva, 1985) for the purpose of accommodating continuous data transmission using frequency offset techniques.

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. **5.444**;

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. **5.443B** 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. **5.443B** 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. **5.443B**, in addition to the relevant characteristics listed in Appendix **4**,

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. **5.443B** 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. **5.328A**,

resolves

1 that the provisional pfd limit given in No. **5.328A** 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. **5.328A**, in addition to the relevant characteristics listed in Appendix **4**,

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. **5.328A** 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. **5.331** 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 641 (Rev.HFBC-87)

Use of the frequency band 7 000-7 100 kHz

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1987),

considering

a) that the sharing of frequency bands by the amateur and broadcasting services is undesirable and should be avoided;

b) that it is desirable to have world-wide exclusive allocations for these services in band 7;

c) that the band 7 000-7 100 kHz is allocated on a world-wide basis exclusively to the amateur service,

resolves

that the broadcasting service shall be prohibited in the band 7 000-7 100 kHz and that the broadcasting stations operating on frequencies in this band shall cease such operation,

urges

the administrations responsible for the broadcasting stations operating on frequencies in the band 7 000-7 100 kHz to take the necessary steps to ensure that such operation ceases immediately,

instructs the Secretary-General

to bring this Resolution to the attention of administrations.

RESOLUTION 642

Relating to the bringing into use of earth stations in the amateur-satellite service

The World Administrative Radio Conference (Geneva, 1979),

recognizing

that the procedures of Articles **9** and **11** are applicable to the amateur-satellite service,

recognizing further

a) that the characteristics of earth stations in the amateur-satellite service vary widely;

b) that space stations in the amateur-satellite service are intended for multiple access by amateur earth stations in all countries;

c) that coordination among stations in the amateur and amateur-satellite services is accomplished without the need for formal procedures;

d) that the burden of terminating any harmful interference is placed upon the administration authorizing a space station in the amateur-satellite service pursuant to the provisions of No. **25.11**,

notes

that certain information specified in Appendix **4** cannot reasonably be provided for earth stations in the amateur-satellite service,

resolves

1 that when an administration (or one acting on behalf of a group of named administrations) intends to establish a satellite system in the amateur-satellite service and wishes to publish information with respect to earth stations in that system it may:

1.1 communicate to the Radiocommunication Bureau all or part of the information listed in Appendix **4**; the Bureau shall publish such information in a Special Section of its BR IFIC requesting comments to be communicated within a period of four months after the date of publication;

1.2 notify under Nos. **11.2** to **11.8** all or part of the information listed in Appendix **4**; the Bureau shall record it in a special list;

2 that this information shall include at least the characteristics of a typical amateur earth station in the amateur-satellite service having the facility to transmit signals to the space station to initiate, modify, or terminate the functions of the space station.

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[1]

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

a) that, in frequency bands shared with equal rights by space radiocommunication and terrestrial radiocommunication services, it is necessary to impose certain technical limitations and coordination procedures on each of the sharing services for the purpose of limiting mutual interference;

b) that, in frequency bands shared by space stations located on geostationary satellites, it is necessary to impose coordination procedures for the purpose of limiting mutual interference;

c) that the calculation methods and interference criteria relating to coordination procedures referred to in *considering a)* and *b)* are based upon ITU-R Recommendations;

d) that, in recognition of the successful sharing of the frequency bands by space radiocommunication and terrestrial radiocommunication services, and the continuing improvements in space technology and that of the Earth segment, each Radiocommunication Assembly has improved upon some of the technical criteria recommended by the preceding Assembly;

e) that the ITU Radiocommunication Assembly has approved a procedure for approving Recommendations between Radiocommunication Assemblies;

f) that the Constitution recognizes the right of Member States to make special arrangements on telecommunication matters; however, such arrangements shall not be in conflict with the terms of the Constitution, Convention or of the Regulations annexed thereto as far as harmful interference to the radio services of other countries is concerned,

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* 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.

1 WRC-97 made editorial amendments to this Resolution.

is of the opinion

a) that future decisions of the ITU-R are likely to make further changes in the recommended calculation methods and interference criteria;

b) that administrations should receive advance information of the drafts of the relevant ITU-R Recommendations;

c) that the administrations should whenever possible apply the current ITU-R Recommendations on sharing criteria when planning systems for use in frequency bands shared with equal rights between space radiocommunication and terrestrial radiocommunication services, or between space radiocommunication services,

invites Administrations

to submit contributions to the Radiocommunication Study Groups, providing information on practical results and experience of sharing between terrestrial and space radiocommunication services or between space services, which help to bring about significant improvements in coordination procedures, calculation methods and harmful interference thresholds, and thereby to optimize the available orbit/spectrum resources,

resolves

1 that the Director of the Radiocommunication Bureau, in consultation with Study Group Chairmen, shall prepare a list identifying the relevant parts of new or revised Recommendations approved by the ITU-R affecting the calculation methods and the interference criteria and also those specific sections of the Radio Regulations to which they are applicable, relating to sharing between space radiocommunication and terrestrial radiocommunication services, or between space radiocommunication services. This list shall be prepared within thirty days following the approval of these Recommendations;

2 that the Director of the Radiocommunication Bureau shall forward this list and the appropriate texts to all administrations within thirty days, asking them to indicate within four months those ITU-R Recommendations or specific technical criteria defined in the Recommendations referred to in *resolves* 1 to which they agree for use in the application of the pertinent provisions of the Radio Regulations;

3 that, should an administration, in its reply to the consultation conducted by the Director of the Radiocommunication Bureau under *resolves* 2, indicate that certain ITU-R Recommendations or technical criteria defined in those Recommendations are unacceptable, the relevant calculation methods and the interference criteria defined in the Radio Regulations shall continue to apply with respect to cases involving that administration;

4 that the Bureau shall publish, for the information of all administrations, a list based on the replies to the enquiry, of the ITU-R Recommendations or of the relevant calculation methods and the interference criteria defined in those Recommendations, indicating the administrations to which each of those Recommendations or relevant technical criteria are acceptable or are not and the administrations which did not reply;

5 that the administrations which do not reply within four months to the consultation conducted by the Director of the Radiocommunication Bureau under *resolves* 2 should, however, inform the Director of their decision on the application of these Recommendations under the relevant provisions of the Radio Regulations at a later stage;

6 that the Bureau shall take into account:

a) the applicability of the ITU-R calculation methods and interference criteria when making technical examinations with respect to cases involving only administrations to which such methods and criteria are acceptable;

b) the applicability of the calculation methods and interference criteria defined in the Radio Regulations in accordance with the list referred to in *resolves* 4, when making technical examinations with respect to cases involving the administrations which did not accept or did not reply to the consultation conducted by the Bureau under *resolves* 2.

RESOLUTION 705 (Mob-87)

Mutual protection of radio services operating in the band 70-130 kHz

The World Administrative Radio Conference for the Mobile Services (Geneva, 1987),

considering

a) that various radio services, including radionavigation systems used by maritime and aeronautical services, operate in frequency bands between 70 and 130 kHz;

b) that, radionavigation being a safety service, all practical steps consistent with the Radio Regulations should be taken to prevent harmful interference to any radionavigation system;

c) that the ITU-R has noted that users of phased pulse radionavigation systems in the band 90-110 kHz receive no protection outside the band, yet may receive benefit from their signals outside the occupied bandwidth,

noting

that ITU-R studies show:

– that for continuous wave radionavigation systems in the frequency bands 70-90 kHz and 110-130 kHz, the protection ratio should be 15 dB within the receiver passband of ±7 Hz at 3 dB;

– that phased pulse radionavigation systems require a 15 dB protection ratio within the band 90-110 kHz;

– that these pulse radionavigation systems would be aided by protection ratios of 5 dB and 0 dB for frequency separations between wanted and interfering signal of 10-15 kHz and 15-20 kHz, respectively,

further noting

that the ITU-R has recommended the exchange of information between authorities operating radionavigation systems in the band 90-110 kHz and those operating other systems in the band 70-130 kHz employing emissions of very high stability,

recognizing

a) that radio services other than radionavigation operating in the bands 70-90 kHz and 110-130 kHz fulfil essential functions that may be affected;

b) the provisions of Nos. **4.5**, **4.10**, **5.60** and **5.62**,

resolves that administrations

1 in assigning frequencies to services in the bands 70-90 kHz, 90-110 kHz and 110-130 kHz, consider the potential mutual impairment to other stations operating in accordance with the Table of Frequency Allocations and apply protective measures;

2 use the relevant ITU-R Recommendations and encourage the exchange of information between authorities operating radionavigation systems in the band 90-110 kHz and those operating other systems in the band 70-130 kHz employing emissions of very high stability, to assist in preventing potential interference problems;

3 encourage consultation, both nationally and internationally, between operators of radionavigation systems using the band 90-110 kHz and of other systems using the band 70-130 kHz,

requests the ITU-R

to continue studies in this matter, particularly the development of technical criteria and standards to permit compatible operations within the allocated bands and to assist in developing the list of contacts of system operators,

invites

1 the Council to place this matter on the agenda of the next competent world radiocommunication conference, in order to establish technical criteria for the harmonious operation of the services in the bands between 70-130 kHz;

2 the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO), the International Association of Lighthouse Authorities (IALA), the Bureau international de l'heure (BIH)* and national authorities to provide the Union with information pertaining to the potential impairment of systems operating in the bands 70-90 kHz, 90-110 kHz and 110-130 kHz, together with their views and proposals resulting therefrom.

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* *Note by the General Secretariat:* The 18th General Conference of the "Bureau international des poids et des mesures (BIPM)", 12-15 October 1987, adopted a Resolution transferring the responsibility of establishing the International Atomic Time (TAI) from the BIH to the BIPM.

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 715 (Rev.WRC-97)

Studies concerning sharing between the radionavigation-satellite service and the mobile-satellite service in the bands 149.9-150.05 MHz and 399.9-400.05 MHz

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the bands 149.9-150.05 MHz and 399.9-400.05 MHz are allocated to and used by the radionavigation-satellite service (RNSS) on a primary basis;

b) that this Conference allocated the bands 149.9-150.05 MHz and 399.9-400.05 MHz (Earth-to-space) to the mobile-satellite service (MSS) on a primary basis;

c) that requirements of the RNSS and the MSS should be met in these frequency bands;

d) that there may be difficulties in the sharing between the RNSS and the MSS, and studies are being carried out by ITU-R;

e) that there is a need for further study of the operational and technical means to facilitate sharing between the RNSS and the MSS (in the Earth-to-space and space-to-Earth directions) in these bands,

recognizing

that No. **4.10** applies to the use of these bands by the RNSS,

resolves

to invite ITU-R to continue to carry out studies in order to finalize Recommendations which identify the operational and technical measures necessary to facilitate sharing between the MSS and the RNSS,

urges administrations

to participate in such studies by submitting contributions to ITU-R relating to the above-mentioned studies as soon as possible.

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 (MSS) 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 MSS, in accordance with the provisions of Nos. **5.389A**, **5.389C** and **5.389D** 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 MSS is subject to coordination with the mobile service under the provisions of Resolution **46 (Rev.WRC-97)** or No. **9.11A**, 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. **9.11A**, 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;

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[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. **11.17** 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. **5.460**;

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 724 (WRC-97)

Use of the frequency band 5 250-5 350 MHz by spaceborne active sensors

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the frequency band 5 250-5 350 MHz is allocated to the radiolocation service on a primary basis;

b) that the frequency band 5 250-5 350 MHz is also allocated to the Earth exploration-satellite (active) and the space research (active) services on a primary basis;

c) that the Report of the Conference Preparatory Meeting to this Conference concluded that terrestrial radars would not cause unacceptable interference to synthetic aperture radars, scatterometers or altimeters, and that active spaceborne sensors and radiolocation systems are compatible provided that spaceborne-synthetic aperture radar and scatterometer design parameters are appropriately selected to ensure compatibility with radiolocation systems;

d) that guidelines for the appropriate selection of these parameters are contained in Recommendation ITU-R SA.1280;

e) that spaceborne sensors have operated in this frequency band since 1991 with no known reports of interference;

f) that many administrations have radiolocation systems operating in this band,

resolves

1 to invite ITU-R to study, as a matter of urgency, specific sharing criteria and emission characteristics for spaceborne active sensors operating in this frequency band, which may be added to Recommendation ITU-R SA.1280;

2 that when developing spaceborne active sensors operating in this frequency band, administrations should take into account the guidelines for the design of spaceborne active sensors found in Recommendation ITU-R SA.1280.

RESOLUTION 725 (WRC-97)

Use of the frequency band 5 350-5 460 MHz by spaceborne active sensors

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the frequency band 5 350-5 460 MHz is allocated to the aeronautical radionavigation service on a primary basis;

b) that the frequency band 5 350-5 460 MHz is also allocated to the Earth exploration-satellite (active) service on a primary basis;

c) that the Report of the Conference Preparatory Meeting (CPM) to this Conference concluded that spaceborne altimeters and aeronautical radionavigation systems are compatible in this frequency band;

d) that the Report of the CPM to this Conference concluded that spaceborne synthetic aperture radars and airborne weather radars operating in the aeronautical radionavigation service are compatible in this frequency band;

e) that guidelines for the appropriate selection of design parameters of active spaceborne sensors are contained in Recommendation ITU-R SA.1280,

resolves

to invite ITU-R to study specific sharing criteria and emission characteristics for spaceborne active sensors operating in the frequency band 5 350-5 460 MHz, with a view to providing further guidance on the matter of compatibility with aeronautical radionavigation systems which will assist in the design of spaceborne active sensors and may add to Recommendation ITU-R SA.1280.

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;

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* *Note by the Secretariat*: Radiocommunication Study Group 1 has transferred Recommendation ITU-R IS.851-1 from the IS Series to the SM Series, its new denomination is ITU-R SM.851-1.

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 729 (WRC-97)

Use of frequency adaptive systems in the MF and HF bands

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the efficiency of spectrum use will be improved by the use of frequency adaptive systems in the MF and HF bands shared by the fixed and the mobile services;

b) that trials of frequency adaptive systems which have been undertaken during the past 20 years have demonstrated the feasibility of such systems and their improved spectrum efficiency;

c) that such improved efficiency is attained through:

– shorter call set-up and improved transmission quality by selection of the most suitable assigned channels;

– reduced channel occupancy, permitting the same channels to be used by different networks, yet decreasing the probability of harmful interference;

– minimization of the transmitter power required for each transmission;

– continued optimization of the emissions owing to the sophistication of the systems;

– simple operation by the use of intelligent peripheral equipment;

– reduced need for skilled radio operators;

d) that following Resolution **23 (WRC-95)**[*], the Radiocommunication Bureau no longer undertakes examination with respect to the probability of harmful interference caused by new assignments recorded in the Master International Frequency Register (MIFR) in the non-planned bands below 28 MHz;

e) that frequency adaptive systems will actively contribute to the avoidance of interference since, when other signals are observed on the channel, the frequency adaptive system will move to another frequency,

resolves

1 that, in authorizing the operation of frequency adaptive systems in the MF and HF bands, administrations shall:

1.1 make assignments in the bands allocated to the fixed and mobile services;

[*] *Note by the Secretariat*: This Resolution was abrogated by WRC-2000.

1.2 not make assignments in the bands:

- allocated exclusively to the maritime or aeronautical mobile (R) services;
- shared on a co-primary basis with the broadcasting service, radiodetermination service or the amateur services;
- allocated to radio astronomy;

1.3 avoid use which may affect frequency assignments involving safety services made in accordance with Nos. **5.155**, **5.155A** and **5.155B**;

1.4 take into account any footnotes applicable to the proposed bands and the implications regarding compatibility;

2 that frequency adaptive systems shall automatically limit simultaneous use of frequencies to the minimum necessary for communication requirements;

3 that, with a view to avoiding harmful interference, the system should evaluate the channel occupancy prior to and during operation;

4 that frequency adaptive systems shall be notified to the Bureau in accordance with the provisions of Article **11**,

invites ITU-R

1 to pursue its studies on the subject (see, for example, Questions ITU-R 204-1/1, ITU-R 147-1/9, ITU-R 205/9 or ITU-R 214/9) with a view to achieving optimum operational performance and compatibility;

2 to report on the results of these studies to a future world radiocommunication conference,

instructs the Director of the Radiocommunication Bureau

to make the necessary arrangements, as soon as practicable, for the notification of frequency assignments to adaptive systems and for their recording in the MIFR, taking into account the studies already undertaken.

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. **5.551A** 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. **5.551A** 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 **5** 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 **5** 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. **5.502**;

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. **5.503**;

e) that, in some countries, the band is also allocated to the fixed service and the mobile service (Nos. **5.499** and **5.500**) and to the radionavigation service (No. **5.501**);

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. **5.502** and **5.503**, with a view to reviewing the constraints in No. **5.502** 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. **5.502** and **5.503**.

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. **9.17** and **9.17A** and the associated provisions in Article **11** 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. **9.19**;

d) that No. **9.19** 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. **9.19** 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 **7** and Annex 3 to Appendix **30** 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. **9.19**, 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 **5**);

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. **5.134** 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 **11**, 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 **25**;

1.7.2 review of the provisions of Article **19** 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 **1** to the extent required as a consequence of changes made in Article **25**;

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 **3**;

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 **13** and Resolution **331 (Rev.WRC-97)** with a view to their deletion and, if appropriate, to consider related changes to Chapter VII 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. **5.543A** 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. **5.340**;

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 **22** 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 **30** and **30A** 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. **5.388A**, 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 **25**, **26** and **27**), 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. **5.332** in respect of the frequency band 1 215-1 260 MHz and No. **5.335A** 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 (Rev.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 **18**;

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.

Recommendations

RECOMMENDATION 7 (Rev.WRC-97)

Adoption of standard forms for ship station and ship earth station licences and aircraft station and aircraft earth station licences[1]

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the standardization of the licence forms issued to stations installed on board ships and aircraft making international voyages and flights would greatly facilitate the task of inspection of such stations;

b) that standard licence forms for ship stations and for aircraft stations would serve as a useful guide to those administrations desiring to improve their existing national licences;

c) that standard licence forms could be advantageously used by these administrations as the form of certification specified in No. **18.8**,

considering further

that the Administrative Radio Conference (Geneva, 1959), formulated:

a) a set of principles for the draft of a standard licence form (see Annex 1);

b) specimens of a ship station licence and of an aircraft station licence (see Annexes 2 and 3),

considering also

changes in radio systems and shipborne radiocommunication equipment introduced in connection with the implementation of the Global Maritime Distress and Safety System (GMDSS),

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[1] Throughout this Recommendation, references to ship stations may include references to ship earth stations and references to aircraft stations may include references to aircraft earth stations.

recommends

1 that administrations which find these forms practicable and acceptable should adopt them for international use;

2 that administrations should, as far as possible, endeavour to bring their national licence forms into line with these standard forms.

ANNEX 1 TO RECOMMENDATION 7 (Rev.WRC-97)

Principles for the formulation of standard ship and aircraft station licences

The Administrative Radio Conference (Geneva, 1959), considered that, in formulating standard ship and aircraft station licences, the following set of principles should be applied:

1 The licence should, as far as possible, be prepared in tabular form, and each line and column of the table clearly numbered or lettered.

2 The licence for ship stations and the licences for aircraft stations should be as similar as possible.

3 The size of the licence should be international standard A4.

4 The licence should be designed in a form which facilitates its display on board a ship or an aircraft.

5 The licence should be printed in Latin characters in the national language of the country which issues it. Those countries whose national language cannot be written in Latin characters should use their national language and, in addition, English, Spanish or French.

6 The title “Ship Station Licence” or “Aircraft Station Licence” should appear at the top of the licence in the national language as well as in English, Spanish and French.

These principles were used in formulating the two standard forms which are given in Annexes 2 and 3.

ANNEX 2 TO RECOMMENDATION 7 (Rev.WRC-97)

(Full name of the authority issuing the licence, in the national language)

.....*

SHIP STATION LICENCE
LICENCE DE STATION DE NAVIRE
LICENCIA DE ESTACIÓN DE BARCO

No. .....
Period of validity .....

In accordance with *(Title of the National Regulation)* and with the Radio Regulations which complement the Constitution and the Convention of the International Telecommunication Union now in force, this authorization is herewith issued for the installation and for the use of the radio equipment described below:

1	2			3	4
Name of ship	Identification of the ship station			Holder of licence	Accounting authority identification code, or additional information including accounting information if required
	Call sign	MMSI	Other identification *(optional)*		

	Equipment	Type or description of equipment	Frequencies
5	Transmitters		**
6	Other equipment *(optional)*		

For the Issuing Authority:

.....
Place Date Authentication

* The words “Ship Station Licence” written in the national language, if this is not English, Spanish or French.

** Specifically or by reference to List V, columns 8 and 9.

ANNEX 3 TO RECOMMENDATION 7 (Rev.WRC-97)

(Full name of the authority issuing the licence, in the national language)

.....*

AIRCRAFT STATION LICENCE
LICENCE DE STATION D'AÉRONEF
LICENCIA DE ESTACIÓN DE AERONAVE

No. .....
Period of validity .....

In accordance with *(Title of the National Regulation)* and with the Radio Regulations which complement the Constitution and the Convention of the International Telecommunication Union now in force, this authorization is herewith issued for the installation and for the use of the radio equipment described below:

1	2	3	4
Nationality and registration mark of the aircraft	Call sign or other identification	Type of aircraft	Owner of aircraft

		a	b	c	d
	Equipment	Type	Power (W)	Class of emission	Frequency bands or assigned frequencies
5	Transmitters				**
6	Survival craft transmitters *(when applicable)*				**
7	Other equipment	*(Optional)*			

For the Issuing Authority:

.....
Place Date Authentication

* The words "Aircraft Station Licence" written in the national language, if this is not English, Spanish or French.

** Specifically or by reference.

RECOMMENDATION 8

Relating to automatic identification of stations

The World Administrative Radio Conference (Geneva, 1979),

considering

a) Article **19** which allows, where practicable, automatic identification of stations in appropriate services, and under certain circumstances;

b) that it is not always feasible or convenient to give manual identification;

c) that sources of harmful interference often remain unidentified for long periods, with consequential delay in measures that might be taken to minimize the interference;

d) that automatic identification procedures, where appropriate, may help overcome some of the disadvantages of manual identification;

e) that automatic transmission of a call sign or other signals may provide a means of identifying some stations for which identification is not always possible, e.g. radio relay and space systems;

f) the desirability of fostering a common automatic identification method to facilitate effective implementation of the provisions of Article **19**, as an alternative to the proliferation of many different systems and modulation techniques that might be used for this purpose,

recommends

that the ITU-R study the matter of automatic identification of stations with a view to recommending technical characteristics and methods of implementing a common universal system, including standard modulation techniques, for application in accordance with Article **19**, with due consideration to the needs of the different services and types of stations.

RECOMMENDATION 9

Relating to the measures to be taken to prevent the operation of broadcasting stations on board ships or aircraft outside national territories[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that the operation of broadcasting stations on board ships or aircraft outside national territories is in conflict with the provisions of Nos. **23.2** and **42.4**;

b) that such operation is contrary to the orderly use of the radio frequency spectrum and may result in chaotic conditions;

c) that the operation of such broadcasting stations may take place outside the jurisdiction of Member States, thereby making the direct application of national laws difficult;

d) that a particularly difficult legal situation arises when such broadcasting stations are operated on board ships or aircraft not duly registered in any country,

recommends

1 that administrations ask their governments to study possible means, direct or indirect, to prevent or suspend such operations and, where appropriate, take the necessary action;

2 that administrations inform the Secretary-General of the results of these studies and submit any other information which may be of general interest, so that the Secretary-General can inform Member States accordingly.

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1 WRC-97 made editorial amendments to this Recommendation.

RECOMMENDATION 14 (Mob-87)

Identification and location of special vessels, such as medical transports, by means of standard maritime radar transponders

The World Administrative Radio Conference for the Mobile Services (Geneva, 1987),

considering

a) the desirability of implementing modern techniques in standard maritime radar transponders for the identification and location of vessels at sea;

b) Provision No. **33.28** and Appendix **13** (Part A4, § 11A), which provide that the identification and location of medical transports at sea may be effected by means of appropriate standard maritime radar transponders;

c) that transponders designed to be compatible with radiolocation radars are not necessarily compatible with radars used by the maritime and aeronautical radionavigation services; nor is their coding for identification technically defined;

d) that if maritime radar transponders of the type described in ex-CCIR Report 775-2* and Recommendations ITU-R M.628-3 and ITU-R M.630, or using the technology described in Recommendation ITU-R M.824-2, were to be encoded for the identification of special vessels such as medical transports, they would probably be incompatible with most radiolocation radars,

invites the ITU-R

to study the question of the identification and location of special vessels such as medical transports by means of standard maritime radar transponders, taking into account also the technical and economic impact of their introduction,

invites administrations

to provide the ITU-R with information on this question,

requests the Council

to include this Recommendation in the agenda of the next competent world radiocommunication conference for review and, if appropriate, to amend the Radio Regulations.

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* This Report is no longer in force.

RECOMMENDATION 34 (WRC-95)

Principles for the allocation of frequency bands

The World Radiocommunication Conference (Geneva, 1995),

considering

a) that ITU should maintain an international Table of Frequency Allocations covering the usable radio-frequency spectrum;

b) that it may be desirable, in certain cases, to allocate frequency bands to the most broadly defined services in order to improve flexibility of use but without detriment to other services;

c) that the development of common worldwide allocations is desirable in order to improve and harmonize utilization of the radio-frequency spectrum;

d) that adherence to these principles for the allocation of spectrum will allow the Table of Frequency Allocations to focus on matters of regulatory significance while enabling greater flexibility in national spectrum use,

recommends that future world radiocommunication conferences

1 should, wherever possible, allocate frequency bands to the most broadly defined services with a view to providing the maximum flexibility to administrations in spectrum use, taking into account safety, technical, operational, economic and other relevant factors;

2 should, wherever possible, allocate frequency bands on a worldwide basis (aligned services, categories of service and frequency band limits) taking into account safety, technical, operational, economic and other relevant factors;

3 should take into account relevant studies by the Radiocommunication Sector and the reports of the relevant Conference Preparatory Meetings (CPM),

recommends administrations

in making proposals to world radiocommunication conferences, to take account of *recommends* 1 to 3,

instructs the Director of the Radiocommunication Bureau and requests the ITU-R study groups

1 when carrying out technical studies relating to a frequency band, to examine the compatibility of a broad definition of services with the existing utilizations and the possibility of aligning allocations on a worldwide basis, having regard to *considerings a)*, *b)*, *c)* and *d)* and *recommends* 1, 2 and 3 above;

2 to conduct these studies, where appropriate in cooperation with the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO);

3 to submit a report to future world radiocommunication conferences containing the results of these studies,

invites

the relevant CPM and Radiocommunication Study Groups to identify areas for study and to undertake the studies necessary to determine the impact on existing services of those agenda items of future world radiocommunication conferences which involve broadening the scope of existing service allocations,

instructs the Secretary-General

to communicate this Recommendation to ICAO and IMO.

RECOMMENDATION 35 (WRC-95)

Procedures for modification of a frequency allotment or assignment plan

The World Radiocommunication Conference (Geneva, 1995),

considering

a) that preceding conferences have developed plans;

b) that these plans may relate to assignments or to allotments;

c) that assignment and allotment plans fundamentally differ as to the complexity of their maintenance;

d) that, in addition to worldwide plans, regional plans exist catering for specialized needs in particular parts of the world,

considering in particular

a) that the Voluntary Group of Experts (VGE) is to be commended for undertaking the development of a procedure (Article **10**) to be applied for modification of any type of plan;

b) the difficulties presently faced by administrations, which have to be involved in the application of a large number of different procedures, and the need to reduce the number and complexity of such procedures;

c) that the question of universal applicability of one single procedure requires greater consideration than most,

noting

a) that VGE Recommendation 2/5 foresaw that WRC-97 might consider that Recommendation with respect to its possible applicability to Appendices **30** and **30A**;

b) that the VGE foresaw the need to decide upon that Recommendation before considering the applicability of Article **10**;

c) that Appendix **6** of the VGE Report, which is associated with Article **10**, would have to be developed further if Article **10** was to apply to Appendices **25**, **30** and **30A**;

d) that this Conference has developed a modified version of Article **10** aimed at resolving the aforementioned difficulties, as set out in the Annex hereto;

e) that the modification procedure for Appendix **25**, as contained in Article **16**[*] has been satisfactorily applied for several years;

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[*] *Note by the Secretariat:* Edition of 1990, revised in 1994.

f) that this Conference, in reviewing the VGE Report, has decided to incorporate the existing modification procedure for Appendix **25** within that Appendix, thereby rendering it self-contained for simplification of use;

g) that this Conference, in reviewing the VGE Report, has decided to defer to a future world radiocommunication conference the question of whether Article **10** could be applied to Appendices **30** and **30A**;

h) that, in the light of the foregoing and having regard to the VGE Report, no further action is required on Appendix **6**, and the provisions of Appendices **30** and **30A** shall continue in force;

i) that this Conference, in reviewing the VGE Report, has decided not to modify Appendices **26**, **27** and **30B**;

j) that the matter of one universal modification procedure for all plans, or all subsequent plans, has not sufficiently matured to permit a decision to be taken at this Conference,

recommends

that the plan modification procedure, contained in the Annex to this Recommendation for information purposes, be considered by future world or regional radiocommunication conferences for possible application for modification of the plans.

ANNEX TO RECOMMENDATION 35 (WRC-95)

Possible procedure for modification of a frequency allotment or assignment plan

T10.1 For the frequency allotment or assignment Plans contained in Appendices to these Regulations, the Radiocommunication Bureau shall maintain the master copies of the Plans, incorporating any agreed modifications, and shall provide such copies in an appropriate form for publication by the Secretary-General when justified by circumstances.

T10.2 Before notifying any assignment which is subject to a plan, the administration shall ensure that it is in conformity with the Plan[1]. If the assignment is not in conformity, the administration shall apply the procedure[2] to effect an appropriate modification to the Plan by seeking the agreement of the administrations, which are identified in accordance with Appendix **6**, as having planned allotments or assignments which may be affected by the proposed modification.

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[1] **T10.2.1** An assignment is subject to a Plan when it is for a station in a radiocommunication service and in a frequency band and in a geographical area covered by a Plan. An assignment is in conformity with the Plan, if it appears in the Plan, or corresponds to an allotment in the Plan, or if the procedure for modification of the Plan has been successfully applied.

[2] **T10.2.2** Where an existing Plan contains a supplementary or alternative procedure that procedure shall continue to be applied.

T10.3 A proposed modification to a Plan may consist of:

T10.4 *a)* a change in the characteristics of an entry in the Plan; or

T10.5 *b)* the inclusion of a new entry in the Plan; or

T10.6 *c)* the cancellation of an entry in the Plan.

T10.7 Before an administration proposes to include in the Plan under the provisions of No. **T10.5**, a new frequency assignment to a space station or to include in the Plan new frequency assignments to a space station whose orbital position is not designated in the Plan for this administration, all the assignments to the service area involved should normally have been brought into service or have been notified to the Bureau in accordance with the relevant provisions of the Plan. Should this not be the case, the administration concerned shall inform the Bureau of the reasons therefore.

T10.8 For the purpose of effecting a modification to a Plan, the administration concerned shall, having regard to the relevant provisions associated with the Plan, send to the Bureau the relevant information listed in Appendix **4**. This action shall be taken within the time limits specified in the relevant appendix.

T10.9 The Bureau, upon receiving the information under No. **T10.8**:

T10.10 *a)* determine in accordance with Appendix **6** the administrations whose allotments or assignments are considered to be affected;

T10.11 *b)* include their names in the information received under No. **T10.8**;

T10.12 *c)* publish the complete information in its Weekly Circular*;

T10.13 *d)* promptly inform all administrations affected of its actions and the results of its calculations, drawing their attention to the relevant Weekly Circular*.

T10.14 Following receipt of the Weekly Circular*, an administration believing that it should have been included in the list of administrations whose services are considered to be affected may, giving the technical reasons for so doing, request the Bureau to include its name. The Bureau shall study this request on the basis of Appendix **6** and the relevant Rules of Procedure. In the event that the request to be included in the list of affected administrations is accepted by the Bureau, an addendum to the publication mentioned in No. **T10.12** shall be published by the Bureau. Should the Bureau reach a negative conclusion, it shall inform the administrations concerned.

T10.15 The administration seeking agreement and those with which it is sought, *or* the Bureau, may request any additional information they consider necessary. The Bureau shall be sent copies of any such requests and the replies.

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* *Note by the Secretariat:* The Weekly Circular was replaced by the BR International Frequency Information Circular, as from 1 January 2000.

T10.16 Comments from administrations on the information published pursuant to No. **T10.12** 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. The Bureau shall inform the administration proposing the modification of the comments that have been made.

T10.17 An administration which has not notified its comments either to the administration seeking agreement or to the Bureau within a period of four months following the date of the Weekly Circular referred to in No. **T10.12** shall be understood to have agreed to the proposed modification. This time-limit may be extended by up to three months for an administration that has requested additional information under No. **T10.15** or for an administration that has requested the assistance of the Bureau under No. **T10.18**. In the latter case the Bureau shall inform the administrations concerned of this request.

T10.18 Any administration involved in this procedure may request the assistance of the Bureau in seeking agreement:

T10.19 *a)* in applying any step of this procedure;

T10.20 *b)* in carrying out any technical study necessary for the application of this procedure.

T10.21 If, following action by the Bureau in response to a request for assistance under No. **T10.18**, the Bureau receives no reply or decision within three months of its request for a decision in the matter from an administration whose agreement has been sought, the administration which requested the agreement shall be deemed to have fulfilled its obligations under this procedure. It shall also be deemed that the administration which did not give its decision has undertaken:

T10.22 that no complaint will be made in respect of harmful interference affecting the services rendered by its stations which may be caused by the use of the assignment in conformity with the proposed modification to the Plan, and

T10.23 if no comments have been received on the expiry of the periods specified in No. **T10.17**, or if agreement has been reached with the administrations which have made comments and with which agreement is necessary, or if the provisions of No. **T10.21** have been applied, the administration proposing the modification 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.

T10.24 The Bureau shall publish in a Special section of its Weekly Circular* the information received under No. **T10.23** together with the names of any administrations with which the provisions of this Article have been successfully applied. The Bureau shall then update the master copy of the Plan. The new or modified entry in the Plan shall then have the same status as others appearing in the Plan and shall be considered as being in conformity with the Plan.

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* *Note by the Secretariat:* The Weekly Circular was replaced by the BR International Frequency Information Circular, as from 1 January 2000.

T10.25 The relevant provisions of the Plan shall be applied when frequency assignments are notified to the Bureau.

T10.26 If no agreement is reached between the administrations concerned the Bureau shall carry out any study that may be requested by those administrations. The Bureau shall inform them of the results and of any recommendations it may be able to offer for a solution of the problem.

T10.27 When a proposed modification to a Plan involves developing countries, administrations shall seek all practicable solutions conducive to the economic development of the radiocommunications systems of those countries.

RECOMMENDATION 36 (WRC-97)

Role of international monitoring in reducing apparent congestion in the use of orbit and spectrum resources

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the geostationary-satellite orbit and the radio-frequency spectrum are limited natural resources and are being increasingly utilized by space services;

b) the desirability of achieving a more effective use of the geostationary-satellite orbit and radio-frequency spectrum in order to assist administrations in satisfying their requirements and, to that end, the desirability of taking steps to make the International Frequency List reflect more accurately the actual use being made of these resources;

c) that monitoring information should assist ITU-R in discharging this function;

d) that facilities for monitoring of emissions originating from space stations are expensive,

recognizing

that an international monitoring system cannot be fully effective unless it covers all areas of the world,

invites ITU-R

to study and make recommendations concerning the facilities required to provide adequate coverage of the world with a view to ensuring efficient use of resources,

invites administrations

1 to make every effort to provide monitoring facilities as envisaged in Article **16**;

2 to inform ITU-R of the extent to which they are prepared to cooperate in such monitoring programmes as may be requested by ITU-R;

3 to consider the various aspects of monitoring emissions originating from space stations to enable the provisions of Articles **21** and **22** to be applied.

RECOMMENDATION 63

Relating to the provision of formulae and examples for the calculation of necessary bandwidths[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that Appendix **1**, Section I requires that the necessary bandwidth be part of the full designation of emissions;

b) that Recommendation ITU-R SM.1138, gives a partial list of examples and formulae for the calculation of the necessary bandwidth of some typical emissions;

c) that sufficient information is not available for the determination of the K-factors used throughout the table of examples of the necessary bandwidth in Recommendation ITU-R SM.1138;

d) that, especially with regard to the efficient utilization of the radio frequency spectrum, monitoring and the notification of emissions, it is required that necessary bandwidths for the individual classes of emission be known;

e) that for reasons of simplification and international uniformity it is desirable that measurements for determining the necessary bandwidth be made as seldom as possible,

recommends that ITU-R

1 provide, from time to time, additional formulae for the determination of necessary bandwidth for common classes of emission, as well as examples to supplement those given in Recommendation ITU-R SM.1138;

2 study and provide values of supplementary *K*-factors required for the calculation of the necessary bandwidth for common classes of emission,

invites the Radiocommunication Bureau

to publish examples of such calculations in the Preface to the International Frequency List.

[1] WRC-97 made editorial amendments to this Recommendation.

RECOMMENDATION 64

Relating to protection ratios and minimum field strengths required[1]

The World Administrative Radio Conference (Geneva, 1979),

recognizing

that the available information on protection ratios and minimum field strengths required for each one of the services needs further refinement in order to permit the most efficient planning of the use of the radio frequency spectrum,

invites the ITU-R

1 to continue to study the protection ratios which define the threshold of harmful interference for the several services;

2 to continue to study the signal-to-noise ratios and the minimum field strengths required for satisfactory reception of the different classes of emission in the several services;

3 to continue the study of fading allowances for the several services;

4 to give particular attention to those studies which will assist in the further refinement of the Rules of Procedure used by the Radiocommunication Bureau.

[1] WRC-97 made editorial amendments to this Recommendation.

RECOMMENDATION 66 (Rev.WRC-2000)

Studies of the maximum permitted levels of unwanted emissions

The World Radiocommunication Conference (Istanbul, 2000),

considering

a) that Appendix **3** 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 **3** 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 **3** 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 **3** 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 **3**;

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 **3**;

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 **1**;

5 study those frequency bands and instances where, for technical or operational reasons, more stringent spurious emission limits than the general limits in Appendix **3** 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 **3** by separately identifying individual space services;

8 report the results of these studies to a competent world radiocommunication conference(s).

RECOMMENDATION 71

Relating to the standardization of the technical and operational characteristics of radio equipment[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that administrations are confronted with the necessity of allocating increasing resources to the regulation of radio equipment performance;

b) that administrations, and in particular those in developing countries, often have difficulty in providing such resources;

c) that it would be of advantage to apply, as far as practicable, any mutually agreed standards and associated type approvals;

d) that a number of international bodies including the ITU-R, International Civil Aviation Organization (ICAO), International Maritime Organization (IMO), International Special Committee on Radio Interference (CISPR) and the International Electrotechnical Commission (IEC) already provide recommendations and standards for technical and operating characteristics applicable to equipment performance and its measurement;

e) that in this context the specific requirements of developing countries have not always been taken fully into account,

recommends

1 that administrations endeavour to cooperate with a view to establishing international performance specifications and associated measuring methods that could be used as models for domestic standards for radio equipment;

2 that such international performance specifications and associated measuring methods respond to widely representative conditions including specific requirements of developing countries;

3 that, when such international performance specifications for radio equipment exist, administrations, as far as practicable, adopt these specifications as a basis for their national standards;

4 that administrations consider as far as practicable mutual acceptance for the type approval of equipment which conforms to such performance specifications.

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[1] WRC-97 made editorial amendments to this Recommendation.

RECOMMENDATION 100 (Rev.WRC-95)

Preferred frequency bands for systems using tropospheric scatter

The World Radiocommunication Conference (Geneva, 1995),

considering

a) the technical and operational difficulties pointed out by Recommendation ITU-R F.698 in the frequency bands shared by tropospheric scatter systems, space systems and other terrestrial systems;

b) the additional allocation of frequency bands made by WARC-79 and WARC-92 for the space services in view of their increasing development;

c) that the Radiocommunication Bureau requires administrations to supply specific information on systems using tropospheric scatter in order to verify compliance with certain provisions of the Radio Regulations (such as Nos. **5.410** and **21.16**),

recognizing nevertheless

that, to meet certain telecommunication requirements, administrations will wish to continue using tropospheric scatter systems,

noting

that the proliferation of such systems in all frequency bands and particularly in those shared with space systems is bound to aggravate an already difficult situation,

recommends that administrations

1 for the assignment of frequencies to new stations in systems using tropospheric scatter, take into account the latest information prepared by ITU-R to ensure that systems established in the future use a limited number of certain frequency bands;

2 in frequency assignment notifications to the Bureau, indicate expressly whether they relate to stations of tropospheric scatter systems,

instructs the Director of the Radiocommunication Bureau

to report on the application of this Recommendation to WRC-97,

invites the Council

to make the necessary arrangements for a future world radiocommunication conference to consider the frequency bands of the fixed service which shall be preferred for use by the new tropospheric scatter systems, taking into account the allocations to space radiocommunication services and the relevant ITU-R Recommendations.

RECOMMENDATION 104 (WRC-95)

Development of power flux-density and equivalent isotropically radiated power limits to be met by feeder links of non-geostationary satellite networks in the mobile-satellite service for the protection of geostationary-satellite networks in the fixed-satellite service in bands where No. 22.2 of the Radio Regulations applies

The World Radiocommunication Conference (Geneva, 1995),

considering

a) that, for operators both of geostationary fixed-satellite service (GSO FSS) networks and of feeder links of non-geostationary mobile-satellite service (non-GSO MSS) networks, it would be beneficial to have a precise definition of the level of protection implied by No. **22.2** in order to reduce regulatory uncertainties;

b) that, in particular, for GSO FSS operators, knowledge of the level of protection to be expected from existing and future non-GSO MSS feeder links is essential for the design of future systems and for ensuring the protection of existing GSO FSS systems;

c) that, in particular, for non-GSO MSS feeder link operators, knowledge of the level of protection to be granted to existing and future GSO FSS networks is essential in order to guarantee that the capability of providing this protection be fully considered during the design of the feeder-link network;

d) that the benefits of precisely defining the level of protection to be granted, as referred to in *considering c)*, would be better achieved by specifying the maximum levels of interfering emissions rather than the maximum levels of their effect;

e) that the several aspects addressed in *considering b)*, *c)* and *d)* could be satisfied by limiting the equivalent isotropically radiated power (e.i.r.p.) that a feeder-link station in a non-GSO MSS system can radiate towards the geostationary-satellite orbit and by limiting the power flux-density that a non-GSO MSS space station transmitting to any of its feeder-link stations can produce at any given point on the Earth's surface,

recommends that ITU-R

1 continue to study, as a matter of urgency, the possibility of developing e.i.r.p. and power flux-density limits to be met by non-GSO MSS feeder links in order to protect GSO FSS networks in accordance with No. **22.2** in bands where Resolution **46 (Rev.WRC-97)*** does not apply;

2 develop an appropriate Recommendation (or Recommendations) reflecting the results of those studies within the next two years.

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* *Note by the Secretariat:* As of 1 January 1999, the relevant procedures are those of No. **9.11A**.

RECOMMENDATION 316 (Rev.Mob-87)

Use of ship earth stations within harbours and other waters under national jurisdiction[1]

The World Administrative Radio Conference for the Mobile Services (Geneva, 1987),

recognizing

that permitting the use of ship earth stations within harbours and other waters under national jurisdiction belongs to the sovereign right of countries concerned,

recalling

that WARC-79, allocated the bands 1 530-1 535 MHz (with effect from 1 January 1990), 1 535-1 544 MHz and 1 626.5-1 645.5 MHz to the maritime mobile-satellite service and the bands 1 544-1 545 MHz and 1 645.5-1 646.5 MHz to the mobile-satellite service,

noting

that the international agreement on the use of INMARSAT ship earth stations within the territorial sea and ports has been adopted and this Agreement is open to accession, ratification, approval or acceptance, as appropriate,

considering

a) that the maritime mobile-satellite service, which is at present in operation worldwide, has improved maritime communications greatly and has contributed much to the safety and efficiency of ship navigation, and that fostering and developing the use of that service in future will contribute further to their improvement;

b) that the maritime mobile-satellite service will play an important role in the Global Maritime Distress and Safety System (GMDSS);

c) that the use of the maritime mobile-satellite service will be beneficial not only to the countries having ship earth stations at present but also to those considering the introduction of that service,

is of the opinion

that all administrations should be invited to consider permitting, to the extent possible, ship earth stations to operate within harbours and other waters under national jurisdiction in the bands 1 530-1 535 MHz (with effect from 1 January 1990), 1 535-1 545 MHz and 1 626.5-1 646.5 MHz,

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[1] WRC-97 made editorial amendments to this Recommendation.

recommends

1 that all administrations should consider permitting, to the extent possible, ship earth stations to operate within harbours and other waters under national jurisdiction, in the above-mentioned frequency bands;

2 that administrations should consider the adoption, where required, of international agreements on this matter.

RECOMMENDATION 318 (Mob-87)

Improved efficiency in the use of the Appendix 18 VHF frequency spectrum for maritime mobile communications

The World Administrative Radio Conference for the Mobile Services (Geneva, l987),

considering

a) that growth in the use of Appendix **18** VHF maritime mobile channels is expected to continue;

b) that in many parts of the world significant congestion already exists;

c) that increases in congestion could be harmful to the safe movement and operation of vessels and port operations and are a matter of concern to the International Association of Lighthouse Authorities (IALA), the International Maritime Organization (IMO) and many administrations,

noting

a) that it may be possible to make more efficient use of the VHF maritime mobile spectrum with the development of existing or new technologies such as narrow-band FM, single sideband, compandored single sideband, use of interleaved channels separated by 12.5 kHz, reduced channel spacing, etc.;

b) that a great number of mariners using low-cost transceivers rely on this band and the safety services that are thereby provided;

c) that any modification to Appendix **18** shall take account of the distress and safety utilization,

invites the ITU-R

urgently to undertake studies to determine the most appropriate means of promoting a more efficient use of the frequency spectrum in the VHF maritime mobile band and to develop Recommendations covering the technical and operational characteristics of systems using this band,

invites administrations

to participate in these studies actively,

recommends

that a future competent radiocommunication conference review and revise, if appropriate, the provisions of Appendix **18**, taking into account the relevant ITU-R Recommendations,

instructs the Secretary-General

to communicate this Recommendation to the IALA and IMO.

RECOMMENDATION 319 (Mob-87)

The need for technical improvements to minimize the risk of adjacent channel harmful interference between assignments used for narrow-band direct-printing telegraphy and data transmission systems in accordance with Appendix 17 and Resolution 300 (Rev.Mob-87)[1,*]

The World Administrative Radio Conference for the Mobile Services (Geneva, 1987),

considering

a) that Appendix **17** contains the channelling arrangement for narrow-band direct-printing telegraphy and data transmission systems (paired frequencies);

b) that the use of these frequency pairs is subject to the provisions of Article **52** and Resolution **300 (Rev.Mob-87)***;

c) that the spacing between the frequencies listed in Appendix **17** is 500 Hz;

d) that the present Conference has decided to adopt No. **52.104** which specifies the maximum mean powers to be used by coast stations for F1B and J2B emissions in bands exclusively allocated to the maritime mobile service between 4 000 kHz and 27 500 kHz,

recommends

that administrations cooperate to the fullest extent possible in resolving harmful interference from adjacent channels used for narrow-band direct-printing telegraphy and data transmission systems (paired frequencies),

invites the ITU-R

1 to study the question of technical compatibility between adjacent channels and make appropriate Recommendations;

2 to take into account, in the study, the maximum mean powers for coast radio-telegraph stations employing class F1B or J2B emissions in the bands exclusively allocated to the maritime mobile service between 4 000 kHz and 27 500 kHz (see No. **52.104**);

3 to present the results of its study to the next competent conference.

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[1] WRC-97 made editorial amendments to this Recommendation.

[*] *Note by the Secretariat:* This Resolution was further revised by WRC-2000.

RECOMMENDATION 401

Relating to the efficient use of aeronautical mobile (R) worldwide frequencies

The World Administrative Radio Conference (Geneva, 1979),

considering

that WARC-Aer2 allotted a limited number of worldwide frequencies for exercising control over regularity of flight and for safety of aircraft,

recommends to administrations

1 that the number of HF aeronautical stations on the worldwide channels should be kept to a minimum consistent with the economic and efficient use of frequencies;

2 that, if possible and practicable, one such station should serve aircraft operating agencies in adjacent countries and there should not normally be more than one station per country.

RECOMMENDATION 402

Relating to cooperation in the efficient use of worldwide frequencies in the aeronautical mobile (R) service[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) the need to make the most efficient use of worldwide frequencies in the aeronautical mobile (R) service;

b) that a Plan has been adopted for the allotment by areas of worldwide frequencies in the aeronautical mobile (R) service;

c) the desirability of coordination between administrations within the areas to which the Allotment Plan applies;

d) the right of an administration to select and notify to the Radiocommunication Bureau for recording in the Master International Frequency Register any frequency assignment in a channel allotted to the area in which its country is located;

e) the role played by the Bureau in regulatory procedures under Article **11**;

f) the role played by the International Civil Aviation Organization (ICAO) in the field of international aeronautical operations,

invites

1 *administrations within a worldwide allotment area*, as they consider it appropriate, *and the ICAO*, to seek the advice of the Bureau in determining the best choice of frequencies from a technical viewpoint in order to make the most efficient use of aeronautical mobile (R) worldwide frequencies;

2 *administrations within a worldwide allotment area*, as they consider it appropriate, to coordinate mutually the use of these frequencies from the viewpoint of aeronautical operations and, in this connection, to bear in mind the benefit that could be gained by obtaining the advice of ICAO in this process;

3 *the Bureau* to assist any administration or group of administrations in a worldwide allotment area wishing to coordinate their requirements for worldwide frequencies and to continue its cooperation with ICAO for this purpose,

requests the Secretary-General

to bring this Recommendation to the attention of the ICAO.

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[1] WRC-97 made editorial amendments to this Recommendation.

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).

RECOMMENDATION 506

Relating to the harmonics of the fundamental frequency of broadcasting-satellite stations[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that the frequency band 23.6-24 GHz is allocated to the radio astronomy service on a primary basis;

b) that the second harmonic of the fundamental frequency of broadcasting-satellite stations operating within the band 11.8-12 GHz may seriously disturb radio astronomy observations in the band 23.6-24 GHz if effective steps are not taken to reduce the level of this harmonic,

in view of

the provisions of No. **3.8**,

recommends

that, when defining the characteristics of their space stations operating in the broadcasting-satellite service, particularly within the band 11.8-12 GHz, administrations take all necessary steps to reduce the level of the second harmonic below the values indicated in the relevant ITU-R Recommendations.

[1] WRC-97 made editorial amendments to this Recommendation.

RECOMMENDATION 515 (Rev.WRC-97)

Introduction of high-frequency broadcasting transmitters and receivers capable of operation with spectrum-efficient modulation techniques

The World Radiocommunication Conference (Geneva, 1997),

considering

a) Resolution **517 (Rev.WRC-97)** relating to the introduction of single-sideband (SSB) or other spectrum-efficient modulation techniques, including digital;

b) that industry should be encouraged to manufacture appropriate transmitters and receivers;

c) Appendix **11** relating to the SSB system specification for the HF bands allocated to the broadcasting service,

considering further

a) that the introduction of SSB or other spectrum-efficient modulation techniques can be accelerated by making the appropriate transmitting and receiving equipment being more widely available in good time;

b) that lead-time is necessary for manufacturers to produce appropriate equipment,

invites ITU-R

to complete its studies on receivers for spectrum-efficient modulation techniques,

recommends administrations

to bring to the notice of transmitter and receiver manufacturers the most recent results of relevant ITU-R studies on spectrum-efficient modulation techniques suitable for use at HF as well as the information referred to in *considering c)*,

instructs the Secretary-General

to transmit this Recommendation to the International Electrotechnical Commission (IEC).

RECOMMENDATION 517 (HFBC-87)

Relative RF protection ratio values for single-sideband (SSB) emissions in the HF bands allocated exclusively to the broadcasting service

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1987),

considering

a) that the Conference has adopted a method for the planning of the HF bands allocated exclusively to the broadcasting service;

b) that this method is based on the use of double-sideband (DSB) emissions;

c) that the RF co-channel protection ratio is one of the fundamental planning parameters;

d) that the Conference has adopted Resolution **517** relating to the transition from DSB to SSB emissions in the HF bands allocated exclusively to the broadcasting service and Recommendation **515** relating to the introduction of transmitters and receivers capable of both DSB and SSB modes of operation;

e) that the SSB system characteristics for HF broadcasting are contained in Appendix **11**;

f) that, however, due to their provisional nature, the values of the relative RF protection ratio to be applied for all relevant combinations of wanted and unwanted DSB and SSB emissions have not been included in the Appendix mentioned in *considering e)*;

g) that preliminary studies have shown that SSB emissions may require a lower RF co-channel protection ratio for the same reception quality;

h) Resolution **514 (HFBC-87)**[*] relating to the procedure to be applied by the Radio Regulations Board and the Bureau in the revision of relevant parts of their Technical Standards used for HF broadcasting,

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[*] This Resolution was abrogated by WRC-97.

recommends

that, subject to the procedure to be applied by the Radio Regulations Board and the Bureau in the revision of relevant parts of their Technical Standards used for HF broadcasting given in Resolution **514 (HFBC-87)**[*], the values of relative RF protection ratio given in the Annex to this Recommendation be used by the Bureau in its Technical Standards relating to SSB emissions in the HF bands allocated exclusively to the broadcasting service,

invites the ITU-R

to continue to study the values of relative RF protection ratio for the different cases and frequency separations covered in the Annex to this Recommendation,

and recommends administrations

to participate actively in these studies.

ANNEX TO RECOMMENDATION 517 (HFBC-87)

Relative RF protection ratio values

1 The values of relative RF protection ratio given in the table should be used whenever SSB emissions in conformity with the specification in Appendix **11** are involved in the use of the HF bands allocated exclusively to the broadcasting service.

2 The values given refer to the case of co-channel DSB wanted and unwanted signals for the same reception quality.

3 For the reception of DSB and SSB (6 dB carrier reduction relative to peak envelope power) wanted signals, a conventional DSB receiver with envelope detection designed for a channel spacing of 10 kHz is assumed.

4 For the reception of an SSB wanted signal (12 dB carrier reduction relative to peak envelope power), the reference receiver as specified in Appendix **11**, Part B, § 3, is assumed.

5 SSB signals with 6 dB carrier reduction relative to peak envelope power assume equivalent sideband power as specified in Appendix **11**, Part B, § 1.2.

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[*] This Resolution was abrogated by WRC-97.

6 The figures for case 2 in the following Table relate to a situation where the centre frequency of the intermediate frequency pass-band of the DSB receiver is tuned to the carrier frequency of the wanted SSB signal. If this is not the case, the value for a difference of +5 kHz may increase to –1 dB.

Relative RF protection ratio values with reference to the co-channel RF protection ratio for DSB wanted and unwanted signals (dB)[1] for use in the HF bands allocated exclusively to the broadcasting service

	Wanted signal	**Unwanted signal**	**Carrier frequency separation *f* unwanted – *f* wanted, Δ*f* (kHz)**								
			–20	**–15**	**–10**	**–5**	**0**	**+5**	**+10**	**+15**	**+20**
1	DSB	SSB (6 dB carrier reduction relative to p.e.p.)	–51	–46	–32	+1	3	–2	–32	–46	–51
2	SSB (6 dB carrier reduction relative to p.e.p.)	DSB	–54	–49	–35	–3	0	–3	–35	–49	–54
3	SSB (6 dB carrier reduction relative to p.e.p.)	SSB (6 dB carrier reduction relative to p.e.p.)	–51	–46	–32	+1	0	–2	–32	–46	–51
4	SSB (12 dB carrier reduction relative to p.e.p.)	SSB (12 dB carrier reduction relative to p.e.p.)	–57	–57	–57	–45	0	–20	–47	–52	–57

[1] Frequency separation Δ*f* less than –20 kHz, as well as Δ*f* greater than 20 kHz, need not be considered.

RECOMMENDATION 519 (WARC-92)

Introduction of single-sideband (SSB) emissions and possible advancement of the date for cessation of the use of double-sideband (DSB) emissions in the HF bands allocated to the broadcasting service

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

a) that WARC HFBC-87 in Resolution **517** called for the introduction of SSB transmissions in the HF bands allocated exclusively to the broadcasting service with the characteristics specified in Appendix **11**;

b) that the use of SSB instead of DSB modulation techniques would lead to improved spectrum utilization;

c) that, in accordance with Recommendation **515 (Rev.WRC-97)**, new HF broadcasting transmitters installed after 31 December 1990 should as far as possible be capable of operating either in both SSB and DSB, or in the SSB mode alone;

d) that the new extension bands allocated by WARC-92 for HF broadcasting are reserved only for SSB emissions;

e) that Resolution **517 (Rev.WRC-97)** specifies the date of 31 December 2015 for the cessation of DSB emissions;

f) that the final date for the cessation of DSB emissions shall be periodically reviewed by competent future world radiocommunication conferences in the light of the latest available complete statistics on the worldwide distribution of SSB transmitters and synchronous demodulator receivers, as stipulated in Resolution **517 (Rev.WRC-97)**,

recommends

that the next competent world radiocommunication conference should consider the possibility of advancing the date given in *considering e)* for the cessation of DSB emissions,

invites the Council

to place this Recommendation on the agenda of the next competent world radiocommunication conference.

RECOMMENDATION 520 (WARC-92)

Elimination of HF broadcasting on frequencies outside the HF bands allocated to the broadcasting service

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

a) that there is an increasing number of HF broadcasting stations operating on frequencies outside the bands allocated to the broadcasting service;

b) that the common use of the HF bands by the broadcasting and other services, without the relevant allocations or detailed regulations, results in inefficient use of the frequency spectrum;

c) that such use has led to harmful interference;

d) that this Conference has allocated additional spectrum to the broadcasting service in the HF bands,

recommends

that administrations shall take practicable steps to eliminate HF broadcasting outside the HF bands allocated to the broadcasting service.

RECOMMENDATION 521 (WRC-95)

Technical parameters for use in the revision of Appendices 30 and 30A in response to Resolution 524 (WARC-92)*

The World Radiocommunication Conference (Geneva, 1995),

considering

that WRC-97 will take action, as appropriate, on the revision of Appendices **30** and **30A** for Regions 1 and 3 in response to Resolution **524 (WARC-92)***,

noting

a) the requirements of Resolution **524 (WARC-92)***;

b) the work carried out by the study groups and the Conference Preparatory Meeting of the Radiocommunication Sector,

recognizing

that it will be necessary to have improved technical parameters for both Appendices **30** and **30A** if the Plans resulting from the decisions of this Conference and WRC-97 are to be best able to satisfy the requirements of Resolution **524 (WARC-92)***,

recommends

1 that the following technical parameters be used in preparation for WRC-97 actions on the revision of Appendices **30** and **30A**:

1.1 e.i.r.p. planning values: a general reduction of 5 dB from the levels listed in Appendix **30**;

1.2 use of an improved receive earth station reference antenna pattern based on Recommendation ITU-R BO.1213;

1.3 simultaneous planning of feeder links and downlinks, with calculation of overall equivalent protection margins;

1.4 aggregate *C*/*I* ratio values of:

– co-channel 23 dB, with no single-entry *C*/*I* lower than 28 dB;

– adjacent channel 15 dB;

* *Note by the Secretariat:* This Resolution was abrogated by WRC-2000.

2 that these updated parameters be applied to possible revisions to assignments not operating or notified; operating or notified systems, to the extent they are in accordance with Appendices **30** and **30A**, will only be adjusted if the administrations concerned with such systems agree;

3 that the general e.i.r.p. reduction in *recommends* 1.1 above be applied, but for countries in high rainfall climatic zones adequate e.i.r.p. levels will be maintained.

RECOMMENDATION 522 (WRC-97)

Coordination of high-frequency broadcasting schedules in the bands allocated to the broadcasting service between 5 900 kHz and 26 100 kHz

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that Article **12** establishes the principles and the procedure for use of the frequency bands allocated to the HF broadcasting service between 5 900 kHz and 26 100 kHz;

b) that the aforementioned principles stipulate, *inter alia*, that the procedure should promote the development of a voluntary coordination process among administrations to resolve incompatibilities;

c) that the procedure itself encourages administrations to coordinate their schedules with other administrations as far as possible prior to submission;

d) that the development of coordination among administrations with the assistance of the Radiocommunication Bureau, when requested, would result in better use of the spectrum allocated to the HF broadcasting service between 5 900 kHz and 26 100 kHz,

recognizing

a) that the participation of broadcasting organizations in this coordination process would make the task of resolving incompatibilities easier;

b) that multilateral coordination of the use of the HF broadcasting bands is already practised on an informal basis in various regional coordination groups[1],

recommends administrations

to promote, as far as possible, regular coordination of their broadcasting schedules within appropriate regional coordination groups of administrations or broadcasting organizations in order to resolve or reduce incompatibilities, through bilateral or multilateral meetings or by correspondence (telephone, facsimile, e-mail, etc.).

[1] Not related to the ITU Regions.

RECOMMENDATION 604 (Rev.Mob-87)

Future use and characteristics of emergency position-indicating radiobeacons (EPIRBs)[1, 2]

The World Administrative Radio Conference for the Mobile Services (Geneva, 1987),

considering

a) that the essential purpose of EPIRB signals is to help locate survivors in search and rescue operations;

b) that requirements for carriage of EPIRBs operating on the frequencies 121.5 and 243 MHz have been included in the 1983 Amendments to the International Convention for the Safety of Life at Sea, 1974;

c) that the International Maritime Organization (IMO) has been considering various types of EPIRBs;

d) that the IMO has stressed in its Resolution A.279 (VIII) the urgent need for unification of the characteristics of EPIRBs,

recognizing

a) that there are provisions in the Radio Regulations for EPIRBs on the frequencies 2 182 kHz, 121.5 MHz, 156.525 MHz, 243 MHz, and in the bands 406-406.1 MHz and 1 645.5-1 646.5 MHz;

b) that Recommendation ITU-R M.690-1 was approved in order to facilitate the application of a universal standard for EPIRBs operating on the frequencies 121.5 MHz and 243 MHz;

c) that for EPIRBs operating on 121.5 MHz and 243 MHz, there is a need to improve their function of being detected and located by satellite systems,

recommends

1 that, in view of their mutual interest in this matter, IMO and the International Civil Aviation Organization (ICAO) be invited, as a matter of urgency, to review and align their concepts for EPIRBs in regard to search and rescue operations and the safety of life at sea;

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[1] For the purpose of this Recommendation, references to EPIRBs include references to satellite EPIRBs as appropriate.

[2] WRC-97 made editorial amendments to this Recommendation.

2 that the ITU-R continue to study technical and operating questions for EPIRBs, in consideration of concepts stated by the IMO and ICAO;

3 that the ITU-R and ICAO study, as a matter of urgency, the technical and operational questions arising from § *d)* of Annex 1 to Recommendation ITU-R M.690-1,

instructs the Secretary-General

to communicate this Recommendation to the IMO and ICAO.

RECOMMENDATION 605 (Rev.Mob-87)

Technical characteristics and frequencies for shipborne transponders[1, 2]

The World Administrative Radio Conference for the Mobile Services (Geneva, 1987),

considering

a) that merchant ships of the world are increasing in size and speed;

b) that every year a significant number of collisions occur involving merchant vessels with resultant loss of life and property and that collisions have a high potential for endangering the natural environment;

c) that there is a need to correlate radar targets with vessels making VHF radio-telephone transmissions;

d) that studies and experiments have shown that shipborne transponders can enhance and supplement radar target images as compared with normal radar images;

e) that current studies and experimentation relating to shipborne transponders indicate that development of equipment can be expected in the near future which will offer adequate radar image enhancement and target identification and, possibly, data transfer capabilities;

f) that such shipborne transponders may require protection from interference;

g) that the selection of technical characteristics for these transponders should be coordinated with other users of the radio frequency spectrum whose operations might be affected,

requests the ITU-R

to recommend, after consultation with appropriate international organizations, the most suitable order of magnitude of frequencies and bandwidth required for this purpose, and the technical parameters to be met by such devices, taking into account both electromagnetic compatibility with other services having allocations in the same frequency band and the need to ensure that the response of a transponder of the system studied should not be capable of interpretation as being from a radar beacon of whatever type,

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1 A receiver-transmitter which emits a signal automatically when it receives the proper interrogation.

2 WRC-97 made editorial amendments to this Recommendation.

invites administrations and the International Maritime Organization (IMO)

to continue to evaluate the operational benefits which could result from the widespread use of transponders on ships and to consider whether there would be advantage in adopting an internationally approved system for future implementation,

recommends

that, pending further technical and operational developments and evaluation, administrations be prepared at the next competent world radiocommunication conference to make the necessary provisions for the use of such devices.

RECOMMENDATION 606 (Mob-87)

The possibility of reducing the band 4 200-4 400 MHz used by radio altimeters in the aeronautical radionavigation service[1]

The World Administrative Radio Conference for the Mobile Services (Geneva, 1987),

considering

a) that there is a demand for additional frequency allocations for the mobile service, particularly the land mobile service;

b) that all systems utilizing the radio-frequency spectrum should be efficient in their use of that scarce resource;

c) that the allocation of the band 4 200-4 400 MHz to the aeronautical radionavigation service appeared in the Radio Regulations (Atlantic City, 1947) and has not been changed despite technological advances;

d) that it has decided not to change the frequency allocations in that band;

e) that studies carried out by the International Civil Aviation Organization (ICAO) on this question indicate that the operation of the existing radio altimeter equipment necessitates the whole band;

f) that it might be possible to operate radio altimeters in this band with sufficient accuracy with a necessary bandwidth of less than 200 MHz;

g) that the frequency tolerance of such devices might be improved,

recommends

1 that the next competent world conference should consider, if appropriate, a reduction of the band 4 200-4 400 MHz allocated to the aeronautical radionavigation service;

2 that any reduction should be based on a detailed technical evaluation of the systems in question, taking into account ICAO reports on the evaluation of future world traffic of aircraft using this band;

3 that the conference mentioned in *recommends* 1 above should consider reallocating to the land mobile service any portion of the band currently available for the aeronautical radionavigation service which is identified as being suitable on the basis of technical considerations,

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[1] WRC-97 made editorial amendments to this Recommendation.

invites the ITU-R

to study the necessary bandwidth and frequency tolerance requirements for systems operating in the aeronautical radionavigation service in the frequency band 4 200-4 400 MHz,

invites the Council

to place this Recommendation on the agenda of the next competent world radiocommunication conference,

instructs the Secretary-General

to refer this Recommendation to ICAO, inviting it to consider the possibility of reducing the band 4 200-4 400 MHz for the aeronautical radionavigation service and to make appropriate recommendations to assist administrations in this matter.

RECOMMENDATION 622 (WRC-97)

Use of the frequency bands 2 025-2 110 MHz and 2 200-2 290 MHz by the space research, space operation, Earth exploration-satellite, fixed and mobile services

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that the bands 2 025-2 110 MHz and 2 200-2 290 MHz are allocated on a primary basis to the space research, space operation, Earth exploration-satellite, fixed and mobile services;

b) that, in response to Resolutions from the 1992 Conference (WARC-92), studies have resulted in a number of ITU-R Recommendations, which, when adhered to by the services, will result in a stable, long-term sharing environment (Recommendations ITU-R SA.364, ITU-R SA.1019, ITU-R F.1098, ITU-R SA.1154, ITU-R F.1247, ITU-R F.1248, ITU-R SA.1273, ITU-R SA.1274 and ITU-R SA.1275);

c) that this Conference adopted No. **5.391** which states that high-density mobile systems shall not be introduced in these frequency bands,

considering further

that enhancements in technology may enable the services mentioned in *considering a)* to minimize the total bandwidth requirement in these frequency bands,

noting

that WARC-92 considered that it is desirable to review the present and planned use of the frequency bands 2 025-2 110 MHz and 2 200-2 290 MHz, with the intent, where practicable, of satisfying some space mission requirements in bands above 20 GHz,

recognizing

that there are increasing requirements for emerging communication systems which need to be satisfied in the frequency range below 3 GHz,

recommends

that administrations planning to introduce new systems in the space research, space operation, earth exploration-satellite, fixed or mobile services in the bands 2 025-2 110 MHz and 2 200-2 290 MHz take into account the ITU-R Recommendations referred to in *considering b)* above when making assignments to these services, and implement enhancements in technology as early as practicable with a view to minimizing the total bandwidth required by systems of each service.

RECOMMENDATION 700

Relating to the utilization and sharing of frequency bands allocated to space radiocommunications

The World Administrative Radio Conference (Geneva, 1979),

considering

Resolutions 1721 (XVI) Part D and 1802 (XVII) part IV § 3 of the United Nations General Assembly which refer, *inter alia*, to the unanimous belief of the Members of the United Nations that communication satellites should be organized on a global basis with non-discriminatory access for all nations,

considering further

the economic and social implications for all nations of global communications by satellites expressed in the report prepared for Members and Associate Members of United Nations Educational, Scientific and Cultural Organizations (UNESCO) in accordance with the decision of the 12th session of its General Conference in December 1962,

recognizing

that all Member States have an interest in and a right to an equitable and rational use of frequency bands allocated to space radiocommunications,

recommends to the Member States

that the utilization and exploitation of the frequency bands allocated to space radiocommunications be subject to international agreements based on principles of justice and equity permitting the use and sharing of these bands in the mutual interest of all nations.

RECOMMENDATION 701

Relating to the use of the frequency band 1 330-1 400 MHz by the radio astronomy service[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that the observations of radiations from neutral hydrogen atoms within the band 1 330-1 400 MHz are of prime importance in understanding the structure of distant galaxies, and subsequently of the evolution of the universe;

b) that recognition has been given to the radio astronomy service in the band 1 330-1 400 MHz within the Table of Frequency Allocations;

c) that the radio astronomy service is devoted to the reception of extremely low-level electromagnetic radiations of extraterrestrial origin, and needs therefore to be protected from radiations of man-made origin, to the maximum degree practicable;

d) that the ability of the radio astronomy service to share frequency bands with other radio services is limited,

recommends that administrations,

1 when preparing for the next competent radiocommunication conference, should consider the question of making provisions in the 1 330-1 400 MHz band to provide the radio astronomy service with increased protection from services that radiate;

2 when drawing up frequency assignment plans, should bear in mind radio astronomy observations being carried out in the band 1 330-1 400 MHz.

[1] WRC-97 made editorial amendments to this Recommendation.

RECOMMENDATION 702

Relating to the use of the frequency bands 1 400-1 727 MHz, 101-120 GHz and 197-220 GHz for search for intentional emissions of extraterrestrial origin[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that it is of special importance to mankind to determine the existence of extraterrestrial civilizations;

b) that there is a maximum probability of detecting radiation from extraterrestrial civilizations in the frequency bands 1 400-1 727 MHz, 101-120 GHz and 197-220 GHz because these frequency bands contain the spectral lines of basic physical interest and are related to the universal phenomena;

c) that in the bands mentioned in *considering b)* there is a probability of detecting radiation, with a maximum signal-to-noise ratio, from extra-terrestrial civilizations;

d) that recognition has been given to the search for extraterrestrial civilizations in the bands 1 400-1 727 MHz, 101-120 GHz and 197-220 GHz within the Table of Frequency Allocations;

e) that the attempt to recognize signals from extraterrestrial civilizations requires the reception of extremely low-level radiations and that such reception needs to be protected, to the maximum degree practicable, from radiations of man-made origin;

f) that, for receiving radiations from extraterrestrial civilizations, the possibilities of sharing frequency bands with active radio services are limited,

recommends

that, when preparing for the next competent radiocommunication conference, administrations should consider the desirability of making provisions so as to provide a controlled environment suitable for the reception of extraterrestrial radiations in the 1 400-1 727 MHz, 101-120 GHz and 197-220 GHz bands,

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[1] WRC-97 made editorial amendments to this Recommendation.

invites organizations concerned with the search for extraterrestrial civilizations

to take into account the following:

1 the relevant provisions of the Radio Regulations;

2 the need to maintain close coordination with their national administrations on matters of frequency usage;

3 the need to select, for observations, locations for receiving facilities that are as remote as possible from sources of radio interference;

4 the appropriate Reports and Recommendations of the ITU-R.

RECOMMENDATION 705

Criteria to be applied for frequency sharing between the broadcasting-satellite service and the terrestrial broadcasting service in the band 620-790 MHz[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that, within the band 620-790 MHz, assignments may be made to television stations using frequency modulation in the broadcasting-satellite service;

b) that it is necessary to have a power flux-density limit which will provide adequate protection to the terrestrial broadcasting service,

taking into account

a) that the conclusions of the Special Joint Meeting of the ex-CCIR (Geneva, 1971), indicated that the following power flux-density limits are necessary to protect the terrestrial broadcasting service:

-121 dB(W/m^2)	for	$\delta \leq 20°$
$-121 + 0.4\,(\delta - 20)$ dB(W/m^2)	for	$20° < \delta \leq 60°$
-105 dB(W/m^2)	for	$60° < \delta \leq 90°$

where δ is the angle of arrival above the horizontal plane (degrees);

b) that additional tests carried out by one administration after the Special Joint Meeting of the ex-CCIR indicated that the following more conservative power flux-density limits may be necessary:

-130 dB(W/m^2)	for	$\delta \leq 20°$
$-130 + 0.4\,(\delta - 20)$ dB(W/m^2)	for	$20° < \delta \leq 60°$
-114 dB(W/m^2)	for	$60° < \delta \leq 90°$

where δ is the angle of arrival above the horizontal plane (degrees);

c) that Report 631-1 of the ex-CCIR gives the results of studies carried out up to 1978;

d) that additional information is required on the protection ratio for interference from an FM television signal into a vestigial sideband (VSB) television signal for both the 625- and 525-line systems;

[1] WRC-97 made editorial amendments to this Recommendation.

e) that with terrestrial television receiving systems using current technology, the minimum field strength to be protected may in some cases be less than the values included in Recommendation ITU-R BT.417;

f) that account may have to be taken of ground reflections;

g) that energy dispersal techniques may reduce the required protection ratio and should be used if shown to be effective,

recommends

1 that in view of the absence of sufficient information on tests under operational conditions and in order to provide sharing criteria, on a provisional basis, the maximum power flux-density produced at the surface of the Earth within the service area of a terrestrial broadcasting station (see Recommendation ITU-R BT.417) by a space station in the broadcasting-satellite service in the band 620-790 MHz should not exceed:

-129 dB(W/m^2)	for	$\delta \leq 20°$
$-129 + 0.4\,(\delta - 20)$ dB(W/m^2)	for	$20° < \delta \leq 60°$
-113 dB(W/m^2)	for	$60° < \delta \leq 90°$

where δ is the angle of arrival above the horizontal plane (degrees);

2 that these limits be not exceeded on the territory of a country except with the agreement of its administration;

3 that the transmission of unmodulated carriers should be avoided;

4 that the ITU-R urgently study the sharing criteria to be applied to frequency sharing between the broadcasting-satellite service, and the terrestrial broadcasting service in the band 620-790 MHz and prepare a Recommendation on power flux-densities to be used in lieu of the above provisional limits;

5 that in its studies the ITU-R consider in particular the following aspects:

5.1 the required protection ratio for both 525- and 625-line systems for interference from an FM television signal into a VSB television signal;

5.2 the minimum field strength to be protected for the terrestrial television service taking into account the current state of the art;

5.3 the effect of ground reflections;

5.4 the number of broadcasting satellites that may be visible from a terrestrial broadcasting receiver;

5.5 the effect of polarization discrimination;

5.6 the effect of antenna directivity;

6 that in its studies the ITU-R should consider the advantages of energy dispersal techniques in the broadcasting-satellite service (television).

RECOMMENDATION 707

Relating to the use of the frequency band 32-33 GHz shared between the inter-satellite service and the radionavigation service[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that the band 32-33 GHz is allocated to the inter-satellite service and the radio-navigation service;

b) that there are safety aspects associated with the radionavigation service;

c) that No. **5.548** has been incorporated into Article **5**,

recommends

that, as a matter of urgency, studies should be made of the sharing criteria for these two services in the frequency band listed above,

requests the ITU-R

to carry out these studies,

recommends further

that a future competent world radiocommunication conference review the ITU-R Recommendations with a view to the inclusion of such sharing criteria in Article **21**.

[1] WRC-97 made editorial amendments to this Recommendation.

RECOMMENDATION 709

Relating to sharing frequency bands between the aeronautical mobile service and the inter-satellite service[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that the bands 54.25-58.2 GHz*, 59-64 GHz, 116-134 GHz*, 170-182 GHz* and 185-190 GHz are allocated to the inter-satellite service and the mobile service;

b) that the aforementioned bands are located in parts of the radio frequency spectrum close to peaks of atmospheric absorption;

c) that, nevertheless, the atmospheric absorption alone may not prevent harmful interference to stations of the inter-satellite service from stations on aircraft flying at high altitude;

d) that for this reason aircraft stations in the aeronautical mobile service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **5.558**, the text of which is reproduced below)[2,**],

recommends

that, as a matter of urgency, studies should be made of the sharing criteria for these two services in the frequency bands listed above,

requests the ITU-R

to carry out these studies,

recommends further

that a future competent world radiocommunication conference review the allocations of these bands, taking into account the results of the ITU-R studies.

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1 WRC-97 made editorial amendments to this Recommendation.

* *Note by the Secretariat:* WRC-97 and WRC-2000 modified the allocations to the mobile service in these frequency bands.

2 "**5.558** In the bands 55.78-58.2 GHz, 59-64 GHz, 66-71 GHz, 116-134 GHz, 170-182 GHz and 185-190 GHz, stations in the aeronautical mobile service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **5.43**)."

** *Note by the Secretariat:* This provision was modified by WRC-2000.

RECOMMENDATION 710

Relating to the use of airborne radars in the frequency bands shared between the inter-satellite service and the radiolocation service[1]

The World Administrative Radio Conference (Geneva, 1979),

considering

a) that the bands 59-64 GHz and 126-134 GHz* are allocated to the inter-satellite service and the radiolocation service;

b) that the aforementioned bands are located in parts of the radio frequency spectrum close to peaks of atmospheric absorption;

c) that, nevertheless, the atmospheric absorption alone may not prevent harmful interference to stations of the inter-satellite service from radars operating on aircraft flying at high altitude;

d) that for this reason airborne radars in the radiolocation service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **5.559**, the text of which is reproduced below)[2,**],

recommends

that, as a matter of urgency, studies should be made of the sharing criteria for these two services in the frequency bands listed above,

requests the ITU-R

to carry out these studies,

recommends further

that a future competent world radiocommunication conference review the allocations of these bands, taking into account the results of the ITU-R studies.

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1 WRC-97 made editorial amendments to this Recommendation.

* *Note by the Secretariat:* WRC-2000 modified the allocation to inter-satellite service in this frequency band.

2 "**5.559** In the bands 59-64 GHz and 126-134 GHz, airborne radars in the radiolocation service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **5.43**)."

** *Note by the Secretariat:* This provision was modified by WRC-2000.

RECOMMENDATION 715 (Orb-88)

Multi-band and/or multiservice satellite networks using the geostationary-satellite orbit[1]

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (Second Session – Geneva, 1988),

considering

a) that, for economic and practical reasons, administrations may find it desirable to utilize multi-band and/or multiservice satellite networks using the geostationary-satellite orbit (for example: fixed-satellite, broadcasting-satellite and mobile-satellite services);

b) that there may be several different regulatory mechanisms covering the services provided by multi-band and/or multiservice satellites and that some of these regulatory mechanisms are associated with plans that include fixed orbital positions;

c) that the need to apply separate regulatory procedures may lead to incompatible results for the different bands or services concerned;

d) that the application of these procedures to bands and services with equal category of allocation shall normally result in equal rights for the networks concerned,

recognizing

a) that an administration having a satellite network subject to more than one procedure will need to apply the procedures independently;

b) that an administration attempting to bring into use a satellite network subject to more than one procedure may find that the process can be difficult to complete but may be facilitated by the sequence in which the coordination procedures are initiated;

c) that additionally there is less flexibility when one of the procedures includes a plan with fixed orbital positions;

d) that, when one or more of these services are planned, it may be practicable to use the modification provisions of those plans as aids in the resolution of difficulties;

e) that it is desirable to simplify the process for bringing into use multi-band and/or multiservice satellite networks,

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[1] WRC-97 made editorial amendments to this Recommendation.

recommends

1 that administrations should take into account the above *considering* and *recognizing* when planning and implementing multi-band and/or multiservice satellite networks;

2 that administrations cooperate to overcome the particular problems of bringing into use multi-band and/or multiservice satellite networks, subject to multiple procedures,

invites

1 the ITU-R to continue its technical studies into the efficient use of the geostationary-satellite orbit as it pertains to multi-band and/or multiservice satellite networks;

2 the Council, in the light of experience with the bringing into use of multi-band and/or multiservice satellites, to place on the agenda of a future competent world radiocommunication conference, if necessary, a review of the process for bringing into use multi-band and multiservice satellite networks,

instructs the Secretary-General

to bring this Recommendation to the attention of the Plenipotentiary Conference (Nice, 1989), and of the Council.

RECOMMENDATION 718 (WARC-92)

Alignment of allocations in the 7 MHz band allocated to the amateur service[1]

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

a) that it is desirable to have exclusive worldwide allocations to the amateur and broadcasting services in the bands around 7 MHz;

b) that the sharing of frequency bands by these services is undesirable and should therefore be avoided;

c) that a number of administrations have made proposals to this Conference for the alignment of the allocations to the amateur service around 7 MHz;

d) that this Conference was able to give only limited consideration to these proposals,

recommends

that a future competent world radiocommunication conference should consider the possibility of aligning the allocations to the amateur service around 7 MHz, with due regard to the requirements of other services,

invites the Council

to place this Recommendation on the agenda of the next competent world radiocommunication conference.

[1] WRC-97 made editorial amendments to this Recommendation.

RECOMMENDATION 719 (WARC-92)

Multiservice satellite networks using the geostationary-satellite orbit[1]

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

a) that the Conference has allocated, on a primary basis, the bands 19.7-20.2 GHz and 29.5-30 GHz in Region 2, and 20.1-20.2 GHz and 29.9-30 GHz in Regions 1 and 3 to the mobile-satellite service;

b) that these bands are also allocated to the fixed-satellite service;

c) that some administrations have expressed interest in developing multiservice satellite networks in these bands;

d) that Recommendation **715 (Orb-88)** calls for simplification of the process for bringing into use satellite networks with different classes of user terminals;

e) that the Voluntary Group of Experts (VGE), among other means of simplifying the Radio Regulations, completed its study or service definitions accommodating a range of services,

recognizing

that the introduction of multiservice satellite networks using, *inter alia*, mobile earth stations, may have an impact on networks operating in the fixed-satellite service,

recommends

that, as a matter of urgency, studies should be carried out on the technical characteristics, including pointing techniques of multiservice satellite networks using the geostationary-satellite networks encompassing mobile-satellite and fixed-satellite applications, and the sharing criteria necessary for compatibility with the fixed-satellite service in the frequency bands referred to above,

invites ITU-R

to carry out these studies,

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[1] WRC-97 made editorial amendments to this Recommendation.

recommends administrations

to participate actively in these studies,

recommends further

a) that a future competent world radiocommunication conference review the allocations of these bands, taking into account the results of the ITU-R studies and the work of the VGE;

b) that a future competent world radiocommunication conference consider the requirement for a single service definition encompassing mobile-satellite service and fixed-satellite service applications, and the possible need for additional frequency spectrum to accommodate the growth of these services,

invites the Council

to place this matter on the agenda of the next competent world radiocommunication conference.