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INTERNATIONAL TELECOMMUNICATION UNION

Radio Regulations

Edition of 1998

3 *Resolutions and Recommendations*

Geneva 1998

Note by the Secretariat

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

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

- the ITU structural changes (world administrative radio conference to world radiocommunication conference, CCIR to ITU-R, IFRB to the Radiocommunication Bureau, Administrative Council to Council, etc.);
- the replacement of ex-CCIR Reports by ITU-R Recommendations;
- the renumbering of Radio Regulation provisions resulting from the simplification of the Radio Regulations.

The term “Member(s)” has been replaced by the term “Member State(s)[‡]” to correspond with the terminology employed currently within the ITU.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

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

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

- Articles, e.g. Article **S52**;
- Provision numbers, e.g. No. **S5.344**;
- Article table numbers, e.g. Table **S22-2**;
- Appendices, e.g. Appendix **S30A**;
- Resolutions, e.g. Resolution **46 (Rev.WRC-97)**;
- Recommendations, e.g. Recommendation **515 (Rev.WRC-97)**.

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

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

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

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

¹ This conference will be held in the year 2000.

² The date of this conference has not been finalised.

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Resolutions

RESOLUTION 1 (Rev.WRC-97)
Notification of frequency assignments¹

The World Radiocommunication Conference (Geneva, 1997),

referring to

- the Preamble of the Constitution,
- Article **42** of the Constitution (Special Arrangements),
- Article **S6** of the Radio Regulations (Special agreements),
- Article **S11** of the Radio Regulations (Notification and recording of frequency assignments),
- Article **S12** 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 services¹**

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 orbit¹**

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 **S30B/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 station² 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 station² 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 station², an administration initiates the coordination procedure specified in No. **S9.7/1060** 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. **S11.31/1503** 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 station² 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. **S11.43A/1547** to **S11.46/1551**;

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 **S4** to the Radio Regulations,

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

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

Relating to technical cooperation with the developing countries in the study of propagation in tropical areas¹

The World Administrative Radio Conference, Geneva, 1979,

having noted

that the assistance provided for the developing countries by the Union in cooperation with other United Nations specialized agencies, such as the United Nations Development Programme (UNDP), in the field of telecommunication augurs well for the future,

being aware

- a) of the fact that the developing countries, particularly those in tropical areas, require adequate knowledge of radio wave propagation in their territories in order to make rational and economical use of the radio 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 invite 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 African Postal and Telecommunications Union (APTU), the Panafrican Telecommunication Union (PATU) 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 spectrum;

¹ WRC-97 made editorial amendments to this Resolution.

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 the 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 management¹

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;

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 8 (Rev.Mob-87)

**Implementation of the changes in allocations in the bands
between 4000 kHz and 27500 kHz¹**

(See also Resolution **512 (HFBC-87)**)

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that parts of frequency bands between 4000 kHz and 27500 kHz that were previously allocated on an exclusive or shared basis to the fixed service have been re-allocated to other services;
- b) that existing fixed and mobile assignments must be removed progressively from those re-allocated bands to make way for other services;
- c) that the assignments to be removed, termed “displaced assignments”, must be re-accommodated in other frequency bands;

recognizing

the difficulties facing administrations and the IFRB during the period of transition from the previous allocations to those made by this Conference;

resolves

- 1 that the transitional procedure in Annex A to this Resolution shall be used for the purpose of ensuring an orderly and equitable implementation of the changeover from the previous allocations to those made by this Conference;
- 2 that the provisions of No. **1242** and the associated provisions of Article **12** concerning the examination and recording in the Master Register of assignments in the bands between 4 000 kHz and 27 500 kHz allocated on an exclusive or shared basis to the fixed service shall be suspended from 1 January 1982 to 30 June 1984;
- 3 that the interim procedure in Annex B to this Resolution shall be used for the purpose of dealing with any urgent new frequency assignments in the relevant bands during the period of suspension of the provisions of Article **12** as specified in *resolves 2*;
- 4 that the review procedure in Annex C to this Resolution shall be used for the purpose of examining any urgent new assignments notified during the period of suspension of the provisions of Article **12** as specified in *resolves 2*;

¹ *Note by the Secretariat:* As all actions referred to in this Resolution were completed on 31 December 1998, the Secretariat did not introduce any editorial amendments to this Resolution.

invites administrations

1 when seeking re-accommodation for their mobile assignments in the bands between 4 000 kHz and 27 500 kHz re-allocated to other services, to make every effort to find replacement assignments in the bands allocated exclusively to the mobile service concerned;

2 to cooperate by not submitting notices for assignments in the relevant bands during the period of suspension of the provisions of Article 12 as specified in *resolves* 2, except for urgent new assignments to be dealt with under the interim procedure;

requests the IFRB

not to examine any notices in the relevant bands under Article 12 during the period of suspension of the provisions of that Article as specified in *resolves* 2, other than those notices requesting deletions of existing assignments.

ANNEX A TO RESOLUTION 8 (Rev.Mob-87)

Transitional procedure for the selection and approval of replacement assignments

PART I – PREPARATORY PHASE

Section I – Preparation and publication by the IFRB of consolidated proposals for replacement assignments

1 For the purpose of this Resolution, the term “displaced assignment” means a frequency assignment to a station in the fixed service in the parts of the bands re-allocated from the fixed service to other services for which a replacement assignment shall be found in accordance with this Resolution.

2 The Board, as soon as possible after completion of the procedure annexed to Resolution 9, shall prepare consolidated proposals for replacements for all displaced assignments listed in the Provisional Section of the Master Register in the bands between 4000 kHz and 27500 kHz which the World Administrative Radio Conference, Geneva, 1979 has re-allocated from the fixed service to other services.

3 The displaced assignment shall be treated in the order of the revised date recorded in Column 2d as indicated in Resolution 9. Furthermore, all displaced assignments which have the same revised date shall be treated in the following order:

- 1) assignments for national use;
- 2) assignments for international use.

In the application of this provision, the displaced assignments shall be processed in batches without any priority being applied to the assignments of any administration.

4 The displaced assignments of class of operation C shall not be treated until all displaced assignments of class of operation A or B have been satisfied.

5 Displaced assignments of class of operation C shall be as far as possible evenly distributed throughout the bands that continue to be allocated to the fixed service.

6 The Board, in complying with the provisions of this Section, shall for the purposes of protecting existing recorded assignments employ only the Master Register reconstructed in accordance with the procedure annexed to Resolution 9.

7 The Board, on 1 July 1983, shall send to each administration a document listing all the assignments concerning that administration, identifying those that were recorded in the Provisional Section of the Master Register, and those proposed as replacements.

Section II – Examination and Approval of Proposed Assignments

8 Each administration, upon receipt of the document specified in paragraph 7, shall acknowledge receipt and shall then examine the proposed replacement assignments contained therein with regard to their acceptability, following which the administration shall advise the Board as soon as possible:

- of its agreement; or
- which of the proposed assignments it finds unacceptable.

In the latter case, the administration shall inform the Board, as quickly as possible, of its reasons therefor.

9 The Board shall examine the responses under paragraph 8 and shall try, preferably by applying small adjustments, to satisfy the administration concerned with respect to the proposed assignments it found unacceptable. The Board shall do so in the following way:

- the Board shall collect all responses received under paragraph 8 within six months after 1 July 1983, and then process them together and without any priority being applied to the reply of any administration; and then
- the Board shall collect all responses received under paragraph 8 in the period from six months to nine months after 1 July 1983, and then process this second batch in the same manner as described above for the first batch.

10 The procedure described in this Section shall terminate on 1 July 1984.

Section III – Subsequent Action by the Board

11 The Board, on termination of the procedure prescribed by Sections I and II of this Annex, shall insert in the Master Register all replacement assignments that have been agreed by administrations, with annotations to indicate:

- that they shall have the same common status as the undisplaced assignments as provided for in Resolution 9; and
- their provisional nature in accordance with No. 1311.

12 The Board shall, for all assignments mentioned in paragraph 11, insert in Column 2d of the Master Register the appropriate date according to paragraph 6.3 of the Annex to Resolution 9.

13 The Board shall then publish, in recapitulatory supplements to the International Frequency List, all replacement assignments made in accordance with the procedure prescribed in Part I of this Annex.

14 The Board, on publication of the supplements prescribed in paragraph 13, shall inform by telegram any administration having outstanding displaced assignments of class of operation A which have not been satisfied.

Section IV – Implementation of Article 12

15 As from 1 July 1984, the provisions of Article 12 shall apply to frequency bands allocated to the fixed service between 4 000 kHz and 27 500 kHz.

16 Following that date, an administration, having been informed by the Board under paragraph 14 that certain of its displaced assignments have not been replaced under this transitional procedure, shall be free to select new assignments taking into account the assignments recorded in the Master Register under paragraph 11, and shall submit new notices to the Board in accordance with Article 12.

PART II – TRANSFER PHASE

Section V – Subsequent Action by Administrations

17 An administration, having received and accepted replacements for its recorded assignments that were displaced by decisions of the World Administrative Radio Conference, Geneva, 1979, shall effect the changeover from the old to the new assignment not later than:

- 1 July 1989 for frequency bands above 10 MHz; and
- 1 July 1994 for frequency bands below 10 MHz.

18 An administration shall promptly inform the Board of the date on which the changeover from an old to a replacement assignment takes place. The Board shall remove from that replacement assignment the special symbol placed in accordance with No. **1311** (see paragraph 11) in the Master Register, thus indicating that it has been implemented, and shall enter the date of the changeover in Column 2c. The date in Column 2c, originally recorded with the displaced assignment, shall be entered in the Remarks Column.

19.1 An administration, having effected the change to a replacement assignment of class of operation A, and having experienced harmful interference or having received a complaint of harmful interference involving another class of operation A assignment:

- a) shall make every effort with any other administration concerned to resolve the problem, and, if unsuccessful,
- b) may select and submit to the Board an alternative replacement assignment².

19.2 An administration, having effected the change to a replacement assignment of class of operation B, and having experienced harmful interference for this class of operation, may select and submit to the Board an alternative replacement assignment².

20 Following a favourable finding by the Board on the replacement assignment selected under paragraph 19.1 *b*) or 19.2, the administration shall be entitled to have inserted in Column 2d of the Master Register, against that assignment, the common date 1 January 1982 for class of operation A and 2 January 1982 for class of operation B.

Section VI – Relevance of Dates in the Master Register

21 The relevance of the dates related to displaced assignments is referred to in the Annex to Resolution **9** and Article **12**.

ANNEX B TO RESOLUTION 8 (Rev.Mob-87)

Interim procedure concerning notices relating to assignments in the bands between 4 000 kHz and 27 500 kHz allocated on an exclusive or shared basis to the fixed service

1 During the period between 1 January 1982 and 30 June 1984, an administration, having an urgent requirement which cannot possibly be delayed until the end of that period, may notify a new assignment in the bands between 4 000 kHz and 27 500 kHz allocated on an exclusive or shared basis to the fixed service. Such notices shall contain the information listed in the appropriate section of Appendix **1**.

² On request from an administration, the Board shall assist in the application of provision 19.1 *b*) or 19.2.

2 An administration submitting a notice in accordance with paragraph 1 above shall be deemed to accept that its assignment:

- a) shall be of an interim nature; and
- b) shall be subject to the review procedure contained in Annex C to this Resolution and shall then be modified if necessary to conform to the results of that review; and
- c) shall not cause harmful interference to any assignments recorded in the Master Register that are entitled to protection.

3 The Board, upon receipt of a complete notice under paragraph 1, shall examine it with respect to No. **1240** and shall return to the notifying administration any notice not complying with that provision together with the reasons for this action.

4 Notices in conformity with No. **1240** shall be included in a special section of the weekly circular, where they shall be annotated to show that they are subject to both the interim and review procedures contained in this Annex and Annex C to this Resolution respectively. Assignments notified under No. **1218** shall additionally be annotated to that effect.

5 The Board shall compile and maintain a Special List of all notices dealt with under paragraph 4.

ANNEX C TO RESOLUTION 8 (Rev.Mob-87)

Review procedure concerning notices relating to assignments for stations of the fixed service in the bands between 4000 kHz and 27500 kHz

1 The Board, commencing on 1 July 1984, shall examine under the appropriate provisions of Article **12** all interim assignments contained in the Special List compiled in accordance with Annex B to this Resolution with a view to recording them in the Master Register.

2 For the purposes of this examination, interim assignments shall be processed without priority being given to the assignments of any administration; however, assignments notified under No. **1218** shall be treated first.

3 All interim assignments shall be examined by the Board with respect to the probability of harmful interference from or to assignments entered in the Master Register on a provisional basis as a result of the application of Annex A to this Resolution. Depending on the findings of the Board subsequent to this examination, further action shall be as follows:

4 Favourable finding with respect to paragraph 3 above

4.1 The interim assignments notified under No. **1218** shall be recorded in the Master Register, and the date 1 July 1984 shall be entered in Column 2d.

4.2 The other interim assignments shall be examined under No. **1242** with respect to frequency assignments recorded in the Master Register at the date of commencement of the interim procedure described in Annex B to the present Resolution. Depending on the findings of the Board, the appropriate provisions of Article **12** shall be applied. When such assignments are to be recorded, the date 1 July 1984 shall be entered in Column 2d.

5 Unfavourable findings with respect to paragraph 3 above

The Board shall, having regard to the class of operation of assignments and the contents of the reconstructed Master Register, propose suitable replacement assignments and enter them on a provisional basis with the date of 1 July 1984 in Column 2d.

6 The Board shall, upon completion of this review, compile a Temporary List of recorded and proposed replacement assignments and publish it as an Annex to its weekly circular. A copy of this List, together with a national extract thereof, shall be sent to each administration having interim assignments in the Special List mentioned in § 1 of this Annex.

7 An administration, upon receipt of the List mentioned in paragraph 6, shall consider the proposed replacements for its interim assignments and shall, within five months of the date of publication of the Temporary List, inform the Board whether the proposed assignments are acceptable. If the proposed assignments are not acceptable, the administration shall give the reasons therefor.

8 Upon acceptance of a proposed assignment, the administration shall indicate the latest date of bringing into use. This date shall be within one year of the publication of the Temporary List.

9 The Board shall examine the replies under paragraph 7 and shall try, if necessary by applying small adjustments, to satisfy the administration concerned with respect to the proposed assignments it found unacceptable and propose alternative frequencies. Simultaneously, the Board shall replace the appropriate provisional entry by the new proposed frequency.

10 If, on 1 July 1985, provisional entries made under paragraph 5 or 9 have not been accepted by the administrations concerned, the Board shall replace these entries by the corresponding interim assignments appropriately annotated. As from that date neither the Special List nor the Temporary List shall be taken into consideration.

11 An administration, having an interim assignment for which no acceptable replacement assignment has been found, shall be free to select a new replacement and shall forward a new notice under the provisions of Article **12**. Upon request from an administration, the Board shall assist in the application of this provision.

RESOLUTION 10

Relating to the use of radiotelegraph and radiotelephone links by the Red Cross, Red Crescent, and Red Lion and Sun organizations

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the worldwide relief work of the Red Cross, Red Crescent, and Red Lion and Sun organizations is of increasing importance and often indispensable;
- b) that in such circumstances normal communication facilities are frequently overloaded, damaged, completely interrupted or not available;
- c) that it is necessary to facilitate by all possible measures the reliable intervention of these national and international organizations;
- d) that rapid and independent contact is essential to the intervention of these organizations;
- e) that for international relief work of the Red Cross, it is necessary that the national Red Cross, Red Crescent, and Red Lion and Sun organizations be able to communicate with each other as well as with the International Committee of the Red Cross and the League of Red Cross Societies,

decides to urge administrations

- 1 to take account of the possible needs of the Red Cross, Red Crescent, and Red Lion and Sun organizations for communication by radio 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 Table of Frequency Allocations; in the case of fixed circuits between 3 MHz and 30 MHz, the frequencies shall be selected, as far as possible, adjacent to the amateur bands;
- 3 to take all practicable steps to protect such links 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 14

Relating to the transfer of technology¹

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the terms of the Resolution relating to International Economic Development and Cooperation (3362(S-VII)) adopted by the United Nations General Assembly at its seventh special session, and the terms of Section III of this Resolution, which emphasizes the role of science and technology in development;
- b) the terms of General Assembly Resolution 32/160, which proclaims a Transport and Communications Decade in Africa in the period 1978-1987, during which a World Communications Year is scheduled to be proclaimed;
- c) the decisions of the General Assembly relating to the preparation of an international development strategy during the Third United Nations Development Decade, i.e. in the 1980s (Resolution 33/193),

noting

that, at the recent United Nations Conference on Science and Technology for Development, Vienna, August 1979, the governments adopted a Declaration relating to a Programme of Action aimed at accelerating the application of science and technology for development,

aware

of the importance of the application of science and technology in telecommunications for the purposes of developing the services and attaining social, economic and cultural objectives,

also aware

of the important role of the ITU as the United Nations specialized agency responsible for undertaking activities leading to the attainment of the objectives set forth in the Constitution of the International Telecommunication Union,

resolves to urge

1 *the governments of the Member States*, particularly those of the developing countries, and their administrations, to take steps to establish national telecommunication development policies to strengthen their technical cooperation activities in order to achieve the efficient

¹ WRC-97 made editorial amendments to this Resolution.

transfer of telecommunication technology, with a view to improving telecommunication services of all types, especially in the field of radiocommunications;

2 *administrations* to participate to the maximum extent practicable in the Study Groups of the Sectors of the Union, which are important forums for the transfer of information on the progress and application of telecommunication technology,

resolves to instruct the Secretary-General

1 to strengthen further those technical cooperation activities geared to the planning, setting up, maintenance and operation of telecommunication systems and to the training of staff for such purposes, with a view to accelerating the transfer and satisfactory application of technology in favour of development, having regard to the specific requirements of each country;

2 to seek, at the international level, the resources required to accelerate these technical cooperation programmes, particularly funds which could be allocated under the Vienna Programme of Action;

3 to bring the present Resolution to the notice of all the Member States and the competent bodies of the United Nations,

invites the Council

to keep abreast of the progress made in the attainment of the objectives set forth in this Resolution and to report on such progress, as appropriate, to the next Plenipotentiary Conference.

RESOLUTION 15

**Relating to international cooperation and technical assistance
in the field of space radiocommunications¹**

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 conflict¹

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 **S13** 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 **S13** 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 **S13** 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 (Mob-87)

**Technical cooperation with developing countries in
the field of aeronautical telecommunications**

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

considering

- a) that the allocations of the frequency bands and the provisions concerning the various aeronautical mobile services have been revised;
- b) that some of these frequency bands and provisions are intended for the worldwide implementation of new aeronautical telecommunication systems;
- c) that these new systems will employ more advanced techniques, such as satellite communications, in combination with modern information transmission media;
- d) that this technological modernization should serve to 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

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,

instructs the Secretary-General

1 to encourage the International Civil Aviation Organization (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 inform ICAO that this Conference has recognized the valuable cooperation provided by that organization to developing countries in its technical assistance programmes;

4 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 **S11** 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. **S11.31**;

* 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 **S7** and **S13**;

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 **S14**;

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 **S11**,

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 23 (WRC-95)

**Provisions applicable to the frequency assignments in
the non-planned bands below 28 000 kHz**

The World Radiocommunication Conference (Geneva, 1995),

considering

- a) that the provisions relating to the notification, examination and recording of the frequency assignments in the bands below 28 000 kHz were modified by this Conference, by suppressing, *inter alia*, provisions Nos. **1241-1245** of the Radio Regulations relating to the examination of the probability of harmful interference and the related re-submission and inquiry procedures for the frequency assignments in the bands that are not subject to Plans (provisions Nos. **1252-1265**, **1269-1273**, **1305-1308** and **1416-1420** of the Radio Regulations);
- b) that the application of the above procedures is time-consuming and requires manpower resources that may be more efficiently used for other tasks;
- c) that the application of the simplified Radio Regulations would lead to the review of all assignments recorded in the Master Register, in particular those which will be examined under the above provisions prior to the entry into force of the simplified Radio Regulations,

resolves

that, with effect from 18 November 1995, the Radiocommunication Bureau shall not examine with respect to Nos. **1241-1245** of the Radio Regulations, and shall not apply the related provisions to, frequency assignment notices in the non-planned bands below 28 000 kHz, including those received prior to 18 November 1995 and whose treatment was not completed by that date, and shall enter a remark in the Master Register for each assignment treated under this Resolution.

RESOLUTION 24 (WRC-95)

**Review of the provisions of the Constitution relating to
revisions of the Radio Regulations**

The World Radiocommunication Conference (Geneva, 1995),

noting

- a) that, pursuant to Nos. 29 and 31 of the Constitution of the International Telecommunication Union (Geneva, 1992), the Radio Regulations is an instrument of the Union which complements the provisions of the Constitution and the Convention;
- b) that the provisions of No. 216 of the Constitution only apply to revisions of the Radio Regulations adopted prior to 22 December 1992;
- c) that revisions of the Radio Regulations adopted after the aforementioned date are governed by Nos. 217 to 223 of the Constitution;
- d) that the decisions of this Conference shall in all circumstances be in conformity with the provisions of the Constitution and Convention (see No. 92 of the Constitution),

considering

- a) 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 Radio Regulations, so that countries or groups of countries may have equitable access to both (No. 196 of the Constitution);
- b) that the Radio Regulations should be applicable to all the Member States[‡];
- c) that ratification, acceptance or approval of the Constitution and Convention (Geneva, 1992) binds Member States[‡] to amendments of the Radio Regulations adopted prior to the date of signature of the Final Acts of the Additional Plenipotentiary Conference (Geneva, 1992);
- d) that subsequent amendments to the Radio Regulations apply, from the date of their provisional application, to all Member States[‡] who have signed the respective Final Acts, *provisionally to the extent permitted by their national law* for a period of three years (No. 217 of the Constitution), and that Member States[‡] are not required to make known the extent of this provisional application;
- e) that world radiocommunication conferences shall normally be convened every two years (No. 90 of the Constitution);

f) that Member States[‡] will be entitled to participate in such conferences with full voting rights even if they do not apply the previous revisions of the Radio Regulations;

g) that, during the period of provisional application, the status of application of the Radio Regulations in each Member State[‡] will be uncertain, and that as a result of the different time periods referred to in *considering d)* and *e)* above, it will become increasingly uncertain with each revision,

resolves to request the next ordinary Plenipotentiary Conference

to review the provisions of Nos. 217 to 223 of the Constitution in the light of the points raised under *noting* and *considering* in this Resolution,

resolves to invite Member States[‡]

1 to propose to the next ordinary Plenipotentiary Conference, in accordance with No. 224 of the Constitution, appropriate amendments to the provisions of the Constitution pertaining to the entry into force of the Administrative Regulations, in particular the Radio Regulations, considering any consequential impact on the scheduling of conferences;

2 in respect of the revisions of the Radio Regulations adopted by this Conference for provisional application prior to the next World Radiocommunication Conference (WRC-97), to advise the Secretary-General of the status of their provisional application, or whether they consent to be bound or not, prior to WRC-97,

instructs the Secretary-General

to inform WRC-97 of the Member States' [‡] responses in accordance with *resolves 2*.

RESOLUTION 25 (WRC-95)

Operation of global satellite systems for personal communications

The World Radiocommunication Conference (Geneva, 1995),

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 Council, at its 1995 session, resolved in its Resolution 1083 that the theme “global mobile personal communications by satellite” be discussed at the first World Telecommunication Policy Forum established by Resolution 2 of the Plenipotentiary Conference (Kyoto, 1994),

recognizing

- a) that the spectrum available to global satellite systems for personal communications is limited;
- b) that successful coordination does not in any way imply licensing authorization to provide a service within the territory of a Member State ‡,

considering further

that other countries intending to use these systems should be guaranteed that they will be operated in accordance with the Constitution, the Convention and the Administrative Regulations,

noting

- a) that the Constitution recognizes the sovereign right of each State to regulate its telecommunications;

- b) that the International Telecommunication Regulations “recognize the right of any Member, subject to national law and should it decide to do so, to require that administrations and private operating agencies, which operate in its territory and provide an international telecommunication service to the public, be authorized by that Member”, and specifies that “within the framework of the present Regulations, the provision and operation of international telecommunication services in each relation is pursuant to mutual agreement between administrations”;
- c) that Article **S18** specifies the authorities for licensing the operation of stations within any given territory;
- d) the right of each Member State[‡] to decide on its participation in these systems, and the obligations for entities and organizations providing international or national telecommunication services by means of these systems to comply with the legal, financial and regulatory requirements of the administrations in whose territory these services are authorized,

resolves

that administrations licensing global satellite systems and stations intended to provide public personal communications by means of fixed, mobile or transportable terminals shall ensure, when licensing these systems and stations, that they can be operated only from the territory or territories of administrations having authorized such service and stations in compliance with Articles **S17** and **S18**, in particular No. **S18.1**,

urges administrations and other Members of the Sectors

to participate in the first World Telecommunication Policy Forum dealing with global satellite systems for personal communications,

invites administrations

to cooperate with worldwide satellite system operators in establishing mutually beneficial arrangements for the provision of service within their territories,

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 S5 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 S6;
- 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 S5;
- 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 radiocommunication 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 radiocommunication conferences.

RESOLUTION 27 (Rev.WRC-97)

References to ITU-R and ITU-T Recommendations in the Radio Regulations

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that the principles of incorporation by reference were adopted by the WRC-95 and have been revised by this Conference (see Annex 1 to this Resolution);
- b) that there are provisions of the Radio Regulations which employ mandatory incorporation by reference but fail to make explicit reference to the ITU-R or ITU-T Recommendations incorporated;
- c) that the 1997 Conference Preparatory Meeting (CPM-97) for this Conference urged administrations to give further consideration to the status of material incorporated by reference:
- using the initial assessment provided by the Radiocommunication Bureau in the CPM Report and the set of principles given in Annex 1 to this Resolution;
 - noting that mandatory references shall be explicit and use the appropriate regulatory language;
 - taking into account the factors set out in Annex 2 to this Resolution;
- d) that the Director of the Radiocommunication Bureau has drawn up a list (see Annex 1 to the CPM Report to this Conference) of the provisions of the Radio Regulations using incorporation by reference, which provides an initial assessment of the status of each reference and forms the basis for the work on appropriate referencing, examples of which are contained in Annex 3 to this Resolution;
- e) that the Bureau has drawn up a list, contained in Annex 4 to this Resolution, of the ITU-R Recommendations to which explicit reference is made in the Radio Regulations,

resolves

that ITU-R and ITU-T Recommendations incorporated or proposed for incorporation by reference in the provisions of the Radio Regulations be identified and examined at WRC-99, with a view to establishing the correct method of reference in accordance with the principles set out in Annex 1 to this Resolution and taking into account the factors listed in Annex 2 to this Resolution, in order to complete the simplification of the Radio Regulations in respect of incorporation by reference,

instructs the Director of the Radiocommunication Bureau

to arrange for a review of the provisions of the Radio Regulations containing references to ITU-R or ITU-T Recommendations and propose suitable recommendations to the CPM-99 for inclusion in its Report to WRC-99, using the list of provisions contained in Annex 3 to this Resolution together with the guidance contained in Annexes 1 and 2 to this Resolution, and taking into account the list of ITU-R Recommendations contained in Annex 4 to this Resolution,

urges administrations

to use the CPM Report to WRC-99 in order to prepare their proposals on incorporation by reference to that Conference.

ANNEX 1 TO RESOLUTION 27 (Rev.WRC-97)

Principles of incorporation by reference

1 Where references are non-mandatory, it is not necessary to establish specific conditions in applying the texts quoted. In such cases, reference could, for example, be made to “the latest version” of a Recommendation.

2 Mandatory references to Resolutions or Recommendations of a world radiocommunication conference (WRC) are acceptable without restriction, since such texts will have been agreed by a WRC.

3 Where mandatory references are suggested, and the relevant texts are brief, the referenced material should be incorporated in the body of the Radio Regulations.

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 referenced text 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 referenced text must be adopted by the Plenary of a competent WRC, but should not be part of the Final Acts;

4.4 all texts incorporated by reference must be readily available, by being published in a separate volume;

4.5 if, between WRCs, a referenced text (e.g. an ITU-R Recommendation) is updated, the reference in the Radio Regulations shall continue to apply to the original version until such time as a competent WRC agrees to incorporate the new version of the reference. The mechanism for considering such a step is given in Resolution **28 (WRC-95)**.

ANNEX 2 TO RESOLUTION 27 (Rev.WRC-97)

**Factors to be considered for the further application of
incorporation by reference**

In reviewing the provisions of the Radio Regulations employing references to other texts, administrations and study groups should address the following factors:

- 1 whether each reference is mandatory, i.e. incorporated by reference, or non-mandatory;
- 2 whether in existing non-mandatory references, or mandatory references which are determined to be of non-mandatory character, appropriate linking language is used, e.g. the words “should” or “may”;
- 3 whether in existing mandatory references, or other types of reference which are determined to be of mandatory character, clear mandatory linking language is used, e.g. the word “shall”;
- 4 whether the incorporated ITU-R or ITU-T Recommendation(s) are explicitly identified;
- 5 where referenced ITU-R or ITU-T Recommendations are not explicitly identified, determine which ones should be identified;
- 6 whether text incorporated from ITU-R or ITU-T Recommendations should be placed directly in the Radio Regulations instead of using incorporation by reference;
- 7 if the ITU-R or ITU-T Recommendation to be incorporated is, as a whole, unsuitable as treaty status text, whether to limit the reference to those portions of the ITU-R or ITU-T Recommendation which are of a suitable nature or to place the mandatory portion directly in the Radio Regulations.

ANNEX 3 TO RESOLUTION 27 (Rev.WRC-97)

Provisions of the Radio Regulations referring to ITU-R and ITU-T Recommendations

A) Provisions of Articles of the Radio Regulations (RR) referring to ITU-R and ITU-T Recommendations

RR provision	Remark
S5.199 S5.287 S5.288 S19.38 S19.48 S19.92 S47.26 S47.27 S47.28 S47.29 S50.9 S51.35 S51.41 S51.77 S52.25 S52.27 S52.31 S52.69 S52.159 S52.181 S52.195 S52.222.1 S52.224 S52.229 S52.231 S52.240 S55.1 S57.1	<p>The reference to an ITU-R Recommendation in this provision is of a mandatory character and the referenced text is explicitly identified.</p> <p>Ensure that a standard method of reference is used.</p>
S1.14 S5.511A S52.23 S52.235*	<p>The reference to an ITU-R Recommendation in this provision seems to be of a mandatory character and the referenced text is explicitly identified, but a non-standard wording is used in this respect.</p> <p>There is a need to review these provisions with a view to using a standard wording.</p> <p>* The application of this provision is not mandatory but, if used, the referenced procedures are.</p>

A) Provisions of Articles of the Radio Regulations (RR) referring to ITU-R and ITU-T Recommendations (*continued*)

RR provision	Remark
<p>S3.2 S5.138 S5.458C S13.19 S21.1 S29.13 S32.5 S32.9.3 S32.21 S32.43 S32.64 S33.17 S33.37 S33.41 S34.1 S34.2 S51.25 S52.112 S58.1*</p>	<p>The incorporation by reference of an ITU-R Recommendation or an ITU-T Recommendation* in this provision is of a mandatory character, but the referenced text is not explicitly identified.</p> <p>There is a need to review these provisions with a view to identifying the referenced text explicitly and ensure that a standard method of reference is used.</p>
<p>S5.208A S5.503A S16.6 S21.2.2 S21.4.1 S29.12 S32.7 S51.71 S52.32 S52.63 S52.148 S52.152 S52.153 S52.234 S54.2** S56.2</p>	<p>The reference to an ITU-R Recommendation in this provision is of a non-mandatory character, but the referenced text is explicitly identified. No need for review, unless administrations wish to consider changing the character of this provision.</p> <p>** Consider whether the application and use of the procedures referenced are mandatory.</p>

A) Provisions of Articles of the Radio Regulations (RR) referring to ITU-R and ITU-T Recommendations (*end*)

RR provision	Remark
<p>S1.156 S3.4 S3.7 S3.14 S5.474 S9.50.1 S15.10 S15.12.1 S15.13.1 S16.1 S19.3 S19.23 S19.24 S19.112* S19.115* S19.126* S21.6.1 S21.12.1 S21.16.1 A.S22.1 S22.22.2 S22.26 S30.1 S56.7*</p>	<p>The reference to an ITU-R Recommendation or an ITU-T Recommendation* in this provision is of a non-mandatory character and the referenced text is not explicitly identified. No need for review, unless administrations wish to consider changing the character of this provision.</p>
<p>S16.2 S19.83 S52.149 S52.188 S52.192 S52.213</p>	<p>The reference to an ITU-R Recommendation in this provision is of an undefined character, but the referenced text is explicitly identified.</p> <p>There is a need to review these provisions with a view to indicating the character of the referenced text (i.e. mandatory or non-mandatory).</p>
<p>S1.153 S1.167 S26.6</p>	<p>The reference to an ITU-R Recommendation in this provision is of an undefined character and the referenced text is not explicitly identified.</p> <p>There is a need to review these provisions with a view to indicating the character of the referenced text (i.e. mandatory or non-mandatory) and, if it becomes mandatory, to identify the referenced text explicitly.</p>

B) Parts of Appendices **S1** to **S18** referring to ITU-R Recommendations and ITU-T Resolutions and Recommendations

Appendix provisions	Remark
<ul style="list-style-type: none"> – AP S4, Annex 2A, § C.11 <i>d</i>) – AP S5, Table S5-1, calculation method re No. S19.17A – AP S5, Annex 1, Tables 1-4 	<p>The reference to an ITU-R Recommendation in this provision is of a mandatory character and the referenced text is explicitly identified. Ensure that a standard method of reference is used.</p>
<ul style="list-style-type: none"> – AP S1, § 3.2 – AP S5, Table S5-1, threshold/condition re No. S19.21 – AP S5, Table S5-1, calculation method re No. S19.21 – AP S13, Part A5., Section I, § 1 <i>c</i>) – AP S16*, Section III, § 5 	<p>The reference to an ITU-R Recommendation or an ITU-T Resolution or Recommendation* in this provision is of a mandatory character, but the referenced text is not explicitly identified. There is a need to review these provisions with a view to identifying the referenced text explicitly and to ensure that a standard method of reference is used.</p>
<ul style="list-style-type: none"> – AP S4, Annex 2A, § C.8 – AP S5, Annex 1, § 1.2.1 and 1.2.3.2 	<p>The reference to an ITU-R Recommendation in this provision is of a non-mandatory character, but the referenced text is explicitly identified. No need for review, unless administrations wish to consider changing the character of this provision.</p>
<ul style="list-style-type: none"> – AP S1, § 2 – AP S2 – AP S3, Table – AP S3, § 12 and 13 – AP S11, Part B, § 3. – AP S12, § 6) – AP S13, Part A1, § 4A – AP S13, Part A6, Section IV, § 12 	<p>The reference to an ITU-R Recommendation in this provision is of a non-mandatory character and the referenced text is not explicitly identified. No need for review, unless administrations wish to consider changing the character of this provision.</p>

ANNEX 4 TO RESOLUTION 27 (Rev.WRC-97)

List of ITU-R Recommendations referred to in the Radio Regulations¹

Recommendation	Title	Status ²	Document	RR provision ³
ITU-R M.257-3	Sequential single frequency selective-calling system for use in the maritime mobile service	NOC	1997 M Series, Part 3	S19.38 , S19.83, S19.92 , S19.96A , S52.188, S52.222.1 , S52.235 , S54.2, AP S13, Part A5, § 11
ITU-R SF.356-4	Maximum allowable values of interference from line-of-sight radio-relay systems in a telephone channel of a system in the fixed-satellite service employing frequency modulation, when the same frequency bands are shared by both systems	NOC	1997 SF Series	AP S7, § 2.3.1, Note 2
ITU-R SF.357-4	Maximum allowable values of interference in a telephone channel of an analogue angle-modulated radio-relay system sharing the same frequency bands as systems in the fixed-satellite service	MOD	1997 SF Series	AP S7, § 2.3.1, Note 2
ITU-R F.405-1	Pre-emphasis characteristics for frequency modulation radio-relay systems for television	NOC	1990 CCIR, Volume IX	AP S30, Annex 5, § 3.1.1
ITU-R TF.460-5	Standard-frequency and time-signal emissions	MOD	1997 TF Series	S1.14
ITU-R S.465-5	Reference earth-station radiation pattern for use in coordination and interference assessment in the frequency range from 2 to about 30 GHz	MOD	1997 S Series	AP S30, Annex 6, § 2.1
ITU-R M.476-5	Direct-printing telegraph equipment in the maritime mobile service	NOC	1997 M Series, Part 3	S19.83 , S19.96A , S51.41
ITU-R S.483-3	Maximum permissible level of interference in a television channel of a geostationary-satellite network in the fixed-satellite service employing frequency modulation, caused by other networks of this service	MOD	1997 S Series	AP S30, Annex 6, § 1.5, Note 5
ITU-R M.489-2	Technical characteristics of VHF radiotelephone equipment operating in the maritime mobile service in channels spaced by 25 kHz	NOC	1997 M Series, Part 3	S51.77 , S52.231 , AP S13, Part A2, § 10 1) AP S18, Note e)
ITU-R M.492-6	Operational procedures for the use of direct-printing telegraph equipment in the maritime mobile service	NOC	1997 M Series, Part 3	S52.27 , S56.2

List of ITU-R Recommendations referred to in the Radio Regulations¹ (continued)

Recommendation	Title	Status²	Document	RR provision³
ITU-R M.493-9	Digital selective calling system for use in the maritime mobile service	MOD	1997 M Series, Part 3	S54.2
ITU-R BT.500-7	Methodology for the subjective assessment of the quality of television pictures	MOD	1997 BT Series	AP S30, Annex 6, § 1.6 <i>b</i>), footnote
ITU-R M.541-8	Operational procedures for the use of digital selective-calling (DSC) equipment in the maritime mobile service	MOD	1997 M Series, Part 3	S51.35 , S52.148, S52.149, S52.152, S52.153, S52.159 , S54.2
ITU-R P.618-5	Propagation data and prediction methods required for the design of Earth-space telecommunication systems	NOC	1997 P Series, part 2	AP S30, Annex 5, § 2.1 AP S30A, Annex 3, § 2.2 and 2.4
ITU-R M.625-3	Direct-printing telegraph equipment employing automatic identification in the maritime mobile service	NOC	1997 M Series, Part 3,	S19.83, S51.41
ITU-R M.627-1	Technical characteristics for HF maritime radio equipment using narrow-band phase-shift keying (NBPSK) telegraphy	NOC	1997 M Series, Part 3	S19.83, S51.41
ITU-R SF.675-3	Calculation of the maximum power density (averaged over 4 kHz) of an angle-modulated carrier	MOD	1997 SF Series	AP S4 (§ C.8 <i>a</i>), footnote ⁴
ITU-R M.690-1	Technical characteristics of emergency position-indicating radio beacons (EPIRBs) operating on the carrier frequencies of 121.5 MHz and 243 MHz	NOC	1997 M Series, Part 4	AP S13, Part A5, § 1 b) and 4 2) AP S15, Table S15-2, 121.5 MHz
ITU-R SF.765	Intersection of radio-relay antenna beams with orbits used by space stations in the fixed-satellite service	NOC	1997 SF Series	S21.22, S21.41, S29.12
ITU-R RA.769-1	Protection criteria used for radioastronomical measurements	MOD	1997 RA Series	S5.208A, S5.511A , S29.12 ⁵
ITU-R M.821-1	Optional expansion of the digital selective calling system for use in the maritime mobile service	MOD	1997 M series, Part 3	S54.2
ITU-R M.825-2	Characteristics of a transponder system using digital selective calling techniques for use with vessel traffic services and ship-to-ship identification	MOD	1997 M Series, Part 4	S54.2

List of ITU-R Recommendations referred to in the Radio Regulations¹ (continued)

Recommendation	Title	Status²	Document	RR provision³
ITU-R P.837-1	Characteristics of precipitation for propagation modelling	NOC	1997 P Series, Part 1	AP S30, Annex 5, § 2.1 AP S30A, Annex 3, § 2.1
ITU-R P.838	Specific attenuation model for rain for use in prediction methods	NOC	1997 P Series, Part 1	AP S30A, Annex 3, § 2.2
ITU-R P.841	Conversion of annual statistics to worst-months statistics	NOC	1997 P Series, Part 1	AP S30A, Annex 3, § 2.2
ITU-R IS.847-1	Determination of the coordination area of an earth station operating with a geostationary space station and using the same frequency band as a system in a terrestrial service	NOC	1997 IS Series	AP S5, Table S5-1 AP S5, Annex 2, Tables 2 and 3
ITU-R IS.848-1	Determination of the coordination area of a transmitting earth station using the same frequency band as receiving earth stations in bidirectionally allocated frequency bands	NOC	1997 IS Series	AP S5, Table S5-1
ITU-R IS.849-1	Determination of the coordination area for earth stations operating with non-geostationary spacecraft in bands shared with terrestrial services	NOC	1997 IS Series	AP S5, Table S5-1 AP S5, Annex 2, Tables 2 and 3
ITU-R SA.1071	Use of the 13.75 to 14.0 GHz band by the space science services and the fixed-satellite service	NOC	1997 SA Series	S5.503A
ITU-R M.1084-2	Interim solution for improved efficiency in the use of the band 156-174 MHz by stations in the maritime-mobile service	MOD	1997 M Series, Part 3	AP S18, Note e)
ITU-R SM.1138	Determination of necessary bandwidths including examples for their calculation and associated examples for the designation of emissions	NOC	1997 SM Series	AP S1, § 1 2) and 2 3.1)
ITU-R SM.1139	International monitoring system	NOC	1997 SM Series	S16.2, S16.6
ITU-R IS.1143	System specific methodology for coordination of non-geostationary space stations (space-to-Earth) operating in the mobile-satellite service with the fixed service	NOC	1995 IS Series	AP S5, Annex 1, § 1.2.1 and 1.2.3.2
ITU-R M.1169	Hours of service of ship stations	NOC	1997 M Series, Part 3	S47.26, S47.27, S47.28, S47.29, S50.9
ITU-R M.1170	Morse telegraphy procedures in the maritime mobile service	NOC	1997 M Series, Part 3	S51.71, S52.23, S52.25, S52.31, S52.32, S52.63, S52.69, S55.1

List of ITU-R Recommendations referred to in the Radio Regulations¹ (continued)

Recommendation	Title	Status²	Document	RR provision³
ITU-R M.1171	Radiotelephony procedures in the maritime mobile service	NOC	1997 M Series, Part 3	S51.71, S52.192, S52.195 , S52.213, S52.224 , S52.234, S52.240 , S57.1 , AP S13, Part A2, § 14A 1)
ITU-R M.1172	Miscellaneous abbreviations and signals to be used for radiocommunications in the maritime mobile service	NOC	1997 M Series, Part 3	S19.48 , S32.7, AP S13, Part A1, § 5
ITU-R M.1173	Technical characteristics of single-sideband transmitters used in the maritime mobile service for radiotelephony in the bands between 1 606.5 kHz (1 605 kHz Region 2) and 4 000 kHz and between 4 000 kHz and 27 500 kHz	NOC	1997 M Series, Part 3	S52.181 , S52.229 , AP S17, Part B, Section I, § 2, 6 a) and b)
ITU-R M.1174	Characteristics of equipment used for on-board communications in the bands between 450 and 470 MHz	NOC	1997 M Series, Part 3	S5.287 , S5.288
ITU-R M.1175	Automatic receiving equipment for radiotelegraph and radiotelephone alarm signals	NOC	1997 M Series, Part 3	AP S13, Part A5, § 9
ITU-R M.1185-1	Method for determining coordination distance between ground based mobile earth stations and terrestrial stations operating in the 148.0-149.9 MHz band	MOD	1997 M Series, Part 5	AP S5, Annex 1, § 3.2, Table 1 Resolution 46 (Rev.WRC-97), Annex 2, Table 1
ITU-R M.1187	A method for the calculation of the potentially affected region for a mobile-satellite service (MSS) network in the 1-3 GHz range using circular orbits	NOC	1997 M Series, Part 5	AP S4, § C.11 d)
ITU-R BO.1212	Calculation of total interference between geostationary-satellite networks in the broadcasting-satellite service	NOC	1997 BO Series	AP S30, Annex 5, § 3.2.4 AP S30A, Annex 3, § 3.9
ITU-R BO.1213	Reference receiving earth station antenna patterns for replanning purposes to be used in the revision of the WARC BS-77 broadcasting-satellite service plans for Regions 1 and 3	NOC	1997 BO Series	AP S30, § 11.1 AP S30, Annex 5, § 3.7.2
ITU-R BO.1293	Protection masks and associated calculation methods for interference into broadcast satellite systems involving digital emissions	NOC	1997 BO Series	AP S30, Annex 5, § 3.4 AP S30A, Annex 3, § 3.3

List of ITU-R Recommendations referred to in the Radio Regulations¹ (end)

Recommendation	Title	Status²	Document	RR provision³
ITU-R BO.1295	Reference transmit earth station antenna off-axis e.i.r.p. patterns for planning purposes to be used in the revision of the Appendix 30A (Orb-88) Plans of the Radio Regulations at 14 GHz and 17 GHz in Regions 1 and 3	NOC	1997 BO Series	AP S30A, § 9A.1 AP S30A, Annex 3, § 3.5.3
ITU-R BO.1296	Reference receive space station antenna patterns for planning purposes to be used for elliptical beams in the revision of the Appendix 30A (Orb-88) Plans of the Radio Regulations at 14 GHz and 17 GHz in Regions 1 and 3	NOC	1997 BO Series	AP S30A, § 9A.1 AP S30A, Annex 3, § 3.7.3
ITU-R BO.1297	Protection ratios to be used for planning purposes in the revision of the Appendices 30 (Orb-85) and 30A (Orb-88) Plans of the Radio Regulations in Regions 1 and 3	NOC	1997 BO Series	AP S30, Annex 5, § 3.4 AP S30A, Annex 3, § 3.3

¹ This list does not include ITU-R Recommendations referred to in Resolutions and Recommendations of world administrative radio conferences or world radio-communication conferences.

² Status as of date of the end of the 1997 Radiocommunication Assembly.

³ The provisions indicated in bold make reference to the listed ITU-R Recommendation in a mandatory manner, i.e. incorporated by reference

⁴ The reference in this provision is Recommendation ITU-R SF.675.

⁵ The reference in these provisions is Recommendation ITU-R RA.769.

RESOLUTION 28 (WRC-95)

**Revision of references to ITU-R Recommendations incorporated
by reference in the Radio Regulations**

The World Radiocommunication Conference (Geneva, 1995),

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;
- d) that, taking into account the rapid evolution of technology, ITU-R may revise the Recommendations incorporated by reference at short intervals;
- e) that revised and approved Recommendations will not have the same legal force as the initial Recommendations, incorporated by reference until a competent world radiocommunication conference has so decided;
- f) that it would be desirable to ensure, in the cases provided for in the Radio Regulations, that the provisions reflect the most recent technical developments,

resolves

- 1 that each Radiocommunication Assembly shall communicate to the following world radiocommunication conference a list of the ITU-R Recommendations incorporated by reference in the Radio Regulations which have been revised and approved during the elapsed study period;
- 2 that, on this basis, the WRC shall examine those revised 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, ITU-R shall continue publishing the ITU-R Recommendations currently referenced in the Radio Regulations;
- 4 that WRCs shall place the examination of Recommendations in conformity with *resolves 1* and *resolves 2* of this Resolution on the agenda of future WRCs,

urges administrations

to participate actively in the work of the Radiocommunication Study Groups and the Radiocommunication Assembly in the revision of those Recommendations to which mandatory references are made 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.

* This Resolution was abrogated by WRC-97.

RESOLUTION 30 (WRC-97)

Publication of the Weekly Circular including special sections

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that the Weekly Circular and the special sections, as referred to in Articles **S9** and **S11**, are currently published on paper, microfiche and diskette;
- b) that the form, content and periodicity of this publication need to be reviewed in order to improve its usability;
- c) that the International Frequency List (IFL) and the database of space radiocommunication stations are published every six months and the terrestrial plans are published on a yearly basis exclusively on CD-ROM;
- d) that significant improvements have been made in recent times in terms of cost reduction and availability of CD-ROM and CD-ROM readers;
- e) that large amounts of data may be more readily consulted if presented in an electronic format by using software;
- f) that the introduction of new technologies requires adaptation and appropriate training from a user's point of view, especially for developing countries;
- g) that information in electronic format could be used to fulfil administrations' database requirements,

further considering

- h) that the ITU budget makes provision for the distribution of one free copy of the Weekly Circular and the special sections to each administration;
- i) that the use of a CD-ROM format would significantly reduce the cost of publishing and distributing the Weekly Circular;
- j) that the use of electronic format is important for many administrations,

resolves

- 1 that the publication of the Weekly Circular and the special sections on paper and microfiche, as well on diskette, be migrated to a CD-ROM format, having regard to *resolves* 4 of this Resolution;
- 2 that this publication be fortnightly;

3 that tests should be conducted in cooperation with all administrations before introducing the CD-ROM publication replacing the Weekly Circular, including the special sections, published on paper, microfiche and diskette;

4 that, following the successful completion of these tests and for an introductory period of a minimum of three months ending 1 January 1999, the paper, microfiche and diskette format and the CD-ROM format should be provided in parallel;

5 that the search software to be made available on the CD-ROM should be capable of easily identifying and extracting to file Parts I, II and III of the Weekly Circular, the associated special sections for terrestrial and space assignments, as well as plan assignments;

6 that administrations are encouraged to discontinue usage of paper, microfiche and diskette as soon as possible and to inform the Radiocommunication Bureau accordingly,

instructs the Director of the Radiocommunication Bureau

1 to initiate the introduction of a CD-ROM format for the publication of the Weekly Circular including the special sections;

2 to consult with all the administrations during the testing phase of the new system;

3 to provide an index of Parts I, II, III and the special sections printed on paper, for those administrations requesting it;

4 to include in radiocommunication seminars appropriate training in the use of the CD-ROM format;

5 to make the data also available on TIES by remote electronic access on a subscription basis;

6 to set a reasonable price for the provision of additional copies of the CD-ROM,

further instructs the Director of the Radiocommunication Bureau

7 to consider an alternative name, if appropriate, for the Weekly Circular;

8 to report to the next world radiocommunication conference on the experience gained in the introduction of the CD-ROM format, with a view to making any necessary consequential amendments to the Radio Regulations,

requests the Secretary-General

to consider the provision of suitable software and/or hardware for the least developed countries requesting it.

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 service¹.

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 Weekly Circular. 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.

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 assignment³ 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;

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 prejudice 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 **S9** 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 **S30**; 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 **S21** (Table **S21-4**) shall apply in the countries mentioned in Nos. **S5.494** and **S5.496**;
- 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 S30 and S30A

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 **S30** and **S30A** 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 S30;
- b) to use modulation characteristics¹ 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 characteristics¹ 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;

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 **S30** or of Article 4 of Appendix **S30A**, 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 **S30** and the procedure of Article 6 or Article 7 of Appendix **S30A**.

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 **S30** or of Article 4 of Appendix **S30A**, 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 **S30** or in Annex 2 to Appendix **S30A**, 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 **S30** 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 **S30** 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 **S30** 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. **S9.7** or under Article 7 of Appendix **S30** or which has been published in accordance with No. **S9.2B** or of § 7.1.3 of Appendix **S30** and the appropriate limits of § 6 of Annex 1 to Appendix **S30** 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 **S30** 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 **S30** 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 **S30** 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 **S30A** 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 **S30A** and for which the limits set out in § 5 of Annex 1 to Appendix **S30A** 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. **S9.7** and the appropriate limits of § 1 of Annex 1 to Appendix **S30A** 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 **S30A** 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 **S30** or Article 5 of Appendix **S30A**, 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 **S30** or Article 4 of Appendix **S30A**, 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 service¹

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 allocated¹

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,

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 ($0^\circ \leq \Omega_j < 360^\circ$).

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 ($0^\circ \leq i_j < 180^\circ$).

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 ($0^\circ \leq \omega_i < 360^\circ$).

a = Semi-major axis.

e = Eccentricity ($0 \leq e < 1$).

ω_p = Argument of perigee, measured in the orbital plane, in the direction of motion, from the ascending node to perigee ($0^\circ \leq \omega_p < 360^\circ$).

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 years² 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 recommending 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/m²/4 kHz) at the Earth's surface.

* 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/m²/4 kHz) for networks for which complete Appendix 3 coordination information has been received by the Bureau prior to 1 November 1996.
- –140 dB (W/m²/4 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/m²/4 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 (A_z) 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_{A_z} for the azimuth A_z , using the following formula:

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

- by the following formula:

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

(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:

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

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

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

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)

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

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 § A2.1.2.2.1 is to be used.

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

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

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

where:

G_0 : maximum gain in the horizontal plane (dBi)

θ : radiation angle above the horizontal plane (degrees)

φ_3 (degrees) is given by:

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

where:

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

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)
		<i>P</i>	<i>r</i> dB/degrees	<i>P</i>	<i>r</i> 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:

$$\begin{array}{ll}
 P & \text{for } 0^\circ \leq \delta \leq 5^\circ \\
 P + r(\delta - 5) & \text{for } 5^\circ < \delta \leq 25^\circ \\
 P + 20r & \text{for } 25^\circ < \delta \leq 90^\circ
 \end{array}$$

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**): $-150 \text{ dB(W/m}^2\text{)}$ 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/m²/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/m²) 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	$-137 + 0.5(\delta - 5)$	-127	1 MHz
6 825-7 075 MHz	Fixed-satellite (space-to-Earth)	-154 and -134	-154 + 0.5($\delta - 5$) and -134 + 0.5($\delta - 5$)	-144 and -124	4 kHz 1 MHz
15.43-15.63 GHz	Fixed-satellite (space-to-Earth)	-127	5°-20°: -127 20°-25°: $-127 + 0.56(\delta - 20)^2$	25°-29°: -113 29°-31°: $-136.9 + 25 \log(\delta - 20)$ 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/m²) in any 1 MHz band for angles of arrival between 0° and 5° above the horizontal plane;

–115 + 0.5(δ – 5) dB(W/m²) in any 1 MHz band for angles of arrival δ between 5° and 25° above the horizontal plane;

–105 dB(W/m²) 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 6700-7075 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 –168dB(W/m²) 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/m²) in any 1 MHz band for angles of arrival between 0° and 5° above the horizontal plane;

–115 + 0.5(δ – 5) dB(W/m²) in any 1 MHz band for angles of arrival δ between 5° and 25° above the horizontal plane;

–105 dB(W/m²) 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/m²) in any 1 MHz band for angles of arrival between 0° and 5° above the horizontal plane;

–125 + (δ – 5) dB(W/m²) in any 1 MHz band for angles of arrival δ between 5° and 25° above the horizontal plane;

–105 dB(W/m²) 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 $\theta \leq 0^\circ$

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

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 Figure 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 (WRC-97)

Administrative due diligence applicable to some satellite communication services

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that Resolution 18 of the ITU 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 make a preliminary report to WRC-95 and a final report to this Conference;
- b) that the Director of the Radiocommunication Bureau provided a comprehensive report to this Conference including a number of recommendations for action as soon as possible and identifying areas requiring further study;
- c) that one of the recommendations in the Director's Report 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 this Conference, 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 (Geneva, 1992) sets out the basic principles for the use of the radio-frequency spectrum and the geostationary-satellite orbit, taking into account the needs of developing countries,

considering further

that this Conference has decided to reduce the regulatory time-frame for bringing a satellite network into use,

resolves

1 that the administrative due diligence procedure contained in Annex 1 to this Resolution shall be applied as from 22 November 1997 for a satellite network or satellite system of the fixed-satellite service, mobile-satellite service or broadcasting-satellite service for which the advance publication information under No. **S9.2B**, or for which the request for modifications of the Plans under Article 4, § 4.1 *b)* of Appendices **S30** and **S30A** that involve the addition of new frequencies or orbit positions, or for which the request for modifications of the Plans under Article 4, § 4.1 *a)* of Appendices **S30** and **S30A** that extends the service area to another country

or countries in addition to the existing service area, or for which the submission of information of Annex 2 of Appendix **S30B** under supplementary provisions applicable to additional uses in the planned bands as defined in Article 2 of that Appendix (Section III of Article 6 of Appendix **S30B**) has been received by the Bureau from 22 November 1997;

2 that for a satellite network or satellite system within the scope of § 1, 2 or 3 of Annex 1 to this Resolution not yet recorded in the Master International Frequency Register (MIFR), for which the advance publication information under No. **1042** of the Radio Regulations 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** of the Radio Regulations or the dates specified in the relevant provisions of Appendix **30** (§ 4.3.5), Appendix **30A** (§ 4.2.5 and 4.2.6) or Appendix **30B** (§ 6.57), 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, 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;

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 Weekly Circular;

6 that if the complete due diligence information is not received by the Bureau before the expiry date specified in *resolves* 2 or 3 above, the request for coordination or request for a modification to the Plans of Appendices **S30/30** and **S30A/30A** or for application of Section III of Article 6 of Appendix **S30B/30B** as covered by *resolves* 1 above submitted to the Bureau shall be cancelled. Any modifications of the Plans (Appendices **S30/30** and **S30A/30A**) shall lapse and any recording in the MIFR as well as recordings in the Appendix **S30B/30B** List shall be deleted by the Bureau after it has informed the concerned administration. The Bureau shall publish this information in the Weekly Circular,

further resolves

that the procedures in this Resolution are in addition to the provisions under Article **S9** or **S11** of the Radio Regulations or Appendices **S30/30**, **S30A/30A** or **S30B/30B**, as applicable, and, in particular, do not affect the requirement to coordinate under those provisions (Appendices **S30/30**, **S30A/30A**) in respect of extending the service area to another country or countries in addition to the existing service area,

instructs the Director of the Radiocommunication Bureau

to report to WRC-99 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 1998 Plenipotentiary Conference.

ANNEX 1 TO RESOLUTION 49 (WRC-97)

1 Any satellite network or satellite system of the fixed-satellite service, mobile-satellite service or broadcasting-satellite service with frequency assignments that are subject to coordination under Nos. **S9.7**, **S9.8**, **S9.9**, **S9.11**, **S9.12** and **S9.13**, Resolution **33 (Rev.WRC-97)**, and Resolution **46 (Rev.WRC-97)** shall be subject to these procedures.

2 Any modifications of the Plans under Article 4, § 4.1 *b*) of Appendices **S30/30** and **S30A/30A** that involve the addition of new frequencies or orbit positions or modifications of the Plans under Article 4, § 4.1 *a*) of Appendices **S30/30** and **S30A/30A** that extend the service area to another country or countries in addition to the existing service area shall be subject to these procedures.

3 Any submission of information under Annex 2 of Appendix **S30B/30B** under supplementary provisions applicable to additional uses in the planned bands as defined in Article 2 of that Appendix (Section III of Article 6 of Appendix **S30B/30B**) shall be subject to these procedures.

4 An administration requesting coordination for a satellite network under § 1 above shall send to the Bureau as early as possible before bringing into use, but in any case to be received before the end of the 5-year period established as a limit to bringing into use in No. **S9.1**, the due diligence information relating to the identity of the satellite network and the spacecraft manufacturer specified in Annex 2 to this Resolution.

5 An administration requesting a modification of the Plans of Appendices **S30/30** and **S30A/30A** under § 2 above shall send to the Bureau as early as possible before bringing into use, but in any case to be received before the end of the period established as a limit to bringing into

use in accordance with Appendix **S30/30**, § 4.3.5, and with Appendix **S30A/30A**, § 4.2.5 and 4.2.6, the due diligence information relating to the identity of the satellite network and the spacecraft manufacturer specified in Annex 2 to this Resolution.

6 An administration applying Section III of Article 6 of Appendix **S30B/30B** relating to additional uses under § 3. above shall send to the Bureau as early as possible before the bringing into use, but in any case so as to be received before the bringing into use, the due diligence information relating to the identity of the satellite network and the spacecraft manufacturer specified in Annex 2 to this Resolution.

7 The information to be submitted in accordance with § 4, 5 or 6 above shall be signed by an authorized official of the notifying administration or of an administration that is acting on behalf of a group of named administrations.

8 On receipt of the due diligence information under § 4, 5 or 6 above, the Bureau shall promptly examine that information for completeness. If the information is found to be complete, the Bureau shall publish the complete information in a special section of the Weekly Circular 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 Weekly Circular.

With respect to the request for modification of the Plans of Appendices **S30/30** and **S30A/30A** under § 2 above, the modification shall lapse if the due diligence information is not submitted in accordance with this Resolution.

With respect to the request for application of Section III of Article 6 of Appendix **S30B/30B** under § 3 above, the network shall also be deleted from the Appendix **S30B/30B** List, if applicable.

12 Before the Bureau extends the date of bringing into use under No. **S11.44**, the complete due diligence information under § 4 above shall have been submitted by the responsible administration.

13 An administration notifying a satellite network under § 1, 2 or 3 above for recording in the MIFR shall send to the Bureau as early as possible before bringing into use, but in any case before the date of bringing into use, the due diligence information relating to the identity of the satellite network and the launch services provider specified in Annex 2 to this Resolution.

14 When an administration has completely fulfilled the due diligence procedure but has not completed coordination, this does not preclude the application of No. **S11.41** by that administration.

ANNEX 2 TO RESOLUTION 49 (WRC-97)

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 Plans in Appendices **S30/30** and **S30A/30A**
- e)* Reference to the request for coordination (not applicable for Appendices **S30/30** and **S30A/30A**)
- f)* Frequency band(s)
- g)* Name of the operator
- h)* Name of the satellite
- i)* Orbital characteristics.

B Spacecraft manufacturer*

- a)* Name of the spacecraft manufacturer
- b)* Date of execution of the contract
- c)* Contractual “delivery window”
- d)* Number of satellites procured.

* NOTE – In cases where a contract for satellite procurement covers more than one satellite, the relevant information shall be submitted for each satellite.

C Launch services provider

- a)* Name of the launch vehicle provider
- b)* Date of execution of the contract
- c)* Anticipated launch or in-orbit delivery window
- d)* Name of the launch vehicle
- e)* Name and location of the launch facility.

RESOLUTION 50 (WRC-97)

Interval between world radiocommunication conferences

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that the Additional Plenipotentiary Conference (Geneva, 1992) concluded that, in general, world radiocommunication conferences should be held every two years in order for ITU to close the widening gap between its Radio Regulations and the current radiocommunication environment;
- b) that No. 90 of the Constitution states that world radiocommunication conferences shall normally be convened every two years; however, following the application of the relevant provisions of the Convention, such a conference need not be convened or an additional one may be convened;
- c) that serious concerns were expressed at this Conference about the extent of the agendas of the forthcoming world radiocommunication conferences, the limited time available for their preparation and the tendency to reconsider major issues at a subsequent conference,

recognizing

- a) the argument that extending the interval between world radiocommunication conferences to two and a half or three years would increase the time available for preparatory studies by Member States, Sector Members and the Radiocommunication Bureau;
- b) the counter-argument that efforts should be focused on establishing realistic and manageable agendas, rather than on extending the interval between conferences;
- c) the strategies enunciated in contributions to this Conference for limiting conference agendas to items requiring urgent regulatory action for which the necessary technical preparatory work can be completed;
- d) the further view that, if it is determined during the course of preparations for any given conference that preparatory studies related to a particular agenda item are not sufficiently mature to lead to substantive results, action on that item could include possible deferral until the following conference,

noting

that a decision to change the interval between world radiocommunication conferences will need to be based on a thorough analysis of the impact of such a change on the future financial plans of the Union and on the extent of the resources available to the secretariat to support such conferences,

resolves to invite

1 the Council, at its 1998 session, on the basis of information provided by the Bureau and the General Secretariat and taking into account the views of the relevant organs of the Union, to undertake an analysis as outlined under *noting* above, with a view to recommending a definitive course of action to the 1998 Plenipotentiary Conference on the feasibility of extending the interval between world radiocommunication conferences;

2 the 1998 Plenipotentiary Conference to determine an appropriate strategy and indicate in its decision whether changes to the Constitution and Convention will be required;

3 the 1998 Plenipotentiary Conference also to consider the feasibility of scheduling conferences in the future on a single theme or a limited number of themes,

invites the Secretary-General

to include this issue, as a matter of urgency, on the agenda of 1998 session of the Council.

RESOLUTION 51 (WRC-97)

Provisional application of certain provisions of the Radio Regulations as modified by WRC-97 and transitional arrangements

The World Radiocommunication Conference (Geneva, 1997),

considering

- a)* that as a result of the review under Resolution 18 (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 it was 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 this Conference, and it is necessary to provide for some transitional measures for the treatment of this information by the Radiocommunication Bureau,

resolves

- 1 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 this Conference, shall be applied by the Bureau and by administrations on a provisional basis as of 22 November 1997;
- 2 that, for satellite networks which are subject to coordination for which the API has been received by the Bureau prior to 22 November 1997 but the coordination data has not been received by the Bureau prior to this date, the responsible administration shall have until 22 November 1999 or the end of the period pursuant to the application of No. **1056A**, whichever date comes earlier, to submit the coordination data in accordance with the applicable provisions of the Radio Regulations; otherwise the Bureau shall cancel the relevant API in accordance with No. **1056A** or No. **S9.5D** as applicable;
- 3 that, for satellite networks for which the API has been received by the Bureau prior to 22 November 1997, the maximum allowed time period from the date of receipt 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)**);

4 that the revised Appendix **S4** with respect to the API for satellite networks which are subject to coordination under Section II of Article **S9** shall be applied as of 22 November 1997;

5 that, for those networks which are subject to coordination for which the API has been received but not yet published prior to 22 November 1997, the Bureau shall publish only the information of the revised Appendix **S4** as modified by this Conference.

RESOLUTION 52 (WRC-97)

Provisional application of Nos. S11.24 and S11.26 of the Radio Regulations adopted by WRC-97 with regard to high altitude platform stations

The World Radiocommunication Conference (Geneva, 1997),

considering

- a)* that this Conference has made provision for the operation of high altitude platform stations within the fixed service in the bands 47.2-47.5 GHz and 47.9-48.2 GHz;
- b)* that the Radio Regulations Board issued a provisional rule of procedure concerning notification periods in No. **S11.24/1228** in February 1997, pending a final decision by this Conference;
- c)* that this Conference modified No. **S11.24** and added No. **S11.26** to the effect that notices relating to assignments for high altitude platform stations in the bands 47.2-47.5 GHz and 47.9-48.2 GHz “shall reach the Radiocommunication Bureau not earlier than five years before the assignments are brought into use”;
- d)* that Resolution **122 (WRC-97)** gives the Bureau instructions concerning the treatment of notices for high altitude platform stations as from 22 November 1997,

resolves

that the provisions of Article **S11** (Nos. **S11.24** and **S11.26**) shall be applied by the Bureau and by administrations on a provisional basis from 22 November 1997.

RESOLUTION 53 (WRC-97)

Updating of the “Remarks” columns in the tables of Article 9A of Appendix S30A and Article 11 of Appendix S30 to the Radio Regulations

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that this Conference has adopted new texts relating to the symbols in the “Remarks” columns of Article 9A of Appendix **S30A** and Article 11 of Appendix **S30** to the Radio Regulations;
- b) that this Conference has adopted new entries in the “Remarks” columns of Article 9A of Appendix **S30A** and Article 11 of Appendix **S30**, on the understanding that the lists of identified administrations will be reviewed and revised, as appropriate, by WRC-99;
- c) that studies of compatibility between the revised Regions 1 and 3 broadcasting-satellite service (downlink and feeder link) Plans, and other services having allocations in the planned bands in all three Regions, and between the revised Regions 1 and 3 Plans and the Region 2 Plans, were performed during this Conference using data which had been received and published by the Radiocommunication Bureau at the time of this Conference under relevant provisions of the Radio Regulations;
- d) that it was not possible to analyse fully the effect of all assignments which were received before 27 October 1997 but which had not been processed at the time of this Conference;
- e) that in order to analyse fully the effect of assignments that have not been fully processed, it is necessary to process the assignments which were received prior to this Conference,

recognizing

- a) that the revised Regions 1 and 3 Plans must be compatible with the Region 2 Plans and with the other services which have primary allocations in the planned bands in all three Regions in accordance with principles adopted at this Conference;
- b) that the Bureau requires clear instructions from this Conference on how to complete the analyses and to finalize the entries to be included in the “Remarks” column of both Article 9A of Appendix **S30A** and Article 11 of Appendix **S30**;
- c) that the instructions to the Bureau shall take effect on 22 November 1997,

resolves

- 1 that the Bureau shall complete the required analyses based on the new Notes 3 to 7 in Section 9A.2 of Article 9A of Appendix **S30A** and Notes 5 to 7 in Section 11.2 of Article 11 of Appendix **S30** added during this Conference;
- 2 that the Radiocommunication Bureau shall publish the results of its analyses after this Conference, together with a modified “Remarks” column of Article 9A of Appendix **S30A** and Article 11 of Appendix **S30**, in the form of a circular-letter;
- 3 that once the circular-letter referred to in *resolves* 2 has been sent, administrations will have a period of 60 days to decide whether they do or do not wish to go on appearing as “affected administrations” in the relevant table. 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 new coordination requirements identified in the above-mentioned circular-letter shall apply provisionally from the date of the above-mentioned circular-letter until a decision is taken by WRC-99;
- 5 that the Bureau shall report the results of its analyses and the final lists of administrations to be included in the modified “Remarks” columns to WRC-99,

instructs the Secretary-General

to bring this Resolution to the attention of the Council, at its next session, with a view to including this item on the agenda of WRC-99.

RESOLUTION 54 (WRC-97)

Implementation of Resolution 46 (Rev.WRC-97)

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that this Conference has modified Resolution **46**;
- b) that the revised version of Resolution **46** is referred to in several footnotes in the Table of Frequency Allocations of the Radio Regulations that have been modified by this Conference;
- c) that these footnotes shall apply provisionally only as from 1 January 1999;
- d) that some administrations have expressed the wish to start the coordination procedure contained in Resolution **46 (Rev.WRC-97)** as soon as possible following this Conference,

considering further

that some administrations have already submitted information on projected networks,

instructs the Radiocommunication Bureau

to apply, as of 22 November 1997, the provisions of Resolution **46 (Rev.WRC-97)** to those bands in which the Resolution is mentioned.

RESOLUTION 60

Relating to information on the propagation of radio waves used in the determination of the coordination area

(See Appendix **S7/28**)

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that Appendix **S7/28** to the Radio Regulations provides a method for the determination of the coordination area which incorporates certain material concerned with radiowave propagation;
- b) that the propagation information contained in Appendix **S7/28** is based directly or indirectly on propagation data given in the texts of the ITU-R;
- c) that ITU-R studies of radiowave propagation are continuing, and therefore the conclusions of these studies are subject to change and may in future show the need to revise those sections of Appendix **S7/28** which incorporate the propagation information;
- d) that no radiowave propagation measurements have been carried out in some parts of the world,

recognizing

- a) that a period of several years is generally required to accumulate sufficient data to form reliable conclusions concerning radiowave propagation;
- b) that for administrative reasons it is desirable that the propagation information used for the determination of the coordination area should not be revised too frequently and, in any case, should be revised only if the effect of such revision on the size of the coordination area is significant;
- c) that in Appendix **S7/28** the coordination area is determined without the need for detailed knowledge of the propagation characteristics of individual paths, and it is desirable that this approach be maintained,

invites the ITU-R

to continue to study propagation data concerned with the determination of the coordination area, and to maintain the relevant ITU-R texts in a format which would permit direct insertion into Appendix **S7/28** in place of the existing § 3, 4 and 6 or Annex III,

resolves

1 that each Radiocommunication Assembly of the ITU-R should come to a conclusion as to whether, according to the propagation information given in the most recent ITU-R Recommendations, any revision of § 3, 4 and 6 or Annex III of Appendix **S7/28** to the Radio Regulations is warranted;

2 that when a Radiocommunication Assembly of the ITU-R has come to the conclusion that a revision of paragraphs 3, 4 and 6 or Annex III of Appendix **S7/28** is warranted, the Director of the Radiocommunication Bureau shall so inform the Secretary-General of the ITU and send him the proposed amendments to Appendix **S7/28**,

requests

1 that the Council then place, as an extraordinary item, on the agenda of the next world radiocommunication conference, the consideration of the conclusion of the ITU-R;

2 that, if the said world radiocommunication conference decides that the propagation information used in Appendix **S7/28** is to be revised, the Secretary-General, in consultation with the Bureau, incorporate the amendments agreed at the said conference in a document which contains the new text of paragraphs 3, 4 and 6 or Annex III of Appendix **S7/28** in a form suitable for direct substitution in the version of Appendix **S7/28** then in force, and send this document to all administrations,

decides

that from a date established by the said conference, the revised text shall form the basis of all subsequent determinations of the coordination area using Appendix **S7/28**.

RESOLUTION 63

Relating to the protection of radiocommunication services against interference caused by radiation from industrial, scientific and medical (ISM) equipment¹

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,

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 70 (WARC-92)

Establishment of standards for the operation of low-orbit satellite systems

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

- a) that the radio-frequency spectrum is a limited natural resource, to which all Member States[‡] should have access on equitable conditions;
- b) that the ITU is required to coordinate efforts to harmonize the development of telecommunication facilities, notably those using space techniques, with a view to taking the utmost advantage of their possibilities;
- c) that one of the purposes of the ITU is to foster collaboration among its Member States[‡] with a view to the establishment of rates at levels as low as possible consistent with an efficient service and with the independent and sound financial administration of telecommunications;
- d) that, in the performance of their studies, ITU-R and ITU-T are required to pay due attention to the study of questions and to the formulation of Recommendations directly connected with the establishment, development and improvement of telecommunications in developing countries at both the regional and international level;
- e) that the Telecommunications Development Bureau is required to carry out studies, as necessary, on technical, economic, financial, managerial, regulatory and general policy issues in the field of telecommunications;
- f) that Resolution 15 of the Plenipotentiary Conference (Nice, 1989), relating to the role of the ITU in the development of world telecommunications, establishes that the ITU should ensure that all its work reflects the position of the ITU as the authority responsible within the United Nations system for establishing in a timely manner technical and operational standards for all forms of telecommunication and for effecting the rational use of the radio-frequency spectrum;
- g) that ITU-T Recommendations provide for the apportionment of accounting revenues on international traffic between terminal countries, in principle on an equitable basis;
- h) that ITU-T and ITU-R Recommendations provide technical bases for a signalling and operational interface between terrestrial and satellite radio systems and public telecommunication networks;

i) that the Radio Regulations provide for the coordination of frequency assignments utilized by mobile satellite networks and that the ITU-R has been invited in Resolution **46 (Rev. WRC-97)** to study frequency sharing and coordination for the mobile-satellite service, with particular attention to low-orbit satellite systems,

recognizing

that current technological developments allow for the provision of telecommunication services through low-orbit satellite systems offering worldwide coverage, and that there are no standards governing the coordination, sharing and operation of such systems within the world telecommunication network,

bearing in mind

that only a very limited number of low-orbit satellite systems offering worldwide coverage could coexist in any given frequency band,

resolves

1 to invite the sectors of the ITU within their fields of competence to carry out, as a matter of priority, technical, regulatory and operational studies to permit the establishment of standards governing the operation of low-orbit satellite systems so as to ensure equitable and standard conditions of access for all countries and to guarantee proper worldwide protection for existing services and systems in the telecommunication network;

2 to invite administrations interested in, or affected by, the introduction and operation of low-orbit satellite systems to participate in such work as the sectors of the ITU may undertake in that connection.

RESOLUTION 72 (WRC-97)

Regional preparations for World Radiocommunication Conferences

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that many regional telecommunication organizations have coordinated their preparations for WRC-97;
- b) that a number of 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,

noting

- a) that at the World Telecommunication Development Conference (Buenos Aires, 1994) many regional telecommunication organizations expressed the need for the Union to cooperate more closely with regional telecommunication organizations;
- b) that consequently the Plenipotentiary Conference (Kyoto, 1994) resolved that the Union should develop stronger relations with regional telecommunication organizations,

further noting

that in some regions the relationship with the ITU-R regional offices has proved to be of great benefit,

resolves to instruct the Director of the Radiocommunication Bureau

a) to consult 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;
- information sessions;
- development of coordination methods;
- identification of major issues;
- facilitation of regional and interregional meetings;
- convergence of interregional views on major issues;

b) to submit a report on the results of the consultation to the Plenipotentiary Conference for consideration,

invites the Plenipotentiary Conference

to consider the report submitted by the Directors of the Radiocommunication Bureau (BR) and the Telecommunications Development Bureau (BDT) and take appropriate measures to provide the necessary resources for BR and BDT to provide the necessary assistance to regional telecommunication organizations in the preparations for world radiocommunication conferences.

RESOLUTION 73 (WRC-97)

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 (Geneva, 1997),

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 the fixed-satellite service (FSS) in Region 3;
- b)* that both services should have equitable access to the orbit and spectrum;
- c)* that at present, the procedures of Appendix **30** to the Radio Regulations applicable to the FSS in Region 3 in respect of the BSS Plan in Region 1 are such that only the Plan assignments are protected, so that it could lead to situations where an FSS system could receive interference from a BSS system, or vice versa, but for which currently there are no regulatory provisions which require any type of coordination procedure to be undertaken;
- d)* 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 the current Article 4 of Appendix **30** procedure, or are still applying the current Article 4 of Appendix **30** modification procedure. Some of these assignments have already been brought into use;
- e)* that some Region 3 FSS systems are currently operating, or are under coordination, applying relevant provisions of the Radio Regulations,

resolves

- 1 that the Radiocommunication Bureau shall apply the criteria of Annex 4 to Appendix **S30/30** to identify:
 - the BSS assignments in the 12.2-12.5 GHz frequency band, submitted under § 4.1 *a)* or 4.1 *b)* of Article 4 of Appendix **S30/30**, for which complete Annex 2 information has been received by the Bureau before 27 October 1997 and which are affected by Region 3 FSS networks for which complete Appendix **3** or Appendix **S4** information, submitted under § 7.2.1 of Article 7 of Appendix **S30/30**, has been received by the Bureau after the date of receipt of the above-mentioned Annex 2 information for BSS and before these modifications and additions have been included in the Regions 1 and 3 BSS Plan;
 - the Bureau shall also identify the administrations whose assignments affect these BSS assignments in the 12.2-12.5 GHz frequency band;

2 that the Bureau shall apply the criteria of Annex 1 to Appendix **S30/30** and relevant Rules of Procedure to identify:

- the Region 3 FSS networks in the frequency band 12.2-12.5 GHz for which complete Appendix **3** or Appendix **S4** information, submitted under § 7.2.1 of Article 7 of Appendix **S30/30**, has been received by the Bureau before 27 October 1997 and which are affected by BSS assignments in the frequency band 12.2-12.5 GHz, submitted under § 4.1 *a)* or 4.1 *b)* of Article 4 of the same Appendix, for which complete Annex 2 information has been received by the Bureau prior to the date of the receipt of the above-mentioned Appendix **3** or Appendix **S4** information but for which the date of inclusion of these modifications or additions in the BSS Plan is after the date of receipt of the above-mentioned Appendix **3** or Appendix **S4** information;
- the Bureau shall identify the administrations whose assignments affect the above-mentioned Region 3 FSS networks in the 12.2-12.5 GHz frequency band;

3 the administrations which have been identified by the Bureau in *resolves* 1 and 2 above shall make all possible mutual efforts to solve the interference problems.

NOTE 1 – The implications of this Resolution on the workload of the Bureau have to be taken into account.

NOTE 2 – Any retroactive application of this Resolution 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 80 (WRC-97)

Due diligence in applying the principles embodied in the Constitution

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that Articles 12 and 44 of the Constitution (Geneva, 1992) lay down the basic principles for the use of the radio-frequency spectrum and the geostationary-satellite orbit;
- b) that those principles have been incorporated in the Radio Regulations through No. **S0.3**;
- c) that, in accordance with Nos. **S11.30**, **S11.31** and **S11.31.2**, notices shall be examined with respect to the provisions of the Radio Regulations, including the provision relating to the basic principles, appropriate rules of procedure being developed for the purpose,

resolves

- 1 to instruct the Radio Regulations Board, as a matter of urgency and within the framework of Nos. **S11.30**, **S11.31** and **S11.31.2**, to develop the rules of procedure to be followed in examining due compliance with the principles reflected in No. **S0.3** in the process leading up to the recording of frequency assignments in the International Frequency Register. These rules shall be applied from a date to be decided by WRC-99;
- 2 that the Board shall circulate the draft of these rules of procedure to administrations by 31 October 1998 with a view to receiving comments by 31 March 1999;
- 3 that the Board shall submit to WRC-99 a detailed report on the action taken on this Resolution.

RESOLUTION 95 (WRC-97)

**General review of the Resolutions and Recommendations of
world administrative radio conferences and world
radiocommunication conferences**

The World Radiocommunication Conference (Geneva, 1997),

considering

a) that it is important to keep the Resolutions and Recommendations of the past world administrative radio conferences and world radiocommunication conferences under constant review, in order to keep them up to date;

b) that the Report of the Director of the Radiocommunication Bureau submitted to this Conference provided a useful basis for a general review of the Resolutions and Recommendations of past conferences which was conducted by this Conference,

invites future competent world radiocommunication conferences

to review the Resolutions and Recommendations of previous conferences with a view to their possible revision, replacement or abrogation and to take appropriate action,

instructs the Director of the Radiocommunication Bureau

to conduct a general review of the Resolutions and Recommendations of previous conferences and, if necessary after consultation with the Radiocommunication Advisory Group and the Chairmen of the relevant Radiocommunication Study Groups, to submit a Report to future competent world radiocommunication conferences which indicates their current status, and what follow-up action may be advised.

RESOLUTION 105 (Orb-88)

Improvement of the quality of certain allotments in Part A of the fixed-satellite service Plan¹

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,

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 GHz¹**

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. **S5.444** 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. **S5.444** and **S5.444A** 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.

RESOLUTION 121 (Rev.WRC-97)

Continued development of interference criteria and methodologies for fixed-satellite service coordination between feeder links of non-geostationary satellite networks in the mobile-satellite service and geostationary-satellite networks in the fixed-satellite service in the bands 19.3-19.7 GHz and 29.1-29.5 GHz

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that WRC-95 made provision for use of the bands 19.3-19.6 GHz and 29.1-29.4 GHz by feeder links of non-geostationary mobile-satellite service (non-GSO MSS) networks and this Conference made provision for an additional 2×100 MHz in the bands 19.6-19.7 GHz and 29.4-29.5 GHz;
- b) that coordination between feeder links of non-GSO MSS networks, and geostationary fixed-satellite service (GSO FSS) networks and terrestrial networks in these bands will be in accordance with Annex 2 of Resolution **46 (Rev.WRC-97)**/Annex 1 of Appendix **S5**;
- c) that simultaneous operation of GSO FSS networks and feeder links of non-GSO MSS networks will in most cases result in short-term, high-level interference between such networks, unless interference mitigation techniques are applied by both types of network;
- d) that the Conference Preparatory Meeting (CPM) Report to this Conference concluded that, of the interference mitigation techniques that were studied, the use of adaptive power control, high-gain antennas and geographic isolation “appear to offer the most benefit in improving the sharing between non-GSO MSS feeder links and GSO FSS networks”;
- e) that ITU-R has developed a Recommendation containing several alternative methodologies for deriving long-term and short-term interference criteria applicable for sharing between non-GSO MSS feeder links and GSO FSS networks;
- f) that further development of the Recommendation in *considering e)* would facilitate the determination of appropriate interference mitigation techniques;
- g) that No. **S5.541A** requires the use of interference mitigation techniques in order to facilitate coordination of feeder links of non-GSO MSS networks with GSO FSS networks;
- h) that the continued development and implementation of interference mitigation techniques would facilitate the coordination of feeder links of non-GSO MSS networks with GSO FSS networks when the interference between such networks exceeds the applicable permissible interference criteria,

resolves to invite ITU-R

1 to undertake, as a matter of urgency, the continued development of appropriate permissible interference criteria for both non-GSO MSS feeder links and GSO FSS networks operating in the bands 19.3-19.7 GHz and 29.1-29.5 GHz;

2 to undertake, as a matter of urgency, studies of interference mitigation techniques (including those techniques listed in *considering d*)) which could facilitate coordination between non-GSO MSS feeder links and GSO FSS networks;

3 to undertake, as a matter of urgency, studies to develop coordination methodologies for GSO FSS networks and non-GSO MSS feeder links operating in the bands 19.3-19.7 GHz and 29.1-29.5 GHz on an equal basis,

urges administrations

to participate actively in the aforementioned studies by submitting contributions to ITU-R,

instructs the Director of the Radiocommunication Bureau

to report on the progress of these studies to WRC-99.

RESOLUTION 122 (WRC-97)

Use of the bands 47.2-47.5 GHz and 47.9-48.2 GHz by high altitude platform stations in the fixed service and by other services

The World Radiocommunication Conference (Geneva, 1997),

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 this Conference has made provision for operation of high altitude platform stations, 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 benefit of the new telecommunication technologies to all the world’s inhabitants” (No. 6 of the Constitution of the ITU (Geneva, 1992));
- 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 high altitude platform systems are in an advanced stage of development and some countries have notified such systems to ITU;
- f) that the Radio Regulations Board issued a provisional rule of procedure concerning notification periods in No. **S11.24/1228** in February 1997;
- g) that in spite of the urgency attached to the development of such systems, technical, sharing and regulatory issues should be studied in order to achieve the most efficient use of the spectrum available for these systems;
- h) that technical studies are required in order to ascertain the extent to which sharing of the bands 47.2-47.5 GHz and 47.9-48.2 GHz is feasible between systems using high altitude platforms in the fixed service and systems in the fixed, fixed-satellite and mobile services, and to ascertain the requirements to protect radio astronomy services in adjacent bands from spurious emissions;
- i) that the radio astronomy service has primary allocations in the bands 42.5-43.5 GHz and 48.94-49.04 GHz;
- j) that ITU-R studies are already under way on the preferred characteristics of systems using high altitude platforms and the feasibility of sharing between these systems and systems of other services and between these systems and other systems in the fixed service (Questions ITU-R 212/9, ITU-R 218/9 and ITU-R 251/4);

k) that No. **S5.552** urges administrations to reserve fixed-satellite service use of the band 47.2-49.2 GHz for feeder links for the broadcasting-satellite service, and that preliminary ITU-R studies indicate that high altitude platform stations in the fixed service may share with broadcasting-satellite feeder links;

l) that the development of services using high altitude platform stations in these bands requires major investment and that manufacturers and operators should be given the confidence to make the necessary investment in these applications,

resolves

1 to urge administrations to facilitate coordination between high altitude platform stations in the fixed service operating in the bands 47.2-47.5 GHz and 47.9-48.2 GHz and other co-primary services in their territory and adjacent territories;

2 that, on a provisional basis, the procedures of Article **S9** shall be used for coordination between satellite systems and high altitude platform systems;

3 to request ITU-R to carry out urgently studies on the appropriate technical sharing criteria for the situations referred to in *considering h*), with priority given to the sharing with other systems in the fixed and fixed-satellite services, in particular the determination of the appropriate geographical separation from feeder links in the broadcasting-satellite service;

4 that WRC-99 should review the results of these studies and consider refinement of the regulatory provisions that might facilitate a broader application of these high altitude platform technologies,

instructs the Director of the Radiocommunication Bureau

1 that notices concerning high altitude platform stations 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 h*) and review of the notification process by WRC-99, the Bureau shall accept notices in the bands 47.2-47.5 GHz and 47.9-48.2 GHz only for high altitude platform stations in the fixed service and for feeder links for the broadcasting-satellite service, shall continue to process notices for fixed-satellite service 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 123 (WRC-97)

Feasibility of implementing feeder links of non-geostationary satellite networks in the mobile-satellite service in the band 15.43-15.63 GHz (space-to-Earth) while taking into account the protection of the radio astronomy service, the Earth exploration-satellite (passive) service and the space research (passive) service in the band 15.35-15.4 GHz

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that the band 15.43-15.63 GHz (space-to-Earth) is allocated to the fixed-satellite service on a primary basis for use by feeder links to non-geostationary (non-GSO) systems in the mobile-satellite service (MSS);
- b) that this band is shared with aeronautical radionavigation services on a primary basis;
- c) that No. **S4.10** applies to the use of the band by aeronautical radionavigation services;
- d) that, in accordance with No. **S5.511B**, aircraft stations were not permitted to transmit in the band 15.45-15.65 GHz;
- e) that this Conference recognized that airborne transmitters were operating in the aeronautical radionavigation service in the 15.43-15.63 GHz band;
- f) that the feasibility of designing and operating feeder links in the space-to-Earth direction with the power flux-density limits in Table **S21-4** of Article **S21** has not been studied by ITU-R;
- g) that the band 15.35-15.4 GHz is allocated on a co-primary basis for exclusively passive use by the radio astronomy service, the Earth exploration-satellite service and the space research service and protection from harmful interference from space stations is needed;
- h) that No. **S5.511A** provides that harmful interference shall not be caused to the radio astronomy service by MSS feeder links operated in the band 15.43-15.63 GHz;
- i) that out-of-band emissions from MSS space stations in the band 15.43-15.63 GHz may cause interference to the radio astronomy service in the band 15.35-15.4 GHz;
- j) that Recommendation ITU-R RA.769-1 specifies the levels of interference which are detrimental to the radio astronomy service, which may not be easily met by non-GSO MSS feeder links operating in the space-to-Earth direction,

invites ITU-R

1 to study, as a matter of urgency, in preparation for WRC-99, the feasibility of implementing non-GSO MSS feeder links in the band 15.43-15.63 GHz, taking into account the above *considering*;

2 to study, as a matter of urgency, the interference potential of feeder links for non-GSO MSS satellites to the radio astronomy service in the 15 GHz band and develop Recommendations to reduce the out-of-band interference,

resolves

that WRC-99 should review the results of the above studies and take appropriate action, including possible adjustments in spectrum allocations.

RESOLUTION 124 (WRC-97)

**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 (Geneva, 1997),

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 No. **S5.464**;
- b)* that the power flux-density limits given in Table **S21-4** of Article **S21** apply to emissions from space stations of the Earth exploration-satellite service (space-to-Earth);
- c)* that, for those administrations where the secondary allocation applied before this Conference, geostationary orbital avoidance was not required for the fixed service and, therefore, the power flux-density limits given in Table **S21-4** of Article **S21** may give rise to excessive interference to the fixed service;
- d)* that the administrations identified by No. **S5.462A** have adopted provisional power flux-density limits lower than those shown in Table **S21-4** of Article **S21** to protect the fixed service;
- e)* that no studies have 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 has not been implemented by stations of the fixed service,

considering further

that the band 8 025-8 400 MHz is used extensively by the fixed service in accordance with ITU-R 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,

resolves

to invite ITU-R to study, as matter of urgency, the required power flux-density limits to be applied to space stations of geostationary-satellite systems in the Earth exploration-satellite service (space-to-Earth) in the frequency band 8025-8400 MHz where geostationary orbital avoidance has not been implemented by the fixed service sharing the band,

urges administrations

to provide ITU-R with the necessary technical parameters of fixed-service links requiring protection in this frequency band.

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. **S5.372** 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. **S29.13/2904** applies)”; and that Article **S29/36** 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 126 (WRC-97)

**Use of the frequency band 31.8-33.4 GHz for high-density systems
in the fixed service**

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that in the frequency band 31.8-33.4 GHz, high-density systems in the fixed service, if deployed, might cause interference to or receive interference from stations in the existing services and that the priority and degree of protection afforded to each service is a matter for each administration to consider;
- b) that the band 31.8-33.4 GHz is allocated on a primary basis to the fixed and radionavigation services and that portions of the band are allocated on a primary basis to the space research (deep space) and inter-satellite services;
- c) that sharing criteria for the fixed and other services in the frequency band 31.8-33.4 GHz have not yet been developed within ITU-R,

resolves

- 1 that the date of the provisional application of the allocation to the fixed service in the frequency band 31.8-33.4 GHz is 1 January 2001;
- 2 that WRC-99 should review this allocation, including the date of 1 January 2001, taking full account of the future requirements and development of the other services to which the band is allocated and available ITU-R studies,

requests ITU-R

to conduct, as a matter of urgency and in time for WRC-99, the appropriate studies to determine what criteria would be necessary for sharing between stations in the fixed service and stations in the other services to which the frequency band 31.8-33.4 GHz is allocated.

RESOLUTION 127 (WRC-97)

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 (Geneva, 1997),

considering

- a)* that the agenda of this Conference included consideration of the adoption of additional allocations for non-geostationary (non-GSO) satellite systems in the mobile-satellite service (MSS);
- b)* that the Report of the 1997 Conference Preparatory Meeting (CPM-97) stated that the Radiocommunication Bureau has identified at least 23 non-GSO MSS networks 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, bit 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, since CPM-97, one administration has carried out additional analyses and hardware demonstrations with a view to determining the feasibility of sharing between non-GSO MSS feeder links and services such as the Earth exploration-satellite (passive), radio astronomy and space research (passive) services in bands around 1.4 GHz;
- e)* that factors taken into account by these 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;

f) that factors taken into account by these 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,

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-97)** 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 a former resolution identified issues relating to frequency sharing between the MSS and terrestrial services at frequencies below 3 GHz as being among the urgent studies required in preparation for this Conference;

c) that one administration performed such studies, which were submitted to ITU-R, but these studies could not be considered due to time limitations;

d) that, since WRC-95, one administration has performed studies 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,

resolves

1 to invite ITU-R, as a matter of urgency, to carry out studies to determine the operational and technical measures required to facilitate sharing in portions of the band 1 390-1 400 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 invite ITU-R, as a matter of urgency, to carry out studies to determine operational and technical means to facilitate sharing, in portions of the band 1 427-1 432 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 invite ITU-R, as a matter of urgency, to study operational and technical measures required 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;

4 to invite a future competent conference* to consider, on the basis of completion of studies referred to in *resolves* 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.

* *Note by the Secretariat* – See Resolution **722 (WRC-97)**.

RESOLUTION 128 (WRC-97)

Allocation to the fixed-satellite service (space-to-Earth) in the 41.5-42.5 GHz band and protection of the radio astronomy service in the 42.5-43.5 GHz band

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that this Conference has added a primary allocation to the fixed-satellite service (space-to-Earth) in the band 41.5-42.5 GHz in Regions 2 and 3 and in certain countries in 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 unwanted emissions from space stations in the fixed-satellite service (space-to-Earth) 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;
- c) that various technical means may be used to reduce these unwanted emissions from space stations in the fixed-satellite service;
- d) that a limited number of radio astronomy stations worldwide require protection, and that there may be means to limit the susceptibility of radio astronomy receivers to interference,

taking into account

the relevant provisions of the Radio Regulations,

resolves

that administrations shall not implement fixed-satellite systems in the band 41.5-42.5 GHz 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,

invites ITU-R

- 1 to study, as a matter of urgency, the harmful interference that space stations in the fixed-satellite service (space-to-Earth) operating in the band 41.5-42.5 GHz may cause to stations in the radio astronomy service operating in the band 42.5-43.5 GHz;
- 2 to identify technical and operational measures that may be taken 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 space stations operating in the fixed-satellite service in the band 41.5-42.5 GHz, as well as measures that may be implemented to reduce the susceptibility of stations in the radio astronomy service to harmful interference;

3 to report on the results of these studies to the Conference Preparatory Meeting for WRC-99,

urges administrations

to participate actively in the aforementioned studies by submitting contributions to ITU-R,

requests

WRC-99 to take appropriate action based on those studies.

RESOLUTION 129 (WRC-97)

Criteria and methodologies for sharing between the fixed-satellite service and other services with allocations in the band 40.5-42.5 GHz

The World Radiocommunication Conference (Geneva, 1997),

considering

- a)* that this Conference has added a primary allocation to the fixed-satellite service (space-to-Earth) in Regions 2 and 3 and in certain countries in Region 1 and to the fixed service in the band 40.5-42.5 GHz;
- b)* that these allocations will provide flexibility to those administrations that seek to implement systems in the bands between 36 GHz and 50 GHz;
- c)* that space service networks (fixed-satellite service and broadcasting-satellite service) will share the band 40.5-42.5 GHz on a primary basis with the fixed and broadcasting services;
- d)* that § 7.5 of the Report of the Conference Preparatory Meeting to this Conference recognized that sharing of spectrum in frequency bands above 30 GHz between the fixed service and one or more other services could result in service impairments, and that there may be utility in further study of the feasibility of co-frequency sharing between the fixed service and other services with allocations in these bands;
- e)* that it may be useful to consider the identification of this spectrum range for high-density fixed service applications;
- f)* that given *considering a) to e)*, it would be useful to conduct such studies in the band 40.5-42.5 GHz;
- g)* that the new co-primary allocations to the fixed-satellite service and fixed service referred to in *considering a)* above are in the band adjacent to the band 42.5-43.5 GHz, which is the subject of an ITU-R study programme under Resolution **128 (WRC-97)**;
- h)* that there is a need to establish sharing criteria, including power flux-density limits, to facilitate the co-existence of the space and terrestrial services with allocations in the band 40.5-42.5 GHz,

resolves to invite ITU-R

- 1 to undertake, as a matter of urgency, studies of appropriate criteria and methodologies for sharing, including power flux-density limits, between the fixed-satellite service and the other services with allocations in the band 40.5-42.5 GHz;
- 2 to report on the results of these studies to the Conference Preparatory Meeting for WRC-99,

urges administrations

to participate actively in the aforementioned studies by submitting contributions to ITU-R,

requests

WRC-99 to take appropriate action based on the results of those studies.

RESOLUTION 130 (WRC-97)

Use of non-geostationary systems in the fixed-satellite service in certain frequency bands

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that the International Telecommunication Union 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 of the International Telecommunication Union (Geneva, 1992));
- b) that it is desirable, in this respect, to promote systems capable of providing universal service;
- c) that new telecommunication services need advanced and reliable networks permitting high-capacity communications;
- d) the need to encourage the development and implementation of new technologies;
- e) that systems based on the use of new technologies associated with both geostationary (GSO) and non-geostationary (non-GSO) satellite constellations are capable of providing the most isolated regions of the world with high-capacity and low-cost means of communication;
- f) 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;
- g) that all Member States[‡] would benefit from the implementation of proposed systems in the allocated spectrum and from avoidance of monopolization or exclusive use of an allocation by a single system;
- h) that the operation of such systems requires a suitable amount of spectrum in appropriate frequency bands;
- i) that decisions on this matter should permit the operation of as many systems as possible;
- j) that, in spite of the urgency attached to the development of such systems, technical, operational and regulatory issues should be studied in order to achieve the most efficient use of the spectrum that may be available for these systems;
- k) that there is a need for the provision of services on a competitive basis between GSO fixed-satellite service (FSS) and non-GSO FSS systems as well as between non-GSO FSS and non-GSO FSS systems;

l) that the Radio Regulations must be sufficiently flexible to accommodate the introduction and implementation of innovative technologies as they evolve, and allow the further development and implementation of any proposed system in conformity with their provisions,

considering further

a) that further technical, operational and regulatory studies are required in order to determine further the conditions under which sharing of the frequency bands 10-30 GHz which are allocated to the FSS and where Resolution **46 (Rev.WRC-97)** does not apply is feasible between GSO and non-GSO systems, between non-GSO systems and between non-GSO and terrestrial systems;

b) that it is likely that non-GSO FSS systems communicated to the Radiocommunication Bureau will not be brought into use before the WRC-99;

c) that the diverging interpretations arising from No. **S22.2** result in an ambiguous regulatory status for both existing and future GSO and non-GSO systems in the FSS in the bands where this provision applies, with consequential risks for both types of systems;

d) that the harmonious development of non-GSO and GSO systems in the FSS requires that these ambiguities be resolved with no further delay;

e) that in resolving these ambiguities in the bands referred to in *resolves* 1 below, the GSO arc must be protected to ensure continued use of existing FSS systems and the development of new GSO technologies and systems in both non-planned bands and bands where plans exist;

f) that these ambiguities may be resolved in certain frequency bands by adopting power flux-density (pfd) limits which would apply to non-GSO FSS systems to protect GSO FSS systems, and by including in Article **S22** limits on the power radiated by non-GSO FSS systems in order adequately to protect GSO FSS systems in the frequency bands and sharing situations where Resolution **46 (Rev.WRC-97)** does not apply;

g) that in certain frequency bands which are currently used or planned to be used extensively by GSO FSS systems, provisional power flux-density limits applicable to non-GSO FSS systems have been developed;

h) that non-GSO FSS systems have been proposed in some of these bands which could meet these limits and would not require specific protection from existing and future GSO FSS systems, provided that minimum constraints are applied to GSO FSS systems, such as off-axis earth station e.i.r.p. limits;

i) that in the bands where the limits referred to in *considering further f), g) and h)* would apply, there would be no need for a coordination procedure between non-GSO FSS and GSO systems, with the exception of coordination between earth stations operating in opposite directions of transmission;

- j)* that there would be a need for a coordination procedure between non-GSO systems in the FSS and between non-GSO FSS systems and non-GSO systems in other services and for specific sharing criteria associated with this procedure, taking into consideration various types of non-GSO systems, including those in highly elliptical orbits;
- k)* the need to protect other co-primary services having allocations in the frequency bands referred to in *considering further a)* above and the need to assess further the sharing conditions between non-GSO FSS systems and these services;
- l)* that further studies on sharing conditions in frequency bands other than the 10-30 GHz frequency bands, where Resolution **46 (Rev.WRC-97)** does not apply, may also be necessary on the basis of the requirements that may emerge,

noting

- 1 that information relating to GSO and non-GSO systems in the FSS in the 10-30 GHz bands has been communicated to the Bureau;
- 2 that some of these systems are in operation and others will be operated in the near future and, consequently, difficulties may be experienced in modifying their characteristics;
- 3 the need to protect existing and future terrestrial and space services and systems;
- 4 that No. **S22.2** is an operational provision which is to be applied between administrations, and does not require any specific action or finding by the Bureau,

recognizing

that the geostationary-satellite orbit and its associated spectrum are a uniquely valuable resource and that equitable access to this resource needs to be protected for all countries in the world,

resolves

- 1 that, as of 22 November 1997, in the frequency bands specified in Tables **S22-3** and **S22-4** of Article **S22**, and in Tables 1 and 2 in Annex 1 to this Resolution, non-GSO FSS systems shall apply the procedures of Section I of Article **S9**, Nos. **S9.17** and **S9.17A**/Sections I and III of Article **11** and the procedures of Article **S11/13**, and the non-GSO FSS systems for which complete notification information has been received by the Bureau after 21 November 1997 shall be subject to the provisional power limits in Article **S22** and in Annex 1 to this Resolution;
- 2 that these limits shall be applied provisionally until the end of WRC-99, and that non-GSO FSS systems for which complete notification information has been received by the Bureau after 21 November 1997 shall be subject to the power limits in Article **S22**, as revised, if appropriate, by WRC-99;

3 that, as of 22 November 1997, in applying No. **S22.2**, administrations may consider these provisional power limits as corresponding to permissible levels of interference from a non-GSO system into a GSO system, irrespective of the dates of receipt by the Bureau of the complete notification information relating for the non-GSO system and of the complete coordination information for the GSO network;

4 that, as of the end of WRC-99, an administration operating a non-GSO FSS system which is in compliance with the limits in Article **S22**, as revised, if appropriate, by WRC-99, shall be considered as having fulfilled its obligations under No. **S22.2** with respect to any GSO network, irrespective of the dates of receipt by the Bureau of the complete notification information for the non-GSO system and of the complete coordination information for the GSO network;

5 that, as of the end of WRC-99, in the frequency bands specified in No. **S22.29** and § 2.4 of Annex 1 to this Resolution, GSO FSS systems for which complete coordination information has been received by the Bureau after the end of WRC-99 shall be subject to the limits in Article **S22** and in § 2.1, 2.2 and 2.3 of Annex 1 to this Resolution, as revised, if appropriate, by WRC-99;

6 that, as of 22 November 1997, in the frequency bands specified in No. **S22.29** and Tables 1 and 2 of Annex 1 to this Resolution, non-GSO systems shall not claim protection from GSO networks in the FSS operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete notification information for the non-GSO FSS systems and of the complete coordination information for the GSO networks;

6.1 that, between 22 November 1997 and the end of WRC-99, if an administration operating or bringing into use a GSO FSS system before the end of WRC-99 considers that a non-GSO FSS system proposed by another administration might cause unacceptable interference into its GSO system, then:

6.1.1 the administration operating the GSO system shall send to the administration operating the non-GSO FSS system the technical details upon which its disagreement is based,

6.1.2 in the bands from 10.7 GHz to 14.5 GHz, the administration operating the non-GSO FSS system shall resolve the difficulties,

6.1.3 in the bands 17.8-18.6 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 27.5-28.6 GHz (Earth-to-space) and 29.5-30.0 GHz (Earth-to-space), the administrations concerned shall make every possible effort to resolve the difficulties by means of mutually acceptable adjustments to their networks;

7 that, if an administration bringing into use a GSO FSS system after the end of WRC-99 considers that a non-GSO FSS system proposed by another administration and which complies with the limits in Article **S22**, as revised, if appropriate, by WRC-99, might cause unacceptable interference into its GSO system, the administrations concerned shall make every possible effort to resolve the difficulties by means of mutually acceptable adjustments to their networks;

8 that, as of 22 November 1997, non-GSO systems in the FSS in the frequency bands referred to in *resolves* 1 above, shall, for coordination with other non-GSO FSS systems, be subject to application of the provisions of § 2.1 of Section II of Resolution **46 (Rev.WRC-97)/No. S9.12**,

requests ITU-R

1¹ taking into account *considering further a)*, to conduct, as a matter of urgency, and complete, in time for consideration by WRC-99:

1.1 the appropriate technical, operational and regulatory studies to review the regulatory conditions relating to the coexistence of non-GSO and GSO systems in the FSS, in order to ensure that they do not impose undue constraints on the development of non-GSO and GSO FSS systems;

1.2 the development of a methodology for calculating the power levels produced by non-GSO FSS systems and the compliance of these levels with the limits referred to in *resolves* 1 and 2 above;

1.3 the studies relating to the sharing criteria to be applied for determining the need for coordination between non-GSO FSS systems and the need for coordination between terrestrial services and non-GSO systems in the FSS and in other space services, with a view to promoting efficient use of spectrum/orbit resources and equitable access to these resources by all countries;

2¹ taking into account *considering further l)*, to undertake the development of power limits or other frequency sharing mechanisms among GSO, non-GSO and terrestrial systems in the frequency bands other than those referred to in *resolves* 1 above and where non-GSO FSS systems are likely to be implemented and GSO systems are used or expected to be used extensively,

instructs the Radiocommunication Bureau

as of the end of WRC-99, to review and, if appropriate, revise, any finding previously made on the compliance with the limits contained in Article **S22** of a non-GSO FSS system for which notification information has been received between 22 November 1997 and the end of WRC-99. This review shall be based on the values in Article **S22**, as revised, if appropriate, by WRC-99.

¹ See Annex 2 for further details concerning specific aspects of these studies in relation to frequency sharing between systems in the non-GSO FSS and the GSO FSS.

ANNEX 1 TO RESOLUTION 130 (WRC-97)

Provisional limits**Section I – Control of interference to geostationary-satellite systems**

1.1 The equivalent power flux-density², at any point on the Earth's surface visible from the geostationary-satellite orbit (GSO), produced by emissions from all the space stations of a non-geostationary-satellite (non-GSO) system in the fixed-satellite service in the frequency bands listed in Table 1, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limits given in Table 1 for the given percentages of time. These limits relate to the equivalent power flux-density (epfd) which would be obtained under free-space propagation conditions into all the reference antennas and in the reference bandwidths specified in Table 1, and for all pointing directions towards the geostationary-satellite orbit.

NOTE – Table 1 contains provisional limits corresponding to an interference level caused by one non-GSO FSS system in the frequency bands to be applied in accordance with this Resolution. These provisional limits are subject to review by ITU-R and are subject to confirmation by WRC-99.

² The equivalent pfd is defined as the sum of the pfd produced at a point on the Earth's surface by all space stations within a non-GSO system, taking into account the off-axis discrimination of a reference receiving antenna assumed to be pointing towards the geostationary-satellite orbit. The equivalent power flux-density is calculated using the following formula:

$$epfd = 10 \cdot \log_{10} \left[\sum_{i=1}^{N_s} 10^{pfd_i/10} \cdot \frac{G_r(\theta_i)}{G_{max}} \right]$$

where:

- N_s : number of non-GSO space stations visible from the point considered at the Earth's surface, within an elevation angle greater than or equal to 0°;
- i : index of the non-GSO space station considered;
- pfd_i : power flux-density produced at the point considered on the Earth's surface in dB(W/m²) in the reference bandwidth;
- θ_i : angle between the direction considered towards the geostationary-satellite orbit and the direction of the interfering space station in the non-GSO system;
- $G_r(\theta_i)$: gain (as a ratio) of the receive reference antenna to be considered as part of a GSO network;
- G_{max} : maximum gain (as a ratio) of the above receive reference antenna;
- $epfd$: computed equivalent power flux-density in dB(W/m²) in the reference bandwidth.

TABLE 1

PART A

Frequency band (GHz)	Equivalent pfd dB(W/m ²)	Percentage of time during which equivalent pfd level may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern
10.7-11.7, 11.7-12.2 in Region 2, 12.2-12.5 in Region 3 and 12.5-12.75 in Regions 1 and 3	-179	99.7	4	60 cm, Rec. ITU-R S.465-5
	-192	99.9	4	3 m, Rec. ITU-R S.465-5
	-186	99.97	4	3 m, Rec. ITU-R S.465-5
	-195	99.97	4	10 m, Rec. ITU-R S.465-5
	-170	99.999	4	60 cm, Rec. ITU-R S.465-5
	-173	99.999	4	3 m, Rec. ITU-R S.465-5
	-178	99.999	4	10 m, Rec. ITU-R S.465-5
	-170	100	4	≥ 60 cm, Rec. ITU-R S.465-5

TABLE 1

PART B

Frequency band (GHz)	Equivalent pfd dB(W/m ²)	Percentage of time during which equivalent pfd level may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern
17.8-18.6	-165	99.0	40	30 cm, Rec. ITU-R S.465-5
	-151		1 000	
	-165	99.0	40	70 cm, Rec. ITU-R S.465-5
	-151		1 000	
	-165	99.5	40	90 cm, Rec. ITU-R S.465-5
	-151		1 000	
	-167	99.8	40	1.5 m, Rec. ITU-R S.465-5
	-153		1 000	
	-180	99.9	40	5 m, Rec. ITU-R S.465-5
	-166		1 000	
	-184	99.9	40	7.5 m, Rec. ITU-R S.465-5
	-170		1 000	
	-188	99.9	40	12 m, Rec. ITU-R S.465-5
	-174		1 000	
	-165	100	40	30 cm to 12 m, Rec. ITU-R S.465-5
-151	1 000			
19.7-20.2	-154	99.0	40	30 cm, Rec. ITU-R S.465-5
	-140		1 000	
	-164	99.9	40	90 cm, Rec. ITU-R S.465-5
	-150		1 000	
	-167	99.8	40	2 m, Rec. ITU-R S.465-5
	-153		1 000	
	-174	99.9	40	5 m, Rec. ITU-R S.465-5
	-160		1 000	
-154	100	40	30 cm to 12 m, Rec. ITU-R S.465-5	
-140		1 000		

1.2 The aggregate pfd³ produced at any point in the geostationary-satellite orbit by the emissions from all the earth stations in a non-GSO system in the FSS, for all conditions and for all methods of modulation, shall not exceed the limits given in Table 2 for any percentage of time. These limits relate to the pfd which would be obtained under free-space propagation conditions in the reference bandwidth specified in Table 2.

NOTE – Table 2 contains provisional limits corresponding to an interference level caused by one non-GSO FSS system in the frequency bands to be applied in accordance with this Resolution. These provisional limits are subject to review by ITU-R and are subject to confirmation by WRC-99.

TABLE 2

PART A

Frequency band (GHz)	Aggregate pfd dB(W/m ²)	Percentage of time during which aggregate pfd level may not be exceeded	Reference bandwidth (kHz)
12.5-12.75	-170	100	4
12.75-13.25	-186	100	4
13.75-14.5	-170	100	4

³ The aggregate pfd is defined as the sum of the pfd produced at a point in the geostationary-satellite orbit by all the earth stations of a non-GSO system. The aggregate pfd is computed by means of the following formula:

$$apfd = 10 \cdot \log_{10} \left[\sum_{i=1}^{N_e} 10^{P_i/10} \cdot \frac{G_i(\theta_i)}{4 \pi d_i^2} \right]$$

where:

- N_e : number of earth stations in the non-GSO system with an elevation angle greater than or equal to 0°, from which the point considered in the geostationary-satellite orbit is visible;
- i : index of the earth station considered in the non-GSO system;
- P_i : RF power at the input of the transmitting antenna of the earth station considered in the non-GSO system in dBW in the reference bandwidth;
- θ_i : off-axis angle between the boresight of the earth station considered in the non-GSO system and the direction of the point considered in the geostationary-satellite orbit;
- $G_i(\theta_i)$: transmit antenna gain (as a ratio) of the earth station considered in the non-GSO system in the direction of the point considered in the geostationary-satellite orbit;
- d_i : distance in metres between the earth station considered in the non-GSO system and the point considered in the geostationary-satellite orbit;
- $apfd$: aggregate power flux-density in dB(W/m²) in the reference band-width.

TABLE 2

PART B

Frequency band (GHz)	Aggregate pfd dB(W/m ²)	Percentage of time during which aggregate pfd level may not be exceeded	Reference bandwidth (kHz)
27.5-28.6	-159	100	40
29.5-30	-145	100	1 000

1.3 The limits given in Table 1 may be exceeded on the territory of any country whose administration has so agreed.

Section II – Earth station off-axis power limitations in the FSS⁴

2.1 The level of equivalent isotropically radiated power (e.i.r.p.) emitted by an earth station shall not exceed the following values for any off-axis angle ϕ which is 2.5° or more off the main-lobe axis of an earth station antenna:

<i>Off-axis angle</i>	<i>Maximum e.i.r.p.</i>
$2.5^\circ \leq \phi \leq 7^\circ$	$(39 - 25 \log \phi)$ dB(W/40 kHz)
$7^\circ < \phi \leq 9.2^\circ$	18 dB(W/40 kHz)
$9.2^\circ < \phi \leq 48^\circ$	$(42 - 25 \log \phi)$ dB(W/40 kHz)
$48^\circ < \phi \leq 180^\circ$	0 dB(W/40 kHz)

2.2 For FM-TV emissions with energy dispersal, the limits in § 2.1 above may be exceeded by up to 3 dB provided that the off-axis total e.i.r.p. of the transmitted FM-TV carrier does not exceed the following values:

<i>Off-axis angle</i>	<i>Maximum e.i.r.p.</i>
$2.5^\circ \leq \phi \leq 7^\circ$	$(53 - 25 \log \phi)$ dBW
$7^\circ < \phi \leq 9.2^\circ$	32 dBW
$9.2^\circ < \phi \leq 48^\circ$	$(56 - 25 \log \phi)$ dBW
$48^\circ < \phi \leq 180^\circ$	14 dBW

⁴ The provisions of this section are suspended pending the review of the values in § 2.1, 2.2 and 2.3 by WRC-99.

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

<i>Off-axis angle</i>	<i>Maximum e.i.r.p.</i>
$2.5^\circ \leq \varphi \leq 7^\circ$	$(53 - 25 \log \varphi)$ dBW
$7^\circ < \varphi \leq 9.2^\circ$	32 dBW
$9.2^\circ < \varphi \leq 48^\circ$	$(56 - 25 \log \varphi)$ dBW
$48^\circ < \varphi \leq 180^\circ$	14 dBW

2.4 The e.i.r.p. limits given in § 2.1, 2.2 and 2.3 are applicable in the following frequency bands allocated to the FSS (Earth-to-space):

12.75-13.25 GHz

13.75-14 GHz

14-14.5 GHz.

ANNEX 2 TO RESOLUTION 130 (WRC-97)

ITU-R studies on frequency sharing between non-GSO FSS and GSO FSS

The following is a list of the studies and related activities required.

1 Characterization of short-duration interference peaks which might exceed equivalent pfd limits set by a world radiocommunication conference for large earth station antennas, in terms of maximum and mean amplitudes, maximum and mean durations, mean time between occurrences, aggregate percentages of time of occurrences and typical amplitude/time profiles.

2 Acquisition of data relating to the impact of the interference peaks on the performance of a range of earth station demodulators of various types and origins. Administrations are encouraged to cooperate in this matter by arranging for the appropriate measurements to be carried out, and submitting the results to the appropriate working parties or task groups in time to be included in the ITU-R report to the next conference.

3 Carrying out computer simulations to determine the impact on equivalent pfd statistics of multiple non-GSO networks interfering with a GSO downlink, and in particular to discover the percentage-of-time thresholds for which the probability of simultaneous interference peaks from satellites in different non-GSO constellations becomes significant. Both

homogeneous and inhomogeneous sets of non-GSO systems should be simulated where the necessary data are available.

4 Conducting investigations to find out whether the emissions from the satellites and earth stations of non-GSO systems would cause problems for the tracking, telemetry and command of GSO (and non-GSO) satellites, during both their launch and operational phases, and the development of methods for avoiding such problems.

5 Carrying out computer simulations to derive the time statistics of short-term interference between two or more non-GSO FSS networks, with the objective of determining the approximate number of such networks which could co-exist in the same bands.

6 Identification and validation of software which could be used by the Bureau to check whether a system for which an application for spectrum has been made would comply with the equivalent pfd and aggregate pfd limits.

7 Carrying out studies to determine the feasibility of frequency sharing between non-GSO FSS networks using circular orbits and networks using slightly-inclined geostationary orbits, and also between non-GSO FSS networks and networks using “quasi-geostationary” orbits.

8 Development, if practicable, of continuous curves of equivalent pfd versus antenna diameter and/or G/T of the GSO earth station to be protected. Whilst it may be necessary to limit the compliance checking by the Bureau to a few discrete antenna sizes, administrations will need to know that the protection will be adequate in the case of antennas of other sizes; hence the desirability of continuous curves.

9 Continuation of studies on techniques for the mitigation of interference between GSO and non-GSO networks, and between non-GSO networks.

10 Refinement of the methodologies in Recommendation ITU-R S.1323 for the derivation of I/N limits and their conversion to equivalent pfd and aggregate pfd limits, taking into account propagation fade statistics, the different circumstances of “transparent” and remodulating satellite transponders, and the impact of fade counter-measures such as adaptive power control.

11 Consideration of how account can be taken, in studies concerning the definition of uplink limits, of the gain versus off-axis angle characteristics of the receiving spot beams of geostationary satellites.

12 Taking into account that the bands allocated to the FSS are used by the fixed, radio-location and space science services, study of the criteria for sharing between non-GSO FSS and GSO FSS systems and systems in those services.

RESOLUTION 131 (WRC-97)

Power flux-density limits applicable to non-geostationary fixed-satellite service systems for protection of terrestrial services in the bands 10.7-12.75 GHz and 17.7-19.3 GHz

The World Radiocommunication Conference (Geneva, 1997),

considering

- a)* that the power flux-density (pfd) limits specified in Table **S21-4** of Article **S21** for the bands 10.7-12.75 GHz and 17.7-19.7 GHz for the protection of terrestrial services were originally developed assuming that potentially interfering space stations in the fixed-satellite service (FSS) would operate in the geostationary-satellite orbit (GSO);
- b)* that the results of studies to date on potential interference from non-GSO FSS networks in the 18.8-19.3 GHz range, but which may be extrapolated to the 17.7-19.3 GHz range, differ as to whether the pfd limits in Article **S21** would provide adequate protection of the fixed service when applied to non-GSO networks with a large number of satellites (i.e. greater than 100);
- c)* that, in the 10.7-12.75 GHz band, some initial sharing studies have been undertaken and further work is required in order to assess the adequacy of the existing pfd limits;
- d)* that further studies are required of the pfd limits applicable to non-GSO FSS systems for the protection of terrestrial services in the bands 10.7-12.75 GHz and 17.7-19.3 GHz,

noting

- a)* that the former Resolution **118 (WRC-95)*** requested studies of the criteria for sharing between non-GSO FSS systems and terrestrial services in the 20/30 GHz bands;
- b)* that non-GSO FSS networks are being developed that take into account the pfd limits that were in force prior to this Conference; however, in the band 18.8-19.3 GHz, these values were subject to review by ITU-R;
- c)* that modifications to existing FSS network design or operating parameters may be needed in order to obtain conformance with the revised limits adopted by this Conference;

* This Resolution was abrogated by WRC-97.

d) that the band 18.6-18.8 GHz is allocated to the Earth exploration-satellite (passive) and space research (passive) services and that administrations should endeavour to reduce to a minimum the risks of interference to passive sensors; the interference criteria for satellite passive sensors are contained in Recommendation ITU-R SA.1029,

resolves

1 that emissions from a space station in non-GSO FSS networks in the bands 10.7-12.75 GHz and 17.7-19.3 GHz shall comply with the pfd limits contained in Article **S21** and in Annex 1 to this Resolution for the protection of terrestrial services (see *considering d*));

2 that in view of *noting b*) in relation to the 18.8-19.3 GHz band in the case of non-GSO FSS networks for which complete coordination or notification information has been received by the Radiocommunication Bureau by 17 November 1995, or are in operation by that date, the pfd limits which were in force prior to 27 October 1997 shall continue to apply; in the case of non-GSO FSS networks for which such information was received after 17 November 1995, the pfd limits in Annex 1 to this Resolution will apply,

invites ITU-R

to study, as a matter of urgency, the appropriate pfd values to be applied to non-GSO networks in the aforementioned bands to ensure protection of the fixed service without unduly constraining the development of either type of network,

requests WRC-99

to review the provisional limits referred to in *resolves* 1 based on the results of the studies carried out by ITU-R,

urges administrations

to consider reductions in the pfd or the number of satellites in non-GSO FSS networks within the spirit of No. **S9.58**, so as to facilitate sharing between non-GSO FSS networks and systems in the fixed service.

ANNEX 1 TO RESOLUTION 131 (WRC-97)

Frequency band	Service	Limits in dB(W/m ²) for angle of arrival δ above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
10.7-11.7 GHz	Fixed-satellite (space-to-Earth)	-150 ¹	$-150 + 0.5(\delta - 5)$ ¹	-140 ¹	4 kHz
12.2-12.5 GHz (Region 3) 12.5-12.75 GHz (Region 1 and Region 3 countries listed in Nos. S5.494 and S5.496)	Fixed-satellite (space-to-Earth)	-148 ¹	$-148 + 0.5(\delta - 5)$ ¹	-138 ¹	4 kHz
11.7-12.2 GHz (Region 2) 11.7-12.2 GHz (Region 3) 11.7-12.5 GHz (Region 1) 12.2-12.7 GHz (Region 2)	Fixed-satellite (space-to-Earth), non-GSO	-148 ²	$-148 + 0.5(\delta - 5)$ ²	-138 ²	4 kHz
17.7-19.3 GHz ^{3, 4}	Fixed-satellite (space-to-Earth)	-115 or -125 ⁵	$-115 + 0.5(\delta - 5)$ or $-125 + (\delta - 5)$ ⁵	-105 or -105 ⁵	1 MHz

¹ Although these limits apply to both GSO and non-GSO FSS satellites, values for non-GSO systems require further study.

² These values require further study.

³ The equality of rights to operate when a frequency band is allocated in different Regions to different services of the same category is established in No. **S4.8**. Therefore, any limits concerning inter-Regional interference which may appear in ITU-R Recommendations should, as far as practicable, be observed by administrations.

⁴ The band 18.6-18.8 GHz is allocated to the earth exploration-satellite (passive) and space research (passive) services. Administrations should endeavour to reduce to a minimum the risks of interference to passive sensors. The interference criteria for satellite passive sensors are contained in Recommendation ITU-R SA.1029.

⁵ These values shall apply provisionally only to emissions of space stations on non-geostationary satellites in networks operating with a large number of satellites, that is systems operating with more than 100 satellites.

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. **S5.523A**;
- 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. **S22.2/2613** 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 **S5.523A** are being developed in the bands 18.8-19.3 GHz and 28.6-29.1 GHz;
- g)* that **S5.523A** will enter into force on the date indicated in Article **S59**;
- h)* that this Conference decided to delete Resolution **118 (WRC-95)***, as of 22 November 1997,

* 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. **S9.11A** as of 22 November 1997) shall apply and No. **S22.2** 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. **S5.523A**, in the bands 18.8-19.3 GHz and 28.6-29.1 GHz, as from 22 November 1997.

RESOLUTION 133 (WRC-97)

Sharing between the fixed service and other services in the band 37-40 GHz

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that the band 37-40 GHz is allocated to the fixed service on a primary basis and that an increasing number of stations in the fixed service are deployed or being planned for use;
- b) that the band 37.5-40 GHz is allocated on a primary basis to the fixed-satellite service (FSS) and that an increasing number of FSS systems are being planned for use;
- c) that the deployment of high-density systems in either the fixed service or FSS may result in interference to the FSS from stations in the fixed service, and that the priority and degree of protection afforded to the FSS is a matter for each administration to consider;
- d) that although sharing is feasible between earth stations in the FSS and terrestrial stations provided 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;
- e) that sharing could be facilitated by the adoption of appropriate frequency sub-bands, such as the gaps between the channelling plans recommended by ITU-R for the fixed service;
- f) that it may be useful to consider the identification of this spectrum range for high-density fixed service applications,

resolves to request ITU-R

- 1 to conduct studies in time for WRC-99 to determine whether the power flux-density limits included in Article **S21** adequately protect terrestrial services from FSS networks;
- 2 to conduct other studies leading to technical and operational recommendations to facilitate sharing between terrestrial and space services,

urges administrations

to participate actively in the aforementioned studies by submitting contributions to ITU-R,

requests

WRC-99 to consider the identification of spectrum in the band 37-40 GHz for high-density applications in the fixed service.

RESOLUTION 134 (WRC-97)

**Use of the frequency band 40.5-42.5 GHz by
the fixed-satellite service**

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that this Conference has added a primary allocation to the fixed-satellite service (FSS) (space-to-Earth) in Regions 2 and 3 and in certain countries in Region 1 and to the fixed service in the band 40.5-42.5 GHz;
- b) that sharing criteria for the use of the band 40.5-42.5 GHz by the FSS have not been studied by ITU-R,

recognizing

that Resolution **129 (WRC-97)** invites ITU-R to undertake, as a matter of urgency, studies of appropriate criteria and methodologies for sharing between the FSS and the other services with allocations in the band 40.5-42.5 GHz,

resolves

- 1 that the date of the provisional application of the allocation to the FSS in Regions 1 and 3 in the band 40.5-42.5 GHz is 1 January 2001;
- 2 that WRC-99 should review this allocation, including the date of 1 January 2001, taking full account of the requirements of the other services to which the band is allocated and available ITU-R studies.

RESOLUTION 205 (Rev.Mob-87)

**Protection of the band 406-406.1 MHz allocated to
the mobile-satellite service¹**

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. **S5.266** and **S5.267** 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. **S5.266**, and that these stations

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. **S16.5**, 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. **S5.266** 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 (Mob-87)

Unauthorized use of frequencies in the bands allocated to the maritime mobile service and to the aeronautical mobile (R) service¹

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

considering

- a)* 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, some of which are operating in contravention of No. **S23.2**;
- b)* that these stations are causing harmful interference to the maritime mobile and aeronautical mobile (R) services;
- c)* that radio is the sole means of communication for the maritime mobile service and that certain frequencies in the bands mentioned in *considering a)* are reserved for distress and safety purposes;
- d)* that radio is the sole means of communication for the aeronautical mobile (R) service and that this is a safety service,

considering in particular

- e)* 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;
- f)* 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 urge 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 guard bands and in the bands

¹ WRC-97 made editorial amendments to this Resolution.

allocated exclusively to that service, except under the conditions expressly specified in Nos. **S4.4**, **S5.128**, **S5.129**, **S5.137** and **S4.13** to **S4.15**; and to ensure that stations of services other than the aeronautical mobile (R) service refrain from using frequencies allocated to that service except under the conditions expressly specified in Nos. **S4.4** and **S4.13**;

2 to make every effort to identify and locate the source of any unauthorized emission capable of endangering human life or property and the safe and regular conduct of aircraft operations, and to communicate their findings to the Radiocommunication Bureau;

3 to participate in the monitoring programmes that the Bureau may organize pursuant to this Resolution;

4 to make every effort to ensure that such emissions are made in appropriate bands allocated to services other than the maritime mobile service or 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 operating in contravention of No. **S23.2**,

to invite the Bureau

1 to continue to organize monitoring programmes, at regular intervals, in the maritime distress and safety channels and their guard bands and in the bands allocated exclusively to the maritime mobile service between 4063 kHz and 27500 kHz and to the aeronautical mobile (R) service between 2850 kHz and 22000 kHz, with a view to 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,

requests administrations

to take all necessary steps in such cases 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.

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 **SVII** 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. **S5.388**, 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. **S5.388** 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,

* 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 213 (Rev.WRC-95)

Sharing studies concerning possible use of the band 1 675-1 710 MHz by the mobile-satellite service

The World Radiocommunication Conference (Geneva, 1995),

considering

- a) that the agenda of this Conference requested the consideration, *inter alia*, of a review of the technical constraints associated with the allocation to the mobile-satellite service (MSS);
- b) that the frequency band 1 675-1 710 MHz is already allocated to the MSS (Earth-to-space) on a primary basis in Region 2;
- c) that this Conference considered proposals for reducing the technical constraints on the MSS for part of the frequency band 1 675-1 710 MHz, but concluded that the required studies were incomplete;
- d) that the band 1 675-1 710 MHz is mainly used by the meteorological-satellite and meteorological aids services, and studies indicate that parts of this band are used by the meteorological-satellite service in a way which may allow sharing with the MSS, but that there are currently more than 5 400 meteorological-satellite receiving terminals in the band 1 690-1 710 MHz registered with the World Meteorological Organization (WMO);
- e) that there are few main meteorological earth stations in the 1 675-1 690 MHz band, but these are the main control and operating stations for meteorological-satellite systems and must therefore receive adequate protection;
- f) that studies to date and the conclusions of the 1995 Conference Preparatory Meeting indicate that sharing of part of the band 1 675-1 710 MHz between the meteorological-satellite and the mobile-satellite services may be feasible, taking into account Recommendation ITU-R SA.1158 and the results of other sharing studies still to be completed;
- g) that parts of the frequency band 1 675-1 710 MHz are also allocated to the fixed and mobile services;
- h) that improvements in some of the radiocommunication characteristics of meteorological aids are technically possible, and that these may improve sharing possibilities;
- i) that the cost impact of improving the radiocommunication characteristics of meteorological aids may reduce their usage in large areas of the world (see Recommendation ITU-R SA.1165);
- j) that there is a need to determine the operational and technical means of preventing harmful interference to the services referred to in § d) above,

resolves to invite ITU-R

as a matter of urgency, and in time for WRC-97 to complete the technical and operational studies on the feasibility of sharing of the band concerned between the services referred to in § d) and g) above and the MSS, and on the required means for preventing harmful interference,

further invites

1 administrations and interested parties (e.g. WMO) to participate actively in such studies, by submitting relevant contributions;

2 ITU-R to investigate a potentially suitable downlink band that may assist in meeting the spectrum requirements of the MSS,

instructs the Secretary-General

to bring this Resolution to the notice of WMO.

RESOLUTION 214 (Rev.WRC-97)

Sharing studies relating to consideration of the allocation of bands below 1 GHz to the non-geostationary mobile-satellite service

The World Radiocommunication Conference (Geneva, 1997),

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 1997 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,

noting

- a)* that additional studies may identify other bands below 1 GHz which could also be considered suitable for a worldwide allocation to non-GSO MSS;

- b) that, based on the sharing techniques being developed for MSS below 1 GHz and the current use of the band 138-470 MHz by terrestrial services, this range may be considered for further study;
- c) 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;
- d) that interference mitigation techniques, such as the dynamic channel activity assignment system described in Recommendation ITU-R M.1039-1, 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;
- e) 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;
- 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 there may be a need to review constraints on the current allocations to the MSS below 1 GHz,

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-99 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;
- 4 that WRC-99 be invited to consider a review of the technical and regulatory constraints on non-GSO MSS allocations in the bands below 1 GHz, taking into account *considering* d),

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 both existing and planned services and non-GSO MSS below 1 GHz;

2 as a matter of urgency, to carry out studies in preparation for WRC-99, including a review of the operating constraints referred to in *noting c)* necessary to protect the existing and planned development of all of the services to which the bands below 1 GHz are allocated, having regard to *noting d)*;

3 as a matter of urgency, to carry out studies in preparation for WRC-99 with respect to interference mitigation techniques, such as the dynamic channel activity assignment system described in Recommendation ITU-R M.1039-1, necessary to permit the continued development of all of the services to which the bands are allocated;

4 to carry out a review for a future competent conference of the technical and regulatory constraints on non-GSO MSS allocations in the bands below 1 GHz, having regard to *considering d)*;

5 to bring the results of these studies to the attention of WRC-99 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.1039-1.

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 **S5**;
- 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 (WRC-97)

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 (Geneva, 1997),

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 this Conference;
- b)* that this Conference 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 there is a demand for use on board aircraft, in order to provide location and two-way messaging functions, of the same type of terminals now used for land and maritime applications;
- e)* that such demand justifies the consideration of possible broadening of the allocation to include aeronautical applications at a future competent conference;
- f)* 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;
- g)* 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-99 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, subject to the satisfactory outcome of technical compatibility studies,

invites ITU-R

to complete in time for WRC-99 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 400.15-2406 MHz interfere with satellite emergency position-indicating radio beacons operating in the mobile-satellite service in the band 406-406.1 MHz under No. **S5.266**;
- b) that in accordance with No. **S5.267**, 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. **S5.162A**

440-450 MHz

470-494 MHz in accordance with No. **S5.291A**

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 218 (WRC-97)

**Use of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz
by the mobile-satellite service**

The World Radiocommunication Conference (Geneva, 1997),

considering

- a)* that this Conference 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 mobile-satellite systems in a flexible and efficient manner;
- b)* that prior to this Conference there was a generic allocation by footnote provisions in some countries for the use of the bands 1 530-1 544 MHz and 1 631.5-1 645.5 MHz by the MSS, on condition that maritime mobile-satellite distress and safety communications have priority access over all other communications;
- c)* that prior to this Conference, there was a generic allocation by two footnotes for the use of the bands 1 555-1 559 MHz and 1 656.5-1 660.5 MHz by the MSS, and in one of these footnotes the following conditions applied in two countries:
- the aeronautical mobile-satellite (R) service has priority access and immediate availability over all other communications within a network;
 - mobile-satellite systems should be interoperable with the aeronautical mobile-satellite (R) service;
 - account shall be taken of the priority of safety-related communications in the other mobile-satellite services;
- d)* that there is at least one global mobile-satellite system that is capable of providing global maritime mobile-satellite distress and safety communications according to Article **S53** and global aeronautical mobile-satellite (R) service communications with priorities 1 to 6 of Article **S44** in accordance with the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO) requirements;
- e)* that technical considerations for sharing satellite network resources between MSS (other than aeronautical mobile-satellite (R) service) and aeronautical mobile-satellite (R) service have been developed by ITU-R (see Recommendation ITU-R M.1233);
- f)* that global and regional mobile-satellite systems are being multilaterally coordinated in the bands 1 525-1 559 MHz (space-to-Earth) and 1 626.5-1 660.5 MHz (Earth-to-space) and that the ITU Radio Regulations provide the international framework for multilateral agreements;

g) that in Nos. **S5.357A** and **S5.353A** priority has been given to accommodating the spectrum requirements for distress, urgency and safety communications of the Global Maritime Distress and Safety System (GMDSS) and aeronautical mobile-satellite (R) service communications with priorities 1 to 6 of Article **S44**. See No. **S9.11A**, except No. **S9.13**,

further considering

a) that the Convention on International Civil Aviation requires that stations of the aeronautical mobile-satellite (R) service shall be in compliance with the internationally agreed Standards and Recommended Practices and Procedures for Air Navigation Services;

b) that the ICAO has developed a global Air Traffic Management system which requires interoperability between stations operating in accordance with the ICAO Convention for those mobile-satellite systems providing aeronautical mobile-satellite (R) service communications with the priority message structure of Article **S44**;

c) that this Conference modified provisions for the operational use of the GMDSS which is fully defined in the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended (see No. **S30.1**);

d) that the IMO may also place similar requirements of interoperability for those mobile-satellite systems providing GMDSS communications with the priority message structure of Article **S53**,

recognizing

that Table S15-2 of Appendix **S15** identifies the bands 1 530-1 544 MHz (space-to-Earth) and 1 626.5-1 645.5 MHz (Earth-to-space) for distress and safety purposes in the maritime MSS as well as for routine non-safety purposes,

noting

that some countries in Region 2 use the bands 1 525-1 544 MHz, 1 545-1 559 MHz, 1 626.5-1 645.5 MHz and 1 646.5-1 660.5 MHz to provide national MSS on a generic basis and, where agreements with other administrations concerned are in place, provide multinational service,

resolves

1 that the future spectrum requirements for the provision of distress, urgency and safety communications in the GMDSS by the MSS and aeronautical mobile-satellite (R) service communications with priority 1 to 6 of Article **S44** should take into account internationally agreed assumptions and methodologies and information on actual GMDSS and aeronautical mobile-satellite (R) service communication traffic usage and growth;

2 that the feasibility of prioritization, real-time pre-emptive access and, if necessary, interoperability between different mobile-satellite systems for GMDSS and aeronautical mobile-satellite (R) service should be determined, in order to achieve the most flexible and practical use of the generic allocations,

requests ITU-R

1 to develop assumptions and methodologies and gather information on actual GMDSS and aeronautical mobile-satellite (R) service communication traffic usage and growth, in order to determine the future spectrum requirements for the provision of distress, urgency and safety communications in the GMDSS by the MSS and aeronautical mobile-satellite (R) service communications with priority 1 to 6 of Article **S44**;

2 to determine the feasibility of prioritization, real-time pre-emptive access and, if necessary, interoperability between different mobile-satellite systems for GMDSS and aeronautical mobile-satellite (R) service, in order to achieve the most flexible and practical use of the generic allocations;

3 to complete and report the results of the studies called for in *requests ITU-R* 1 and 2 above by WRC-99 or a future competent conference,

requests the next competent world radiocommunication conference

to take into account the outcome of ITU-R studies and take appropriate action on this subject,

invites

ICAO, IMO, International Association of Lighthouse Authorities (IALA), administrations and other organizations concerned to participate in the studies identified in *requests ITU-R* 1 and 2 above.

RESOLUTION 219 (WRC-97)

Studies relating to consideration of the allocation to the non-geostationary mobile-satellite service in the meteorological aids band 405-406 MHz and the impact on primary services allocated in the adjacent bands

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that there is a significant shortfall of spectrum for the non-geostationary (non-GSO) mobile-satellite service (MSS) below 1 GHz, and there is an urgent need to make additional spectrum available on a worldwide basis for such non-GSO MSS systems;
- b) that the Report of the 1997 Conference Preparatory Meeting (CPM-97) to this Conference states that the Radiocommunication Bureau has identified 23 non-GSO MSS networks, at frequencies below 1 GHz, at some state of coordination under Resolution **46 (Rev.WRC-97)/No. S9.11A**, that it is likely that a number of these systems may not be implemented for reasons not connected with spectrum availability and that several administrations have indicated in their information submitted to the Bureau that they plan on implementing these non-GSO MSS systems by the year 2002 or earlier;
- c) that the CPM-97 Report to this Conference also states that it appears that many of the proposed networks cannot be implemented in the existing allocations because there is not enough spectrum to allow the development of all of these systems in an economically viable manner;
- d) that meteorological aids systems are essential to produce the upper air measurements required by the World Meteorological Organization (WMO), as summarized in Recommendation ITU-R SA.1165, and that systems using the band 400.15-406 MHz constitute the majority of the mobile and fixed observation stations worldwide;
- e) that meteorological aids systems are also essential to produce the upper air measurements required for civilian and other applications;
- f) that the amount of spectrum required by meteorological users, including WMO (station spacing requirement of 250 km), civilian users and other related users, in most geographical areas is about 5 MHz in the band 401-406 MHz using the currently employed technology;
- g) that since this Conference upgraded the allocation to the Earth exploration-satellite service and the meteorological-satellite service to primary in the band 401-403 MHz, this is likely to impose constraints on the meteorological aids service in this band in certain geographical areas;

h) that the development of more spectrum-efficient meteorological aids systems is continuing in order to minimize the bandwidth required by these systems, as outlined in Recommendation ITU-R SA.1165, and that recent development of these related technologies has been rapid;

i) that sharing studies to date have shown that co-channel sharing between currently proposed non-GSO MSS systems and meteorological aids in the band 401-406 MHz is not generally feasible, that any sharing would require band segmentation and that the band 405-406 MHz has been named by some administrations as a possible candidate band for such a new allocation;

j) that any transition of meteorological aids from the band 405-406 MHz should not increase the operational costs of meteorological aids networks beyond the available financial resources, and should not constrain the future development of the meteorological aids service, while using more spectrum-efficient systems;

k) that the COSPAS-SARSAT system operates within an exclusive allocation in the band 406-406.1 MHz, that the radio astronomy service has a primary allocation in the band 406.1-410 MHz and that these services need to be protected from MSS transmissions including unwanted emissions,

noting

a) that the possible use of the band 405-406 MHz by the MSS should be limited to systems using narrow-band modulation techniques until further ITU-R studies conclude that other modulation techniques can protect COSPAS-SARSAT (406-406.1 MHz) and the radio astronomy service (406.1-410 MHz);

b) that Resolution **214 (Rev.WRC-97)** also addresses sharing studies relating to consideration of the allocation of bands below 1 GHz to the non-GSO MSS,

resolves to invite ITU-R

1 as a matter of urgency, with the participation of WMO, to assess further the current and future requirements of the meteorological aids service in the band 401-406 MHz, taking into account the requirements of the earth exploration-satellite service and the meteorological-satellite service in the band 401-403 MHz;

2 as a matter of urgency, with the participation of WMO, to consider the possible transition of the meteorological aids service out of the band 405-406 MHz, which would minimize the impact on the meteorological aids service, while taking into account requirements for the implementation of non-GSO MSS;

3 to consider, based on the outcome of § 1 and 2 above, a possible transition plan, including a transition date at which time meteorological aids could migrate their operations out of the band 405-406 MHz and MSS operations could commence;

4 as a matter of urgency, to study, with the participation of the Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science (IUCAF) and other relevant entities, the impact of unwanted emissions on the COSPAS-SARSAT system in the band 406-406.1 MHz and the radio astronomy service in the band 406.1-410 MHz, and identify appropriate protection measures for these services,

resolves

that WRC-99 be invited to consider, based on the outcome of *resolves to invite ITU-R* above, the possibility of allocating the band 405-406 MHz to the MSS, including any appropriate transition plan,

urges administrations

1 to assess their current and future requirements for meteorological aids systems in the band 401-406 MHz taking into account the requirements of the Earth exploration-satellite service and the meteorological-satellite service in the 401-403 MHz band;

2 to, either individually or on a subregional or regional basis, report to WMO and ITU-R on whether the whole of the band 401-406 MHz will be needed for meteorological aids, and the possibility of transition out of the band 405-406 MHz;

3 to submit to ITU-R the most up-to-date information on their plans for possible implementation of non-GSO MSS systems and the associated spectrum requirements,

instructs the Secretary-General

to bring this Resolution to the attention of WMO.

RESOLUTION 220 (WRC-97)

**Studies to consider the feasibility of use of a portion of
the band 1 559-1 610 MHz by the mobile-satellite
service (space-to-Earth)**

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that the band 1 559-1 610 MHz is allocated on a primary basis to the aeronautical radionavigation and radionavigation-satellite services;
- b) that proposals were made to this Conference for an allocation to the mobile-satellite service (MSS) in the band 1 559-1 567 MHz;
- c) that the aeronautical radionavigation and radionavigation-satellite services are safety services in the space-to-Earth direction and must be protected from harmful interference (No. **S4.10** applies);
- d) that studies carried out by some administrations indicate that an aggregate power flux-density limit at the Earth's surface of $-112 \text{ dB(W/m}^2/1 \text{ MHz)}$ for all angles of arrival from the MSS space station is appropriate for the protection of aeronautical radionavigation and radionavigation-satellite services;
- e) that other administrations have conducted studies and have concluded that the power flux-density referred to in *considering d)* does not provide protection for the aeronautical radionavigation and radionavigation-satellite service;
- f) that studies have not been conducted in ITU-R on the sharing possibilities between the MSS and the aeronautical radionavigation or radionavigation-satellite services in the 1 559-1 610 MHz band;
- g) that the band 1 559-1 610 MHz is used by the global positioning system (GPS) and global orbiting navigation satellite system (GLONASS) radionavigation-satellite systems and their augmentations, and that these systems are components of the International Civil Aviation Organization (ICAO) global navigation satellite system (GNSS);
- h) that the International Maritime Organization (IMO) has recognized GPS and GLONASS as elements of their GNSS;
- i) that the aeronautical radionavigation and radionavigation-satellite systems are evolutionary systems and that other GNSSs are under development for operation in the band 1 559-1 610 MHz;
- j) that studies are currently being conducted in ITU-R for use in the radionavigation-satellite service in the space-space direction,

recognizing

- 1 the essential need to protect systems operating in the aeronautical radionavigation and radionavigation-satellite service in the band 1 559-1 610 MHz;
- 2 the requirement for additional spectrum for the MSS;
- 3 that Resolution **213 (Rev.WRC-95)** identifies the possible use in parts of the band 1 675-1 710 MHz in the Earth-to-space direction and invites ITU-R to investigate potentially suitable downlink bands that may assist in meeting the requirements of the MSS,

resolves to request ITU-R

to study, as a matter of urgency, the technical criteria and operational and safety requirements to determine if sharing between the aeronautical radionavigation and radionavigation-satellite services operating, or planned to operate, in the band 1 559-1 610 MHz, and the MSS in a portion of the 1 559-1 567 MHz frequency range, is feasible, taking into account the above *recognizing*,

further resolves

- 1 to instruct the Director of the Radiocommunication Bureau to facilitate to the greatest extent possible, the completion of these studies in time for consideration by WRC-99;
- 2 to recommend that WRC-99 take into account the results of ITU-R studies in evaluating the feasibility of an allocation in the space-to-Earth direction to the MSS in a portion of the 1 559-1 567 MHz frequency range;
- 3 to urge all administrations and concerned organizations, including ICAO, the International Association of Lighthouse Authorities (IALA) and IMO, to contribute to these studies and cooperate to the maximum extent possible, to ensure a mutually satisfactory result is presented to WRC-99.

RESOLUTION 300 (Rev.Mob-87)

Use and notification of the paired frequencies reserved for narrow-band direct-printing telegraphy and data transmission systems in the HF bands allocated on an exclusive basis to the maritime mobile service

(See Appendix **S17** (Part B, Section II)/Appendix **32**)

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

considering

- a)* that certain sections of the HF bands allocated to the maritime mobile service have been reserved for narrow-band direct-printing telegraphy and data transmission systems for use on a paired frequency basis only;
- b)* that Appendix **S17** (Part B, Section II)/Appendix **32** contains a channelling arrangement in the maritime mobile HF bands for narrow-band direct-printing telegraphy and data systems (paired frequencies);
- c)* that this Conference has made available an increased number of paired frequencies reserved for narrow-band direct-printing telegraphy and data transmission systems for use on a paired basis only, and has modified Appendix **S17** (Part B, Section II)/Appendix **32** accordingly;
- d)* that WMARC-74 established interim measures for the orderly bringing into use of the paired frequencies;
- e)* that the WMARC-74 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,

resolves

1 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 the following manner:

1.1 assignments of pairs of frequencies for transmission and reception shall be made solely to coast stations. Ship stations of any nationality shall use by right for their transmissions the receiving frequencies of the coast stations with which they exchange traffic;

1.2 each administration shall choose the pairs of frequencies for its requirements, if necessary with the assistance of the Bureau;

1.3 the assignments thus selected shall be notified to the Bureau in notices as shown in Appendix **S4/1** and administrations shall supply the basic characteristics listed in Annexes 1A and 1B/Section A or B of that Appendix, as appropriate;

1.4 whenever practicable, each notice should reach the Bureau before the date on which the assignment is brought into use. It must reach the Bureau not earlier than one year before the date on which it is to be brought into use but in any case not later than 30 days after it is actually brought into use;

1.5 assignments which are in conformity with the Radio Regulations, and in particular Appendix **S17** (Part B, Section II)/Appendix **32**, shall be examined by the Bureau from the viewpoint of the probability of harmful interference to be caused by or to other existing or proposed uses. The Bureau shall inform the administration concerned of the results of its examination and shall record the notified assignment with reference to this Resolution and without any date in Column 2. The date of receipt of the notice by the Bureau and the date of putting into use of the assignment shall be entered in the Remarks Column. In cases where the Bureau identifies incompatibilities, it shall make suggestions with a view to resolving them;

1.6 any notice not in conformity with the Radio Regulations shall be returned to the notifying administration by the Bureau, together with any suggestion which the Bureau may be able to submit in this respect;

1.7 should difficulties arise between administrations using the same channel, or adjacent channels, the matter shall be settled by agreement between the administrations concerned taking into account the information published by the Bureau;

2 that a future competent conference be invited to review this Resolution and examine any difficulties which may have arisen in its application;

3 that the entries made in the Master Register under this Resolution shall in no way prejudice any decisions which may be taken by the aforementioned conference,

invites the Council

to place this Resolution on the agenda of the next competent conference in order to examine any difficulties which may have arisen in its application.

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 **S52/60** and Appendix **S17** (Part B, Section IV)/Appendix **34**);
- d)* that the effectiveness of the new calling procedure requires agreement between administrations with respect to the groups specified in Appendix **S17** (Part B, Section IV)/Appendix **34** 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 areas¹

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 B1 and 4E1 of the Preface to the International Frequency List and the Weekly Circular.

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 S13

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 **SVII**;
- c) that some administrations and vessels, not subject to SOLAS, 1974, as amended, may wish to continue to use provisions of Appendix **S13** 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 **SVII** and the present distress and safety system described in Appendix **S13** 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 **S13** 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 **S13** 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 **S13** and Chapter **SVII** 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.

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 radio-navigation 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. **S20.7**).

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. **S20.16** of Article **S20** 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. **S20.15**, 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 data-base,

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 **S32** of the Radio Regulations)

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. **S20.16**.

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 (WRC-97)

Review of new technology to provide improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that the agenda of WRC-97 included the consideration of the use of Appendix **S18** to the Radio Regulations in respect of maritime mobile communications and the use of new technology for maritime radiotelephony channels;
- b) Recommendation **318 (Mob-87)**;
- c) that Appendix **S18** identifies frequencies to be used for distress and safety communications on an international basis;
- d) that the introduction of new technology in the maritime mobile service shall not disrupt distress and safety communications in the VHF band including those established by the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended;
- e) that ITU-R is conducting studies on improving efficiency in the use of this band, and that these studies are still ongoing;
- f) that changes made in Appendix **S18** should not prejudice the future use of these frequencies or the capabilities of systems or new applications required for use by the maritime mobile service;
- g) that the congestion on Appendix **S18** frequencies calls for the implementation of efficient new technologies;
- h) that the use of new technology on maritime VHF frequencies will make it possible to better respond to the emerging demand for new services,

noting

that some administrations are considering adopting some of the above changes to their operations within the Appendix **S18** frequencies,

resolves

that WRC-99 should consider the use of new technology in the band 156-174 MHz and consequential revision of Appendix **S18**,

invites ITU-R

to continue studies on the following with a view to providing a report to WRC-99:

- a) to identify the future requirements of the maritime mobile service;
- b) to identify suitable technical characteristics of the system or interoperable systems to replace existing technology;
- c) to identify necessary modifications to the frequency plan contained within Appendix **S18**;
- d) to recommend a timetable for the introduction of new technology and the necessary changes;
- e) to study and recommend how new technology can be introduced without harming the distress and safety requirements,

instructs the Secretary-General

to communicate this Resolution to the International Maritime Organization.

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 **S47** 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 S47, 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 **S31** and No. **S52.221** 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;

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.

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 **S52** 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 **S17** 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,

* This Resolution was abrogated by the WRC-97.

resolves

to recommend that WRC-01 make changes to Appendix **S17** and Article **S52**, as needed,

instructs the Secretary-General

to bring this Resolution to the attention of the International Maritime Organization.

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 **S53** 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 S15); 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 405

Relating to the use of frequencies of the aeronautical mobile (R) service¹

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 **S27/27Aer2**);
- 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;

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 **S27/27Aer2** 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 406

Relating to the use of frequency bands higher than the HF bands in the aeronautical mobile (R) service and the aeronautical mobile-satellite (R) service for communication and for meteorological broadcasts

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that from an aeronautical viewpoint, higher frequency bands can provide a more reliable and more interference-free communication system than HF;
- b) that from a technical and operational viewpoint, the use of VHF by aviation has progressed significantly;
- c) that the future possibility of communications utilizing satellite technology is now recognized;
- d) that, owing to the ever increasing development of aeronautical telecommunications in all areas of the world, there is an increasing demand for frequencies for communication with and for meteorological broadcasts to aircraft in flight,

resolves

that administrations, taking into account the relevant economic and technical factors, consider to the maximum extent possible meeting their requirements for communication and for meteorological broadcasts by frequencies in frequency bands, higher than the HF bands, which are allocated to the aeronautical mobile (R) service and the aeronautical mobile-satellite (R) service.

RESOLUTION 411 (WARC-92)

Implementation of the new provisions applicable in the frequency bands allocated exclusively to the aeronautical mobile (OR) service between 3 025 kHz and 18 030 kHz¹

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

- a)* that the conditions for use of each of the frequency bands between 3 025 kHz and 18 030 kHz allocated exclusively to the aeronautical mobile (OR) service were modified by WARC-92 Conference so as to enable a more efficient usage of the available frequency spectrum;
- b)* that the implementation of the modified conditions of use will entail a considerable workload for administrations, since a large number of frequency assignments to both aircraft and aeronautical stations will have to be transferred from existing frequencies to the new frequencies and channels designated by this Conference;
- c)* that the full implementation of the modified provisions for the frequency usage may require considerable investment for the replacement of the existing equipment;
- d)* that, nevertheless, the modified provisions for frequency usage should be implemented fully and as soon as possible so that the advantages of the new arrangement may be realized at the earliest opportunity;
- e)* that the changeover to the new conditions of operation should be effected with the least possible disruption to the service rendered by each station,

recognizing

- a)* that the implementation of the decisions made by the present Conference relating to the new arrangement of the frequency bands allocated exclusively to the aeronautical mobile (OR) service between 3 025 kHz and 18 030 kHz should follow an orderly procedure for the transfer of existing services from the old to the new conditions of operation;
- b)* that the procedures for the transfer of the existing frequency assignments in the aeronautical mobile (OR) service, in the bands allocated exclusively to that service between 3 025 kHz and 18 030 kHz, are specified in Resolution **412 (WARC-92)** adopted by this Conference,

¹ WRC-97 made editorial amendments to this Resolution.

resolves

1 that the provisions of Appendix **S26/26 (Rev.WARC-92)**, as well as the relevant provisions of Article **S11/12**, as modified by this Conference, shall apply to any new frequency assignment, as from 0001 UTC on 12 October 1993;

2 that administrations shall take all the necessary measures to comply with the new conditions of use of the bands governed by Appendix **S26/26 (Rev.WARC-92)** by not permitting the installation of new equipment whose emissions occupy a necessary bandwidth exceeding 2 800 Hz;

3 that, until 15 December 1995, administrations may continue to use their existing assignments in accordance with the characteristics recorded in the Master International Frequency Register. After that date administrations shall take all necessary measures to modify the characteristics of their assignments so as to ensure their conformity with the provisions of Appendix **S26/26 (Rev.WARC-92)**;

4 that, not later than 15 December 1997, administrations shall discontinue all emissions whose bandwidth exceeds 2 800 Hz,

invites Administrations

to make every effort to eliminate incompatibilities which may occur in the transition period.

RESOLUTION 412 (WARC-92)

Transfer of frequency assignments of aeronautical stations operating in the frequency bands allocated exclusively to the aeronautical mobile (OR) service between 3 025 kHz and 18 030 kHz¹

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

- a) that the conditions for use of each of the frequency bands between 3 025 kHz and 18 030 kHz allocated exclusively to the aeronautical mobile (OR) service were modified by this Conference so as to enable a more efficient usage of the frequency spectrum available;
- b) that administrations will need to change the frequencies of their aeronautical and aircraft stations to bring them into conformity with the new Frequency Allotment Plan, as contained in Appendix **S26/26 (Rev.WARC-92)**, and to notify such transfers, where appropriate, to the Radiocommunication Bureau,

resolves

- 1 that, at an appropriate date, the Bureau shall send each Administration a list of assignments to stations of the aeronautical mobile (OR) service entered on its behalf in the Master Register in the bands allocated exclusively to that service between 3 025 kHz and 18 030 kHz;
- 2 that, in the above list, the Bureau shall indicate, for each frequency assignment, a replacement frequency(-ies) which fulfil(s) the provisions of Appendix **S26/26 (Rev.WARC-92)** and which is(are) intended to replace the frequency of the assignment concerned;
- 3 that, after receipt of the above list, administrations shall take all the necessary measures to modify the characteristics of their assignments, so as to bring them into conformity with the provisions of Appendix **S26/26 (Rev.WARC-92)**, as early as possible and in any event, not later than 15 December 1997; any modification which has been implemented shall be notified to the Bureau in accordance with No. **S11.2/1214**;
- 4 that the frequency assignments notified by administrations under § 3 above shall be examined by the Bureau under the relevant provisions of Article **S11/12**, as modified by this Conference;

¹ WRC-97 made editorial amendments to this Resolution.

5 that the assignments existing in the Master Register on 15 December 1997 which are not in conformity with the provisions of Appendix **S26/26 (Rev.WARC-92)** shall be treated as follows:

5.1 within 60 days from 15 December 1997, the Bureau shall send relevant extracts of the Master Register to the administrations concerned advising them that, under this Resolution, the assignments in question are to be modified, within a period of 90 days, so as to meet the provisions of Appendix **S26/26 (Rev.WARC-92)**;

5.2 if an administration fails to notify the Bureau of the modifications within the prescribed period, the original entry will be retained in the Master Register for information only, without a date in Column 2, without a finding in Column 13A and with a suitable remark in the Remarks column. The administration will be advised of this action.

RESOLUTION 500

**Relating to the modification of carrier frequencies of
LF broadcasting stations in Region 1**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that it would be advantageous, both technically and economically, to reduce interference in domestic broadcasting receivers caused by combination frequencies;
- b) that such interference is considerably reduced when the nominal values of the carrier frequencies of broadcasting stations are multiples of the channel separation;
- c) that the nominal values of the carrier frequencies of stations listed in the LF Broadcasting Plan for Region 1 (Geneva, 1975) are not multiples of the channel separation (9 kHz);
- d) that, in order to avoid interference between the stations in question, it is necessary that the modifications of the carrier frequencies of LF broadcasting stations in Region 1 be carried out on the same date, at least for all stations sharing the same channel, without reducing thereby the spacing between adjacent carrier frequencies;
- e) that modification of the carrier frequencies of LF broadcasting stations will, in certain cases, increase the interference caused to aeronautical radionavigation stations,

noting

that the aeronautical radionavigation service is a safety service,

resolves

1 that over the period 1 February 1986 to 1 February 1990 the nominal values of the carrier frequencies of all LF stations operating or planned in conformity with the LF/MF Broadcasting Agreement (Geneva, 1975) shall be reduced by 2 kHz, so that they become multiples of 9 kHz, the other characteristics of the stations remaining unchanged;

2 that, in order to ensure that all steps can be taken to avoid any additional interference to the aeronautical radionavigation service, the change of the frequencies of the broadcasting stations shall be made in groups of five channels beginning at the lowest assigned frequency;

3 that the changes shall be made in three steps, as follows:

channels 1 to 5 on 1 February 1986	}	at 0100 UTC
channels 6 to 10 on 1 February 1988		
channels 11 to 15 on 1 February 1990		

4 that at the date of the first change (1 February 1986) the lower limit of the band allocated to the broadcasting service shall become 148.5 kHz and that after 1 February 1990 the allocation to the broadcasting service shall become 148.5-283.5 kHz;

5 that any modifications to the frequency assignment of an aeronautical radio-navigation station resulting therefrom shall be notified to the Bureau and upon receiving a favourable finding with respect to No. **S11.31** shall be entered in the Master Register without any change of date or status. If, however, the finding is unfavourable only with respect to No. **1241**, it shall be entered in the Master Register in accordance with the relevant provisions of Article **S11** with no change in the original date*,

further resolves

that administrations shall inform the Bureau at least two years in advance of making any foreseen modifications of the characteristics of their existing LF broadcasting stations or bringing into use any new stations,

requests the Bureau

to publish this information in a special section of its weekly circular,

requests the Secretary-General

to send this Resolution to the Secretary-General of International Civil Aviation Organization (ICAO).

* *Note by the Secretariat* – This sentence is not applicable in the frame of the Radio Regulations adopted by WRC-97.

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 **S30** and **S30A** 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 **S11** 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 **S11**.
- 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 **S11** 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 **S12**, 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 518 (Orb-88)

**Country/geographical area symbols used in
Appendices S30/30 and S30A/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),

noting

that several country/geographical area symbols used in Appendix **S30/30** have changed or are no longer appropriate and are therefore not listed in the Preface to the International Frequency List (IFL),

noting further

the provisions of No. **S20.16/2237**,

recognizing

that country symbols in the Preface to the IFL may be changed at irregular intervals, as the need arises and on the basis of prior consultation between the Secretary-General and the Radiocommunication Bureau and the countries concerned,

considering

that there should be no discrepancies between the country/geographical area symbols listed in the Preface to the IFL and those appearing in Appendices **S30/30** and **S30A/30A**,

resolves to instruct the Secretary-General

to ensure that, when publishing updated versions of the Radio Regulations, the country/geographical area symbols used in Appendices **S30/30** and **S30A/30A** reflect the latest status, following consultation with the countries concerned.

RESOLUTION 519 (Orb-88)

Possible extension to Regions 1 and 3 of provisions for interim systems

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-88 has reviewed Resolution **42 (Orb-85)** of the First Session and has incorporated into the Radio Regulations a modified text of that Resolution containing provisions covering the use of interim systems in Region 2;
- b) that this Conference has adopted a feeder-link Plan for the broadcasting-satellite service in Regions 1 and 3;
- c) that some administrations in Regions 1 and 3 have expressed interest in the adoption, for these Regions, of provisions similar to those adopted for interim systems in Region 2;
- d) that the broadcasting-satellite and associated feeder-link Plans for Regions 1 and 3 differ from those adopted for Region 2,

resolves

- 1 that a future competent conference should consider the possible application of regulatory provisions covering the operation of interim systems in Regions 1 and 3;
- 2 that administrations of Regions 1 and 3 wishing to bring into use interim systems of the broadcasting-satellite service before the date that may be determined by the future competent conference referred to in *resolves* 1, shall apply the provisions of Article 4 of Appendix **S30/30** or Article 4 of Appendix **S30A/30A** as appropriate, using if necessary the provisions of 4.3.15 of Appendix **S30/30** or 4.2.16 of Appendix **S30A/30A**.
- 3 that, when such interim systems are notified, Article 5 of Appendix **S30/30** or Article 5 of Appendix **S30A/30A**, as appropriate, shall be applied,

invites the Council

to place this matter on the agenda of the next conference competent to consider broadcasting-satellite service matters.

RESOLUTION 524 (WARC-92)

Future consideration of the Plans for the broadcasting-satellite service in the band 11.7-12.5 GHz (Region 1) and the band 11.7-12.2 GHz (Region 3) in Appendix S30/30 and the associated feeder-link Plans in Appendix S30A/30A

The World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992),

considering

- a) that Article **14** of Appendix **30** indicates that the broadcasting-satellite service Plan for Regions 1 and 3 in Appendix **30** meets requirements until January 1994;
- b) that WARC Orb-88 in Resolution **521***, *resolves* 3, stated that “while the Plans for the 11.7-12.7 GHz band can already be used for certain types of high definition television, studies should be continued on the long range future suitability of these bands for HDTV without prejudice to the existing plans in this band”;
- c) that modernization of the Plans in Appendix **30** associated with Regions 1 and 3, which had their origins in WARC-SAT-77, would be valuable in offering the prospects of more efficient utilization of the spectrum and orbit resources by taking into account technological improvements (e.g. satellite antennas and receiver sensitivity) which could be used to increase the capacity and the flexibility of the Plan without reducing the number of current assignments to each country;
- d) that improvements in the use of the 12 GHz planned band may enable countries, in particular those which have high rainfall climatic zones, to accommodate their Broadcasting-satellite service (HDTV) needs, or part of their needs, in that band,

invites the ITU-R

to study, as a matter of priority, the technical possibilities for improving the efficiency and flexibility of the Plans for Regions 1 and 3 contained in Appendices **S30/30** and **S30A/30A**, taking into account the intent of the conference referred to below, and to study the particular needs of high rainfall climatic zones for HDTV and the technical methods which could be used to implement this service in the 12 GHz band,

urges administrations

to contribute to the studies of the ITU-R and, also, to consider the need for a future competent conference to review and as necessary revise the relevant parts of Appendices **S30/30** and **S30A/30A**,

* This Resolution was abrogated by WARC-92.

recommends the next Plenipotentiary Conference

to consider the convening of a radiocommunication conference to revise those parts of the Plans in Appendices **S30/30** and **S30A/30A** applying to Regions 1 and 3 in the light of the studies carried out by the ITU-R,

resolves

1 that the future conference, in revising the Region 1 and 3 parts of Appendices **S30/30** and **S30A/30A**, should:

- a) maintain each country's assigned BSS capacity in the Plan, as a minimum;
- b) provide for the needs of new countries;
- c) protect notified systems which are in conformity with Appendices **S30/30** and **S30A/30A**;
- d) take account, as far as possible, of systems which have been communicated to the Radiocommunication Bureau/ex-IFRB under Article 4 of Appendices **S30/30** and **S30A/30A**;

2 that the future conference shall ensure that the integrity of the Region 2 Plans and their associated provisions is preserved, by providing the same protection to the assignments contained in those Plans as they now receive under the relevant provisions of the Radio Regulations and by not requiring more protection from assignments in the Region 2 Plans than that currently provided under the Radio Regulations,

instructs the Secretary-General

to bring this Resolution to the attention of the Council with a view to the convening of a conference to undertake the review and any necessary revision of the relevant parts of Appendices **S30/30** and **S30A/30A** and associated provisions of the Radio Regulations, taking account of the latest ITU-R studies.

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 3¹**

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.

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 **S27/34**, 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/m²) in any 1 MHz band for angles of arrival between 0° and 5° above the horizontal plane; or
- -105 dB(W/m²) 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 links¹

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 broadcasting¹

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,

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 GHz¹

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,

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 531 (WRC-95)

Review of Appendices S30/30 and S30A/30A of the Radio Regulations

The World Radiocommunication Conference (Geneva, 1995),

considering

- a) the objectives set out in Resolution **524 (WARC-92)**;
- b) the institutional nature of the ITU, which is founded on an agreement between Member States †;
- c) the treaty status of the Plans in Appendices **S30/30** and **S30A/30A**;
- d) the increasing number of applications under Article 4 for modifications to the Plans;
- e) the need to provide guidance to the Radiocommunication Bureau in order to preserve the integrity of the Plans until WRC-97,

resolves

that WRC-97, in revising Appendices **S30/30** and **S30A/30A**, may take into account the results of the studies considered by this Conference and contained in the report set out in annex hereto to WRC-97 on review and revision of Appendices **S30/30** and **S30A/30A**,

urges all members of the ITU

to consider that report and actively participate in the planning exercises referred to in § 5.4,

instructs ITU-R

to take appropriate actions based on the matters contained in the report, particularly in respect of § 5.

ANNEX 1 TO RESOLUTION 531 (WRC-95)

**Report of WRC-95 to WRC-97 on review and revision of
Appendices S30/30 and S30A/30A of the Radio Regulations**

(RESOLUTION 524 (WARC-92))

1 Introduction

In 1977 a frequency Plan was established by ITU which regulates the use of the BSS in the bands 11.7-12.5 GHz (Region 1) and 11.7-12.2 GHz (Region 3). The Plan assigned, with a few exceptions, five channels to each country. The Plan was based on frequency modulation of the analogue TV systems PAL, SECAM, NTSC with one FM sound subcarrier. In accordance with the Radio Regulations (Appendix **S30/30**) other modulation systems are, however, not precluded “provided that the use of such characteristics does not cause greater interference than that caused by the system considered in the appropriate Regional Plan”.

Appendix **S30/30** contains the regulatory provisions for the use of the 11.7-12.5 GHz frequency band by the broadcasting-satellite service in Regions 1 and 3, known as the WARC-SAT-77 Plan, and other services occupying the planned bands in all three Regions. The main provisions of this Appendix are:

- the list of assignments, as contained in the columns of the Plan, with their detailed characteristics for each country (channel number, polarization, satellite orbital location, beam boresight, size and orientation, satellite e.i.r.p., earth station test points, reference interference situation). The Plan is updated regularly by the Radiocommunication Bureau. Its initial version (in 1977) is included in Article 11 of Appendix **S30/30**;
- the technical criteria on which the Plan has been established (i.e. *C/N* objectives, satellite and earth station antenna radiation patterns, protection ratios, etc.). These **technical criteria** are provided in Annex 5 to Appendix **S30/30**;
- the procedure for modification of the Plan. This **procedure** is provided in Article 4 of Appendix **S30/30** and also includes technical provisions, the most important of which are given in Annexes 1 and 7 of Appendix **S30/30**.

In 1988 the Plans were completed by the addition of Appendix **S30A/30A** which delineates the feeder-link assignments associated with the downlinks in Appendix **S30/30**. New procedures to regulate the use of these feeder links were developed, including some variations to the concepts contained in Appendix **S30/30**.

Decisions to revise the Plans may lead to modifications to these Plans, the technical criteria and the procedures.

The agenda of WRC-95 included the following item:

“3 to consider the following items, taking into account the work carried out by the study groups and the Conference Preparatory Meeting of the Radiocommunication Sector, with a view to taking action, as appropriate:

- a) Appendices **30** and **30A** for Regions 1 and 3 in response to Resolution **524 (WARC-92)**, and taking particular account of *resolves* 2 of that Resolution and with due regard to the advantage of taking into account, where practicable, the orbital arcs of Appendix **30B**;

In addressing this agenda item, WRC-95 discussed many aspects of the possible revision of the Plan and contributions to the subject from Member States[‡]. As required by the agenda, WRC-95 also took into account the work of ITU-R as given in the Report of the Conference Preparatory Meeting (CPM). The Bureau also contributed a report on its experience in administering the Plan.

It was considered desirable to fully discuss some of the issues which will need to be resolved during WRC-97 and convey the outcome of those deliberations in this Report, to enable the results of consensus and agreements reached to be available as guidance for the preparatory work for WRC-97 by the Radiocommunication Sector and administrations.

To enable WRC-97 to revise Appendices **S30/30** and **S30A/30A**, WRC-95 adopted and included in this Report a set of material required for ITU-R, and in particular the Bureau, for the work to be carried out. This material may also serve as a guide to administrations when preparing their proposals to WRC-97. It consists of planning principles, planning parameters, considerations on the current procedures and instructions to ITU-R. In developing this material, due account was taken of Resolution **524 (WARC-92)**.

As indicated in Resolution **524 (WARC-92)**, revision of Appendices **S30/30** and **S30A/30A** shall include requirements for new countries. The Bureau indicated in its report to WRC-95 (Annex 2) the difficulties it encountered in dealing with requirements it received from new countries. Taking account of the limited resources of the Bureau, requirements of new countries shall be considered within the revision of Appendices **S30/30** and **S30A/30A**.

2 Planning principles

Several administrations submitted proposals for principles to be adopted for the WRC-97 review of the Plans. These were discussed by WRC-95 and adopted as a basis for the preparatory work of the Radiocommunication Sector and to guide the preparations of administrations for WRC-97.

The revision of Appendices **S30/30** and **S30A/30A** should be based on the following principles.

- 2.1 There is agreement that the revision of the Plans should, as a minimum:
 - 2.1.1 use the revised planning parameters adopted in Recommendation **521 (WRC-95)**;

2.1.2 provide for new countries, and those countries having less than the minimum number of channels assigned by WARC SAT-77 (for example, in Region 1 this was five channels, if available, in the specific orbital location), an initial capacity equivalent to that which would have been provided to them using the principles adopted at WARC SAT-77.

2.1.3 be based on national coverage;

2.1.4 protect, on the basis of the criteria set forth in Appendix **S30/30** (respectively **S30A/30A**), the assignments which are in conformity with Appendix **S30/30** (respectively **S30A/30A**), and have been notified under § 5.1 of Article 5 of Appendix **S30/30** (respectively **S30A/30A**) and for which the entry into service has been confirmed to the Bureau under § 5.2.8 of Appendix **S30/30** (respectively **S30A/30A**); and protect, on the basis of the planning parameters contained in Recommendation **521 (WRC-95)** and, as far as possible, on the basis of the criteria set forth in Appendix **S30/30** (respectively **S30A/30A**), the assignments which are in conformity with Appendix **S30/30** (respectively **S30A/30A**) and have been notified under § 5.1 of Article 5 of Appendix **S30/30** (respectively **S30A/30A**);

2.1.5 in order to avoid the obsolescence of the Plans, caused by technical assumptions becoming out of date, ensure that the plan is established with a view to achieving long-term flexibility;

2.1.6 taking account of the increased requirements of subregional systems, avoid a high fill factor of the band in order to facilitate the development (in a balanced way among the Regions) of multi-administrations and subregional systems through the application of procedures associated with the Plan;

2.1.7 take account, as far as possible, of systems which have been communicated to the Bureau under Article 4 of Appendices **S30/30** and **S30A/30A**.

2.2 To the extent possible, the revision of the Plans and associated procedures should facilitate:

2.2.1 a channel capacity large enough to permit the economical development of a broadcasting-satellite system;

2.2.2 utilization of existing orbital locations, except for those administrations wishing alternative ones. Where necessary in the revision, in some segments of the orbital arc, it may be desirable to use an orbital spacing other than the nominal spacing, without increasing the amount of assigned orbital locations and without affecting other assignments in the Plans;

2.2.3 the establishment of procedures associated with the Plans which would allow administrations, under conditions to be specified, to use their entry(ies) in the Plan for the fixed-satellite service;

2.2.4 considering, for planning, the appropriateness of a complete digital approach in the future and, if so, providing for the simultaneous operation of analogue and digital systems, if necessary during a defined time-scale.

2.3 The planning shall maintain the integrity of the Region 2 Plan in accordance with the provisions of *resolves 2* of Resolution **524 (WARC-92)**.

2.4 Compatibility shall be ensured between the broadcasting-satellite service in Regions 1 and 3 and those services having allocations in the planned bands in all three Regions.

3 Planning parameters

WRC-95 decided to adopt revised technical planning parameters recommended by the CPM and supported in the proposals of administrations, in Recommendation **521 (WRC-95)** which recommends:

- “1 that the following technical parameters be adopted in preparation for WRC-97 actions on the revision of Appendices **S30/30** and **S30A/30A**:
 - 1.1 e.i.r.p. planning values: a general reduction of 5 dB from the levels listed in Appendix **S30/30**;
 - 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;
- 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 **S30/30** and **S30A/30A**, will only be adjusted if the administrations concerned agree;
- 3 that the general e.i.r.p. reduction in § 1.1 above be applied, but for countries in high rainfall climate zones adequate e.i.r.p. levels will be maintained.”

4 Procedural matters requiring preparatory work and consideration by WRC-97

4.1 Modification procedures

A number of contributions recognized the desirability of improving the procedures for modification of the Plans. It is considered that further study is needed by the Radiocommunication Sector, taking into account the studies of the VGE and the study groups. Additionally, in its report to the Conference, the Bureau identified a number of matters where procedures could be improved to ensure more efficient and effective processing of applications. Some specific items were identified for consideration.

4.1.1 It might be necessary to discourage modifications to the Plan which are not intended to be brought into use.

Further studies need to be carried out to suitably review the modification procedures contained in Article 4 of Appendices **S30/30** and **S30A/30A** (see Recommendation **35 (WRC-95)**).

4.2 Relationship with Appendix S30B/30B

The potential for aligning BSS assignments with the orbital positions and their predetermined arcs of Appendix **S30B/30B** has been studied. It was found that, if applied systematically, this will complicate any planning exercise. It may, however, be feasible in some cases to take commonality in an orbital arc into account in revising the Plans taking into account § 2.2.2 above.

4.3 Matters relating to the application of No. S23.13/2674

4.3.1 No. **S23.13/2674** states: “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 extent practicable, the radiation over the territory of other countries unless an agreement has been previously reached with such countries”.

It is a general provision applicable to all BSS bands, planned and unplanned, in all three Regions. The interpretation and application of No. **S23.13/2674** by the Bureau is explained in the Rules of Procedure for Article **S23/30** which were adopted in December 1994 without objection from administrations.

4.3.2 In its Document 21, the Bureau referred to the need to bring in line the English and the French wording of No. **S23.13/2674**; this may be indicated to WRC-97 and the preparation of a revised text should be dealt with in the framework of the preparation of WRC-97.

4.3.3 The agreement referred to in No. **S23.13/2674** is not covered by Article 4 of Appendices **S30/30** and **S30A/30A**. No existing procedure is indicated for its application. Should such a procedure be developed, it should first allow the identification of the administrations whose agreement is required, and then indicate any steps that should be applied in this specific case.

4.3.4 It may be difficult for the Board to adopt criteria permitting the Bureau to evaluate the extent to which the available technical means have been used to reduce the radiation over the territory of another administration. For the purpose of the application of No. **S23.13/2674**, the administration communicating a satellite network should indicate the service area in terms of territories of another administration (or test points), as indicated under § 6 of Annex 2 of Appendix **S30/30**.

4.3.5 Recognizing that the agreement under No. **S23.13/2674** and the agreement required in Article 4 of Appendices **S30/30** and **S30A/30A** are separate agreements, the agreement under No. **S23.13/2674** should be sought directly from the administration concerned or through the Bureau; in this latter case, the agreement under No. **S23.13/2674** should be sought through the publication required under Article 4 of Appendices **S30/30** and **S30A/30A**. In case of no comment being received by the Bureau within a determined period, the non-commenting administration is considered as not having a major objection. In the case of a disagreement, and if the administrations concerned cannot reach an agreement, the Bureau shall modify the service area to exclude the territory of the objecting administration. In either case, the administration initiating the project is entitled to bring into use the modification after successful completion of Article 4 of Appendices **S30/30** and **S30A/30A** procedures.

4.3.6 When a subregional system is communicated to the Bureau by an intergovernmental organization referred to in No. 261 of the ITU Convention (Geneva, 1992), in accordance with its internal rules, it shall be deemed that the members of that organization have given their agreement under No. **S23.13/2674**.

4.4 Subregional systems

WRC-95 considered the desirability of facilitating the development of subregional and multinational systems in the procedures of Appendices **S30/30** and **S30A/30A**.

It noted there are a number of such systems being proposed to the Bureau for which the existing procedures may not be adequate.

Guidance for development of suitable procedures can be found in Resolution **42 (Rev.Orb-88)** and Appendix **S30B/30B** (see § 5.1.8). It is desirable that studies be undertaken to provide advice to WRC-97.

4.5 Alignment of Appendices S30/30 and S30A/30A

There are inclusions in the Articles of Appendix **S30A/30A** adopted at WARC Orb-88 which differ from those in Appendix **S30/30**. It would be desirable for these to be brought into alignment as far as possible. The Radiocommunication Sector is requested to study the provisions of the two sets of procedures and suggest appropriate adjustment.

5 Advice and instructions to ITU-R

5.1 Matters of which WRC-95 takes note

WRC-95 takes note of the following issues appearing in § 2.6 of the Bureau's Report to WRC-95 (attached hereto):

5.1.1 Introduction, networks submitted to the Bureau, publications and protection margins report (§ 2.6.1 and 2.6.2.1).

5.1.2 Applicability of the group concept (§ 2.6.3.1).

5.1.3 Resolution **42 (Rev.Orb-88)** (§ 2.6.3.3).

5.1.4 Reference protection margin for the BSS Plan of Regions 1 and 3 (§ 2.6.3.5).

5.1.5 Station-keeping (§ 2.6.4.2).

5.1.6 Extension of the date of bringing into use (§ 2.6.3.7).

5.1.7 Shaped beams (§ 2.6.6.3).

5.1.8 Experience of the Bureau in applying Appendix **S30B/30B** (§ 2.6.7).

5.2 Matters for which WRC-95 considers that further studies are required to be carried out by ITU-R with the results to be available by CPM-97 at the latest

- 5.2.1 Frequency assignments in the guardbands of the Plans (§ 2.6.3.4 of the Bureau's Report to WRC-95).
- 5.2.2 Power control (§ 2.6.3.8).
- 5.2.3 Very low equivalent protection margins (§ 2.6.6.1).
- 5.2.4 Coordination area around a feeder-link transmitting earth station (§ 2.6.6.4).
- 5.2.5 Rain climatic zones in Appendices **S30/30** and **S30A/30A** (§ 2.6.6.5).
- 5.2.6 Linear polarization and digital transmission (§ 2.6.4.1).
- 5.2.7 Time difference in the conclusion of the Article 4 procedure by different networks (§ 2.6.6.2).
- 5.2.8 Coexistence of analogue and digital systems.
- 5.2.9 Non-uniform spacing.
- 5.2.10 Member States[‡] with unified/divided territories.
- 5.2.11 Transmit earth station antenna.
- 5.2.12 Energy dispersal.
- 5.2.13 Subregional systems (see § 4.4 above).
- 5.2.14 Compatibility between the broadcasting-satellite service and the fixed-satellite service in the BSS planned bands (see § 2.2.3 above).
- 5.2.15 Emissions overlapping guardbands (§ 2.6.4.3).
- 5.2.16 Service area contours and steerable beams (§ 2.6.6.6).

5.3 Rules of Procedure

5.3.1 Agreements under No. S23.13/2674 (§ 2.6.3.6 of the Bureau's Report to WRC-95)

WRC-95 instructs the RRB to modify the Rules of Procedure for No. **S23.13/2674**, for Regions 1 and 3 as described in § 4.3 above.

5.3.2 Application of Appendices S30/30 and S30A/30A to new Member States[‡] (§ 2.6.5 of the Bureau's Report to WRC-95)

This Conference confirms the Bureau's action to treat submissions under Article 4 of Appendices **S30/30** and **S30A/30A** by new Member States[‡] as follows:

- that when countries become new Member States[‡], they may apply the modification procedures of Appendices **S30/30** and **S30A/30A** to suitably modify the Plans in order to accommodate their requirements.

5.3.3 Former assignments not reflecting current administrative and geographical situation

In cases where the Bureau identifies a new case of excess of interference into an assignment to an administration in the Plan which has administratively or geographically changed with respect to its situation at the time of the conferences, the Bureau will have to include in the list of affected administrations the name(s) of the new Member(s) State(s)[‡] in the territory of which the affected test point(s) is (are) located.

Then, if the administration of one of these new Member States[‡] has the intention to ask for the use of the former assignments, as mentioned above, during WRC-97, it may have the opportunity to send unfavourable comments to the administration responsible for the submission under Article 4 of Appendices **S30/30** and **S30A/30A** before the end of the four-month period specified therein.

5.3.4 General remarks on the submitted data. Non-standard parameters (§ 2.6.2.2 and 2.6.3.2 of the Bureau's Report to WRC-95)

WRC-95 instructs the Bureau to identify the systems still under Article 4 of Appendices **S30/30** and **S30A/30A**, including those using parameters different from those on the basis of which the current Plans were developed, in order to include a Note in the relevant publications.

This Note is intended to indicate that if the proposed system has not successfully completed the Article 4 procedures by WRC-97, WRC-97 will take account as far as possible of its parameters (see § 2.1.7 above); otherwise, if this is not possible, the administration responsible for this system may either revise its parameters, at WRC-97, so as to be compatible with the revised Regions 1 and 3 Plan, or maintain the modification and continue coordination under the modification procedures adopted by WRC-97, as of their entry into force.

5.3.5 Overall equivalent protection margins (OEPM) (Addendum 1 of the Bureau's Report to WRC-95)

The Bureau shall develop calculation methods on the basis of existing ITU-R Recommendations or any material at its disposal, and circulate them for comment by administrations.

Pending subsequent decision by WRC-97, WRC-95 instructs the Bureau and ITU-R, in calculating the OEPM for Regions 1 and 3 Plan to be developed, to use the OEPM algorithm appearing in § 1.14 of Annex 5 of Appendix **30** and § 1.12 of Annex 3 of Appendix **30A** for the Region 2 analysis, as properly modified to calculate the overall margins for co-channel, first lower adjacent and first upper adjacent channels. The above-mentioned margins will be then combined using the equations appearing in the above-mentioned sections in order to obtain the OEPM reference situation to be used in the planning exercises to be carried out by ITU-R, together with the additional technical criteria referred to in Recommendation **521 (WRC-95)**.

5.4 Planning exercises

The Bureau, in cooperation with administrations and the study groups and on the basis of the planning principles contained in § 2 above, is instructed to conduct planning exercises as follows and report the results of its work for the conference preparatory meeting.

Step 1: Modify the existing Plan assignments on the basis of the new parameters contained in Recommendation **521 (WRC-95)**.

In this and subsequent steps the Bureau should protect, on the basis of the criteria set forth in Appendix **S30/30** (respectively **S30A/30A**), assignments which are in conformity with Appendix **S30/30** (respectively **S30A/30A**), and have been notified under § 5.1 of Article 5 of Appendix **S30/30** (respectively **S30A/30A**) and for which the entry into service has been confirmed to the Bureau under § 5.2.8 of Appendix **S30/30** (respectively **S30A/30A**); and protect, on the basis of the planning parameters contained in Recommendation **521 (WRC-95)** and, as far as possible, on the basis of the criteria set forth in Appendix **S30/30** (respectively **S30A/30A**), assignments which are in conformity with Appendix **S30/30** (respectively **S30A/30A**) and have been notified under § 5.1 of Article 5 of Appendix **S30/30** (respectively **S30A/30A**).

Step 2: Provide for new countries, and those countries having less than the minimum number of channels, an initial capacity equivalent to that which would have been provided to them by the principles adopted for WARC SAT-77.

To conduct this step, it will be necessary for the Bureau to consult with the administrations concerned to establish their test points and new beam requirements. Assignments in the Plans to former Member States † may be utilized, as appropriate in accommodating the requirements.

Step 3: Take account, as far as possible, of systems which have been communicated to the Bureau under Article 4 of Appendices **S30/30** and **S30A/30A**.

ANNEX 2

EXTRACT FROM DOCUMENT WRC-95/21

2.6 Experience in the application of Appendices 30 and 30A (CPM Report, Chapter 3)**2.6.1 Introduction**

The present material summarizes the main conclusions* of the experience of the Bureau in its application of Appendices **30** and **30A** to the Radio Regulations. These comments are submitted to the Conference for its consideration when dealing with preparatory activities for WRC-97. Taking into account the reference to Appendix **30B** in agenda item *3a*), some comments on the application of that Appendix are also included in the present Report.

The Bureau's experience and difficulties in the application of the above-mentioned Appendices were considered by the Radio Regulations Board (RRB) in 1994 on the basis of draft Rules of Procedure submitted by the Radiocommunication Bureau (BR). The Rules of Procedure approved by the RRB were circulated to all administrations with Circular-letter CR/32 of 5 December 1994 to which no comments, relating to the application of the above Appendices, have been received to date.

2.6.2 Networks submitted to the Bureau**2.6.2.1 BR publications**

The Bureau has published so far 29 special sections AP30/E (Part A) in response to 64 requests under Article 4 of Appendix **30** and 28 special sections AP30A/E (Part A) in response to 62 requests under Article 4 of Appendix **30A**. The Bureau has received seven requests and published six special sections AP30/E (Part B) and five requests and published four special sections AP30A/E (Part B) under Article 4 of Appendices **30** and **30A** respectively. It has received two requests and published one special section Resolution **42 (Rev.Orb-88)**.

The Bureau has processed 14 out of 16 submissions under Article 5 of Appendix **30** and has processed 9 out of 11 submissions under Article 5 of Appendix **30A**.

According to the provisions of paragraphs 4.5 and 4.4 of Appendices **30** and **30A** respectively, the updated Plans, together with a protection margin report of the plan entries, were published through Circular-letters 376 of 15 April 1977, 656 of 30 May 1986, 881 of 14 October 1991 and 919 of 24 November 1992. Since then, due to the considerable amount and scope of proposed modifications/additions to the Plans, the publication of these data on paper has been

* A more detailed document on the subject which was submitted to the September 1995 meeting of ITU-R Working Party 10-11S is also available and may be provided on request.

discontinued. The related information is, however, available on diskette and on ITU's Telecom Information Exchange Services (TIES) for subscribers.

2.6.2.2 General remarks on the submitted data

When establishing the BSS and Feeder-Link Plans, the Planning Conferences of 1977 and 1988 took into consideration a set of generalized requirements such as five TV channels per country, national coverage, circular or elliptical beams, circular polarization, analogue modulation, pre-established channelling arrangements and assignment bandwidths as well as typical receiving and transmitting antenna patterns. The introduction of the broadcasting-satellite service took a much longer period than what was foreseen at the time of the first planning Conference and in the meantime the requirements of administrations have considerably changed. The IFRB (before 1993) and the Radiocommunication Bureau (after 1993) received several submissions for modification/addition to the Plans relating to characteristics different from the above-mentioned ones, such as number of TV channels up to 40, supranational service area, shaped satellite antenna beams, linear polarization, digital modulation, assigned frequencies or assigned bandwidths or both different from those included in the initial Plans, etc. Modifications/additions have also been submitted with transmitting/receiving earth station antenna patterns which differ from those foreseen in the initial Plans.

2.6.3 RRB Decisions included in the Rules of Procedure

2.6.3.1 Applicability of the group and cluster concepts

Following the introduction by RARC-83 of the grouping concept for Region 2 (Articles 9 and 10 of Appendices **30A** and **30** respectively) and further to the decision of WARC Orb-88 to apply this concept to the Regions 1 and 3 Feeder-Link Plan (Article 9A of Appendix **30A**), the Radio Regulations Board decided to extend this concept to the procedures applicable to the WARC-77 BSS Plan. This means that it is assumed that no simultaneous transmission will occur on the same channels by space stations that are part of the same group (either from one or different orbital positions). Consequently, in the calculation of interference to assignments that are part of the group, only the interference contribution from assignments that are not part of the same group is included. On the other hand, for the calculation of interference from the assignments belonging to a given group into the assignments that are not part of the same group, only the worst interference contribution from that group is taken into consideration.

Furthermore, subsequent to the introduction of the cluster concept by RARC-83 for Region 2 for BSS and feeder links (Section B of Annex 7 of Appendix **30**, paragraph 4.13 of Annex 3 of Appendix **30A**) and for Regions 1 and 3 by WARC Orb-88 for feeder links (paragraph 3.15 of Annex 3 of Appendix **30A**), the Board decided that Regions 1 and 3 may also apply this concept for the BSS Plan provided that the required agreement is obtained from administrations in the cluster.

The Board also decided that the 8 dB reduction in the e.i.r.p. referred to in section A.3 of Annex 7 to Appendix **30** is not applicable in the case of an orbital position situated within the cluster centred on one of the nominal orbital positions of the Plan.

2.6.3.2 Class of emission, assigned frequency and assigned bandwidths

The Board decided to accept, for plan modifications, other classes of emission and bandwidths than 27M0F8W (for Regions 1 and 3) and 24M0F8W (for Region 2). (Some examples of classes of emission and bandwidths recently received: 27M0F3F, 27M0F9W, 27M0G7W, 33M0G7W, 27M0FXF, 27M0FXX, 33M0FXX, 33M0GXX.)

2.6.3.3 Resolution 42 (Rev.Orb-88)

Provisions 5.1 *a*) and 5.2 *a*) of the Annex to Resolution **42 (Rev. Orb-88)** do not include any allowance for the overall equivalent protection margin (OEPM) to trigger the need for coordination. The Board decided that if the calculations for a proposed interim system show that the OEPM of any assignment which is currently 0 dB or negative, decreases by more than 0.25 dB, then that administration is identified as possibly affected.

2.6.3.4 Frequency assignments in the guardbands of the Plans

Due to the lack of any specific procedure, the Board decided that frequency assignments in the guardbands of the Plans are subject to advance publication. No other technical examination or publication is to be effected, however, by the Bureau.

2.6.3.5 Reference protection margin for the BSS Plan of Regions 1 and 3

The reference equivalent protection margin is used as the basis for comparing the effect of a proposed modification, addition or interim system. There exists some difference between the calculation method and criteria applicable for Region 2 and Regions 1 and 3, respectively. The Board decided to introduce some amendments to the Regions 1 and 3 method to harmonize the two models (see Rules of Procedure, Part A1, AP30, Annex 1, Sec. 1 and 2, pages 11 and 12).

2.6.3.6 Objections under No. 2674

In connection with objections of administrations related to the inclusion of their territories in the service area of a BSS space station of another administration, the Board noted that there is a significant difference between the texts of the English and French versions of provision No. **2674**; therefore, the Board suggested that this provision be reviewed by WRC-95. In addition, the Board noted that No. **2674** refers to the radiation from a space station and consequently this provision relates mainly to the question of “coverage area” and not “service area”.

As far as the application of this provision is concerned, the Bureau uses the Rules of Procedure concerning No. **2674** (Part A1, AR30, page 1).

2.6.3.7 Extension of the date of bringing into use

Provision 4.3.5 of Appendix **30** states that modifications involving additions (new assignments) will lapse if they are not brought into service by the date indicated. The provision does not contain any possibility for administrations to extend this date within a specified period as is done

in No. 1550 of Article 13. The Board decided that, for modifications or additions to the Plans, the postponement of the date of bringing into use will be possible beyond the original date by no more than three years. On the other hand, it is to be noted that a similar lapse period is not contained in paragraph 4.2.5 of Appendix 30A.

2.6.3.8 Power control

Provision 3.11.4.4 of Annex 3 to Appendix 30A (Orb-88) states that “in the event of modifications to the Plan, the IFRB shall recalculate the value of power control for the assignment subject to modification and insert the appropriate value for the assignment in column 9 of the Plan. A modification to the Plan shall not require the adjustment of the values of permissible power increase of other assignments in the Plan”. The Radio Regulations Board decided that immediately after the Regions 1 and 3 Feeder-Link Plan (14 GHz or 17 GHz) is updated and before Part B publication is effected, the Bureau shall recalculate the power control values and will inform the notifying administration about its findings. If the values of permissible power increase of other assignments in the Plan need to be adjusted, the responsible administration shall seek by all possible means to solve the matter with the affected administrations.

The 1977 Regions 1 and 3 Plan was developed, generally speaking, on the basis of a 6° orbital separation. After proposed modifications or additions to the Plan, this minimum orbital separation may no longer “be valid” or “exist”. Section 3.11.1.1 of Annex 3 to Appendix 30A establishes that the list of assignments in the same orbital position and the two adjacent positions liable to suffer interference from the assignments studied must be taken into consideration. For the sake of clarity, the Bureau confirms that in its calculations of power control, it considers not only the two adjacent orbital positions but at least those in the 6° arc (or even farther if no station is found within the 6° arc).

2.6.4 Collaboration between ITU-R WP 10-11S and the Bureau

2.6.4.1 Linear polarization and digital transmission

The initial Appendices 30 and 30A Plans were based on the use of assignments with circular polarization and analogue transmission, consequently no model exists in those Appendices to deal with other polarization or modulation cases. The IFRB, when dealing with the first submissions involving digital transmission or other than circular polarization under Article 4 of Appendices 30 and 30A, sought the technical guidance of Working Party 10-11S on how to treat these cases. In order to satisfy the Board’s request, the Working Party nominated a Special Rapporteur to coordinate activities and provided the Bureau with the necessary models to evaluate the interference between assignments of different (linear or circular) polarization as well as digital transmissions including assigned frequencies having different bandwidths and non-regular channel spacing. The algorithm developed by the Working Party has now been implemented in the MSPACE computer software.

2.6.4.2 Station-keeping

WARC-77 considered that space stations in the broadcasting-satellite service must be maintained in position with an accuracy of better than $\pm 0.1^\circ$ in both N-S and E-W directions. However, WARC Orb-88 did not foresee any allowance for station-keeping. Working Party 10-11S in dealing with this issue considered that “there is a need to revise Appendix **30A** in order to take this parameter into account, as is done in Appendix **30**”.

2.6.4.3 Emissions overlapping guardbands

In their proposed modification/addition to the Plans, some administrations, due to the use of different bandwidths from those in the Plan, overlap into the guardbands of the Plans. Working Party 10-11S has decided to assess the compatibility of BSS transmissions in the guardbands with the space operation service. Until the conclusions of the study are available, the Bureau includes, for such cases, a specific Note in the special section and asking administrations likely to be affected to provide their comments within four months of these publications.

2.6.5 Application of Appendices 30 and 30A to new ITU Members

The Bureau, in treating requests received from new country Members of the ITU, has noted that, unlike the provisions of Appendix **30B**, Appendices **30** and **30A** of the Radio Regulations do not explicitly foresee any regulatory procedure for the addition of new orbital position and corresponding frequency assignments for a new Member of the Union nor do these Appendices explicitly prevent a new ITU Member from applying the plan modification procedure of Article 4, in order to seek a new orbital position and associated frequency assignments. Similarly, Appendices **30** and **30A** of the Radio Regulations do not contain any regulatory procedure for the transfer of frequency assignments in the Plan from one administration to another (new) administration. Pending the decision of WRC-95 on this matter, the Bureau has taken into account the requests of new countries on a provisional basis and applies the Article 4 procedures subject to the endorsement of the Conference. This approach was confirmed by the Radio Regulations Board in its June 1995 meeting.

In dealing with the above-mentioned regulatory procedures, it might happen that the responsible administration and/or the Radiocommunication Bureau identifies an affected administration in the Plan which no longer exists or which has politically or geographically changed with respect to its situation at the time of the conferences. Therefore, the responsible administration seeking the agreement, and the Bureau in carrying out its tasks, may face the problem of not being in a position to clearly identify with whom the agreement must be obtained, or to whom correspondence is to be addressed as well as the validity of comments received from administrations which are still not in the Plan. Several instances of this situation have already occurred.

2.6.6 Other comments of the Radiocommunications Bureau

2.6.6.1 Very low equivalent protection margins (EPM) in the Plan

The Bureau's analysis has shown that the sensitivity of Plan entries to interference, in terms of being identified as affected by networks submitted to the Bureau, decreases when these networks produce very low equivalent protection margins (EPM). In these cases, due to the above-mentioned phenomenon, some plan entries might not be identified as affected or may lose their right to be protected if the administration responsible for the plan entry does not react in a timely manner within the plan modification procedures (paragraphs 4.3.12 of Appendix 30 and 4.2.13 of Appendix 30A refer).

In addition and similarly to other plan modification procedures, if the delay between publications of Part A and Part B is too long, the subject network remains in the Bureau file and should be protected against any subsequent incoming network unless the notifying administration formally withdraws the submission. This may lead to freezing in the Plans for a certain number of years.

2.6.6.2 Time difference in the conclusion of the Article 4 procedure by different networks

In determining those administrations that may be affected, a proposed modification/addition is examined with respect to the Plan as it exists at the date of receipt of the request for modification/addition including the proposed modification/addition received before that date. It might happen that while the requests for modifications/additions of networks A, B and C are still at the stage of application of Article 4, a new request for modification/addition (network D) is submitted to the Bureau. It may also happen that the above-mentioned new proposed modification (network D) successfully completes the procedure of Article 4 and is entered in the Plan while networks A, B or C are still in the stage of application of Article 4. Because of its later submission date for Article 4 network D will not be duly protected against the proposed modifications of networks A, B and C. This case is not properly handled in the Plan procedures. (Working Party 10-11S has decided to set up a special Reporter's group to examine this matter.)

2.6.6.3 Shaped beams

The plan was developed on the basis of elliptical beams. To handle shaped beams, the Bureau's MSPACE computer system uses a software package called the Graphical Interference Management System (GIMS) to calculate the corresponding gain at the test points defining the service area.

2.6.6.4 Coordination area around a feeder-link transmitting earth station

The Bureau has compared the results of calculations according to Annex 4 of Appendix 30A of the Radio Regulations and Recommendation ITU-R IS.848-1. The coordination areas produced by Recommendation ITU-R IS.848-1 were found to be much smaller. In Recommen-

dition ITU-R IS.848-1, unlike in Annex 4 of Appendix **30A**, it is assumed that the antenna of the hypothetical receiving earth station is not pointing towards the horizon but towards a satellite at some elevation above the horizon. This implies that it will receive much less interference from the transmitting earth station than a terrestrial station in the same location, which leads to a smaller coordination area.

2.6.6.5 Rain climatic zones in Appendices 30 and 30A

Figures 2 and 3 of Annex 5 to Appendix **30** provide the rain climatic zones corresponding to the three ITU Regions to be used when dealing with Appendix **30**, while Figures 1, 2 and 3 of Annex 3 to Appendix **30A** provide the corresponding rain climatic zones to be used when dealing with Appendix **30A**. None of the maps correspond to Recommendation ITU-R PN.837-1 that contains the latest information available on the subject.

2.6.6.6 Service area contours

Contrary to Appendix **3/S4** to the Radio Regulations, Annex 2 of Appendices **30** and **30A** does not explicitly require that service area contours be furnished; however, a set of test points are provided for C/I compatibility analyses. In order to enable the Bureau to carry out the examination of power-flux density (pfd) under Annex 4 of Appendix **30** (protection of broadcasting-satellite service by space stations in the fixed-satellite service sharing the same frequency bands) and to find out whether the test points having a pfd excess belong to the service area associated to the beam under protection, the service area contours should be provided with Annex 2 data.

Moreover, some administrations have sent to the Bureau modifications or additions to the Appendices **30** and **30A** plans involving steerable beams for which the service area and antenna radiation patterns are only defined by a simple series of test points. Service area contours would here again be required. Annex 2 of the Appendices **30** and **30A** should be put in line with paragraphs 2.B6) *d*) and 2.C3) *d*) of Appendix **3/S4** of the Radio Regulations.

2.6.7 Appendix 30B

Before the Appendix **30B** assignments are notified under Article **13** of the Radio Regulations for recording in the Master Register, they must first successfully apply the procedure specified in Article 6 of Appendix **30B**. In examining the submissions of administrations, the Radio-communication Bureau has encountered some regulatory and technical problems which are not currently covered by the provisions of Appendix **30B**. Most of these problems were considered by the former IFRB and the Radio Regulations Board on a case by case basis, whereby solutions were included in the Rules of Procedure. Some other problems would need decisions from the next competent world radiocommunication conference.

2.6.7.1 The PDA concept

The nominal orbital positions of the Plan of Appendix **30B** were associated with orbital segments of a given size, i.e. “predetermined arcs” (PDA) to provide flexibility to the Plan.* The application of this concept results in modifying the nominal orbital position of an administration contained in the Plan or in the Appendix **30B** List within its predetermined arc. Such modification may be initiated by an administration for its own orbital position or may be the result of the application of the PDA by another administration or by the Bureau, if its assistance/action is requested.

So far, the Bureau has a limited experience in the application of the PDA concept and its implementation to practical cases. These cases show nevertheless that its application is very complex both technically and administratively. Application of the PDA procedure for more than one case at the same time is not practical because of different orbital positions being identified pursuant to the different PDA procedures for the same allotment. It seems, therefore, that the goal of seeking commonality of the FSS Plan, as contained in Appendix **30B**, with the BSS and Feeder-Link Plans of Regions 1 and 3 when revising these Plans, may be difficult for the majority of cases.

For the resolution of incompatibilities, the concept of PDA implies the moving of the orbital position of the allotment, within its predetermined arc, of a given administration (Adm. B) affected by the proposed allotment conversion of Administration A. Some cases were observed in which an Administration A proposed to move the orbital position of the allotment of Administration B outside its PDA. Even if the agreement of Administration B is obtained, or requirements specified in Annex 4 are met, it is unclear what size of PDA should be associated with the new orbital position of the allotment of Administration B that is moved outside its original PDA. The same problem may exist even for modifications of orbital positions within the initial PDA when the same size of the predetermined arc cannot be reallocated.

2.6.7.2 Treatment of new ITU Member Administrations

The Bureau’s experience in application of the procedures of Appendix **30B** confirms the conclusions of WARC Orb-88 that in certain regions of the World the spectrum/orbit capacity is fully used by the Plan. In fact the first trial applications of Article 7 of Appendix **30B** (Addition of new allotments to the Plan for new Members) show that the provision of new allotments or the incorporation of modifications to orbital positions will not be possible in all regions of the World without degradation of the C/I criteria of the Plan (vis-à-vis allotments, “existing systems” and assignments recorded in the Appendix **30B** List).

* The PDA concept is specified in paragraphs 5.3 and 5.4 of Article 5, paragraphs 6.13, 6.16, 6.21, 6.31, 6.48 of Article 6, paragraph 7.3 of Article 7, paragraph 8.2 of Article 8 and Annex 5 of Appendix **30B**. The conditions under which the nominal orbital position could be moved within the predetermined arc are specified in paragraph 5.3 c) of Article 5 and in Annex 5 of Appendix **30B**.

Moreover, in searching for an optimal orbital position for a new country (or in providing assistance to administrations, when requested, for the selection of an alternative orbital position), workable means/tools are not available. Conducting such a study depends on the availability of an internationally agreed optimization method together with appropriate computer software. The Radiocommunication Bureau has neither the manpower resources nor the agreed methodology to develop the necessary computer software.

2.6.7.3 Conclusion of the application of the procedure

Similarly to other Plan modification procedures, Appendix **30B** may also be inconclusive for the cases in which an administration with which coordination is sought does not reply to the administration seeking coordination or to the Bureau acting on the case at the request of that administration. Continuing disagreement between administrations on coordination or lack of reply to the requesting administrations may cause unacceptable delays for the administration proposing an allotment conversion.

Additionally, in the case of a return of frequency assignments to the notifying administration (as a result of unfavourable finding, lack of agreement from affected administration), by the date of resubmission of the same assignment, the reference protection situation of the Plan could undergo several changes. Due to these modifications in the reference situation, the resubmitted assignment which might have now been successfully coordinated with all administrations initially identified as affected may receive again an unfavourable finding due to the new coordination requirement resulting from the updated reference situation in force at the time of resubmission. In that case, the coordination process should be restarted by the notifying administration and may result in an open-ended process.

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 **S30/30** and **S30A/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 **S30/30** and **S30A/30A**, in cooperation with the IRG and in accordance with the principles set out in Annex 1,

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 **S30** and **S30A** 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 **S30** and **S30A** 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 **S30/30** and **S30A/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.

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 S30/30*

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.

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 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 (WRC-97)

**Implementation of the decisions of the WRC-97 relating to
Appendices S30 and S30A to the Radio Regulations**

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that WRC-97 has adopted values for various technical parameters relating to Appendices **S30** and **S30A**;
- b) that these technical parameters were used for the establishment of the revised Plans for Regions 1 and 3,

recognizing

- a) that the revised Regions 1 and 3 Plans must be compatible with the Region 2 Plan and with the other services which have primary allocations in the planned bands in all three Regions;
- b) that, in revising the Regions 1 and 3 Plans, the orbital position of a number of administrations were changed;
- c) that a large number of Appendices **S30** and **S30A** Article 4 submissions that have either been processed or are currently being processed might affect the services mentioned in *recognizing a)* above;
- d) that the Radiocommunication Bureau needs clear instructions from this Conference on how to deal with these submissions and how to protect the Region 2 Plan and other services;
- e) that the instructions to Bureau should take effect as of the close of this Conference (22 November 1997),

resolves

1 that as of 22 November 1997 the Bureau shall use the values of technical parameters adopted for planning at this Conference in its subsequent examination of submissions for modification and notifications of assignments in the Regions 1 and 3 Plans received under Articles 4 and 5 of Appendices **S30** and **S30A**. In particular, the following technical parameters shall be applied:

- protection ratios used for the equivalent protection margin (EPM) analyses as defined in Recommendation ITU-R BO.1297 instead of the protection ratios applied at WARC SAT-77 and WARC Orb-88;
- new reference earth receiving antenna pattern (Recommendation ITU-R BO.1213) instead of earth reference receiving antenna pattern applied at WARC SAT-77;

- new reference feeder-link antenna patterns (Earth and space stations) in accordance with Recommendations ITU-R BO.1295 and ITU-R BO.1296 instead of the feeder-link (Earth and space stations) reference antenna patterns applied at WARC Orb-88;

2 that the following revisions to the Regions 1 and 3 Plans:

- the replacement of the assignments to Australia at 128° E and 98° E by assignments at 152° E and 164° E, respectively;
- the assignments successfully coordinated under Article 4 of Appendices **S30/30** and **S30A/30A** for satellite networks RST-1, -2, -3 and -5, at orbital positions 36° E, 56° E, 86° E and 140° E, respectively;
- the replacement of assignments at 31° W by assignments at 30° W and 33.5° W*;

shall not be considered as new or additional assignments under § 4.1 *b*) of Article 4 of Appendices **S30** and **S30A**. Therefore, these assignments shall not be subject to the provisions of § 4.3.5 of Appendix **S30** and § 4.2.5 of Appendix **S30A** and the associated Rules of Procedure. In particular, the associated orbital positions shall be treated as “orbital positions in the Plan”, and the assignments shall not lapse even if they are not brought into use within eight years from the adoption of the revised Plans;

3 that the Bureau shall use EPM criteria to establish a new reference situation for the revised Regions 1 and 3 broadcasting-satellite service and feeder-link Plans. In creating the new reference situation, the Bureau shall convert the merged overall EPM file into separate feeder-link and downlink EPM files by eliminating the redundant beams created for the purpose of overall EPM calculations using different “strapping” between feeder-link and downlink channels. The resultant new reference situation, including the use of power control for the feeder link, shall be published in a Circular-Letter for subsequent use in the application of the provisions of Appendices **S30** and **S30A**;

4 that the Bureau shall review all special sections already published in order to determine the requirement for coordination with the revised Regions 1 and 3 Plans as well as with the current Region 2 Plan and other services in all three Regions, and publish the results of its review in corrigenda to the concerned special sections (see Resolution **53 (WRC-97)**);

5 that in examining the requirement for coordination of other services in all three Regions with the revised Regions 1 and 3 Plans in the cases described in *resolves* 4, the following methodology shall be applied:

- Protection from fixed-satellite service assignments already published. The Bureau shall review all relevant special sections of the series, e.g. AP30/C previously published, and publish corrigenda where required.

* The orbital position at 31° W shall no longer be considered as an orbital position in the Plan.

- Protection from fixed-satellite service assignments not yet processed. The Bureau shall determine the requirement for coordination and publish the request in its Weekly Circular. The administrations responsible for the fixed-satellite service assignments shall then initiate coordination with the affected assignments in the revised Plans.
- Protection from terrestrial assignments already in process. The Bureau shall determine the requirement for coordination and publish the request in its Weekly Circular. The administration responsible for the terrestrial assignments shall then initiate coordination with the affected assignments in the revised Plans;

6 that as of the end of the Conference the Bureau shall process the pending Article 4 modifications with respect to the revised reference situation described in *resolves* 3, as follows:

- the Bureau shall process all pending modifications to the Plans of Appendix **S30** and Appendix **S30A** (i.e. those modifications being treated under Article 4 that have not yet completed the modification procedures) in the same date order of receipt by the Bureau of the complete information on the request for modification and, using the new technical planning criteria and reference situation, identify for each pending modification the list of administrations whose agreement is required and publish this list of affected administrations;
- within four months from the date of the above publication, possibly affected administrations should provide comments to the Bureau and to the notifying administration; however, the notifying administration shall indicate any agreements which have been obtained previously and any new agreements;
- in those cases where the degradation of the equivalent protection margins caused by the proposed modification is no worse under the new situation arising from the revision of the Plans than under the original situation, any agreements previously obtained under the Article 4 procedures of Appendices **S30/30** or **S30A/30A** should be confirmed by the respective administrations;
- the existing time period to bring the modifications or additions into use of five years plus a possible extension of three years will continue to be counted as from the date of receipt of the modification or additions by the Bureau of the complete Annex 2 information pertaining to the request for modification;
- any modifications or additions involving new frequencies or orbit positions, or both, which have not been brought into service within this five + three-year period shall be cancelled by the Bureau after it has informed the notifying administrations.

RESOLUTION 534 (WRC-97)

**Implementation of Annex 5 to Appendix S30 and Annex 3
to Appendix S30A of the Radio Regulations**

The World Radiocommunication Conference (Geneva, 1997),

considering

- a)* that WRC-97 has modified the Plan for the broadcasting-satellite service (BSS) in the frequency bands 11.7-12.2 GHz in Region 3 and 11.7-12.5 GHz in Region 1, as well as the Plan for feeder links for the BSS in the frequency bands 14.5-14.8 GHz and 17.3-18.1 GHz in Regions 1 and 3, using the updated technical criteria as contained in Annex 5 to Appendix **S30** and Annex 3 to Appendix **S30A**;
- b)* that this Conference decided that the provisions of the Radio Regulations, as revised by it, shall provisionally apply as from 1 January 1999;
- c)* that there is a need to apply the same technical criteria for processing new Article 4 submissions, so as to avoid problems of a parallel set of technical criteria,

resolves to instruct the Radiocommunication Bureau

to apply, as of 22 November 1997, the technical data contained in Annex 5 to Appendix **S30** and Annex 3 to Appendix **S30A** to the submissions under Articles 4 and 5 of those Appendices.

RESOLUTION 535 (WRC-97)

**Information needed for the application of Article S12
of the Radio Regulations**

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that WRC-97 adopted Article **S12** as a simple and flexible seasonal planning procedure for high-frequency broadcasting (HFBC) based on coordination;
- b) that Article **S12** responds to the intent of Resolution **508*** and Resolution **523 (WARC-92)***;
- c) that Article **S12** 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 **S12** and relevant radiocommunications seminars.

* 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 **S12**; 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.

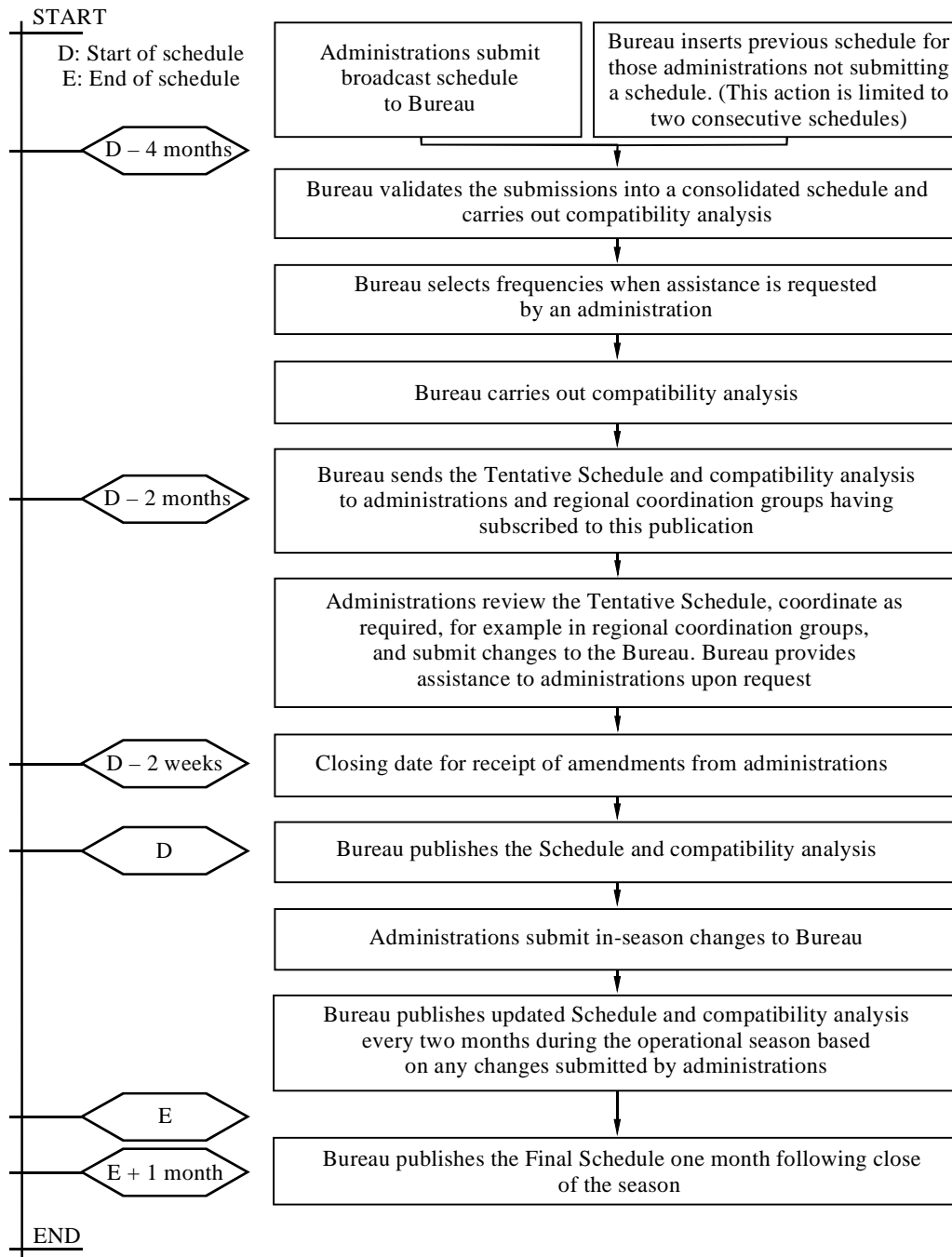
Date	Action
D – 4 months	Closing date for administrations to send their schedules ¹ to the Radiocommunication Bureau (Bureau), preferably by electronic mail or on 3.5" diskette (720 kbytes or 1.44 Mbytes). Schedule data will be made available via TIES as soon as it has been processed.
D – 2 months	Bureau 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



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 **S30** and **S30A**;
- 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 **S30** and **S30A** for modifications to the Plans, leading to many multinational systems;
- e) that No. **S23.13/2674** 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 **S30** and **S30A** 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. **S23.13/2674**, 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.

RESOLUTION 538 (WRC-97)

Use of the frequency bands covered by Appendices S30/30 and S30A/30A by non-geostationary-satellite systems in the fixed-satellite service

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that provisional limits have been established and included in Article **S22** and in the Annex to this Resolution to ensure that the interference caused by non-geostationary-satellite (non-GSO) systems in the fixed-satellite service (FSS) into assignments operated in conformity with the Appendices **S30** and **S30A** Plans is maintained within negligible levels;
- b) that the integrity of the above-mentioned Plans and their future modifications is to be ensured;
- c) that non-GSO systems should not be entered into those Plans and therefore should not apply the procedures associated with the Plans and should not be protected by those procedures;
- d) that this Conference has decided to introduce in Article **S5** a new allocation to the FSS in the frequency bands 11.7-12.5 GHz in Region 1, 12.2-12.7 GHz in Region 2 and 11.7-12.2 GHz in Region 3, limited to non-GSO FSS systems,

resolves

1

- 1.1 that, as of 22 November 1997, a non-GSO FSS system operating in the frequency bands covered by Appendices **30** and **30A** shall comply with the provisional limits specified in Article **S22** and in the Annex to this Resolution;
- 1.2 that such a system shall, as of the end WRC-99, comply with the limits specified in Article **S22**, as revised, if appropriate, by WRC-99, irrespective of the date of receipt of the complete notification information relating to the non-GSO FSS system;
- 1.3 that as of 22 November 1997, in applying No. **S22.2**, administrations may consider these provisional power limits as corresponding to permissible levels of interference from a non-GSO system into a GSO system, irrespective of the dates of receipt by the Radiocommunication Bureau of the complete notification information for the non-GSO system and for the GSO network;

1.4 that as of the end of WRC-99, an administration operating a non-GSO FSS system in the band 17.8-18.1 GHz (space-to-Earth) which is in compliance with the limits appearing in Article **S22** as revised, if appropriate, by WRC-99, shall be considered as having fulfilled its obligations under No. **S22.2** with respect to any GSO network operating in the Earth-to-space direction, irrespective of the dates of receipt by the Bureau of the complete notification information for the non-GSO system and of the complete coordination or notification information, as appropriate, for the GSO network;

1.5 that between 22 November 1997 and the end of WRC-99, if an administration operating or bringing into use a GSO system before the end of WRC-99 considers that a non-GSO FSS system proposed by another administration might cause unacceptable interference into its GSO system, then:

- the administration operating the GSO system shall send to the administration operating the non-GSO FSS system the technical details upon which its disagreement is based;
- the administration operating the non-GSO FSS system shall resolve the difficulties, taking into account especially degradation of picture and sound quality or signal availability with regard to GSO systems in operation;

1.6 that, as of 22 November 1997, a non-GSO FSS system operating in the frequency bands covered by Appendices **S30** and **S30A** shall apply the procedures of Section I of Article **S9**, and Nos. **S9.17** and **S9.17A** Sections I and III of Article **11**, and the procedures of Article **S11/13**;

1.7 that, as of 22 November 1997, such a system shall be subject, for the coordination with non-GSO systems, to the application of the provisions of § 2.1 of Section II of Resolution **46 (Rev.WRC-97)/No. S9.12**;

1.8 that, as of 22 November 1997, such a system shall apply, using an equivalent power flux-density threshold of $-185.3 \text{ dB(W/m}^2/4 \text{ kHz)}$ for 99.7% of the time, calculated with the reference 90 cm diameter antenna pattern provided in Annex 5 of Appendix **S30** for Regions 1 and 3, the provisions of No. **S9.8/Article 7** of Appendix **S30** with respect to assignments which appear in Article 11 of Appendix **S30** with the symbols AE or PE;

2 that non-GSO FSS systems in the frequency bands referred to in *resolves* 1 above shall not be operated before the end of WRC-99,

requests ITU-R

a) to conduct, as a matter of urgency and in time for consideration by WRC-99, the appropriate technical, operational and regulatory studies to review the regulatory provisions concerning the operation of non-GSO FSS systems in the frequency bands referred to in *resolves* 1.1 above in order to ensure that these provisions ensure appropriate protection of the Plans and their future modifications and do not place unreasonable constraints on the development of non-GSO systems in these bands;

b) to undertake and complete the development of a methodology for calculating the power levels produced by non-GSO FSS systems and the compliance of these levels with the limits referred to in *resolves* 1.1 and 1.2 above;

c) to complete the studies relating to the sharing criteria to be applied for determining the need for 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;

d) to report to the 1999 Conference Preparatory Meeting (CPM-99) on the conclusion of these studies,

instructs the Radiocommunication Bureau

as of the end of WRC-99, to review and, if appropriate, revise, any finding previously made on the compliance with the limits contained in Article **S22** of a non-GSO FSS system for which notification information has been received between 22 November 1997 and the end of WRC-99. This review shall be based on the values in Article **S22**, as revised, if appropriate, by WRC-99.

ANNEX TO RESOLUTION 538 (WRC-97)

Provisional limits**Section I – Control of interference to geostationary-satellite systems**

1.1 In the frequency band 17.8-18.1 GHz, the maximum aggregate power flux-density (pfd) produced at the geostationary-satellite orbit (GSO) by all the space stations in a non-geostationary-satellite (non-GSO) system in the fixed-satellite service (FSS) shall not exceed the values given in Table 2.

1.2 The equivalent pfd¹, at any point on the Earth's surface visible from the GSO, produced by emissions from all the space stations of a non-GSO system in the FSS in the frequency bands listed in Table 1, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limits given in Table 1 for the given percentages of time. These limits relate to the equivalent pfd which would be obtained under free-space propagation conditions, into a reference antenna and in the reference bandwidth as specified in Table 1, for all pointing directions towards the GSO.

¹ The equivalent pfd is defined as the sum of the pfd produced at a point on the Earth's surface by all space stations within a non-GSO system, taking into account the off-axis discrimination of a reference receiving antenna assumed to be pointing towards the GSO. The equivalent pfd is calculated using the following formula:

$$epfd = 10 \cdot \log_{10} \left[\sum_{i=1}^{N_s} 10^{pfd_i/10} \cdot \frac{G_r(\theta_i)}{G_{max}} \right]$$

where:

N_s : number of non-GSO space stations visible from the point considered at the Earth's surface, within an elevation angle greater than or equal to 0°;

i : index of the non-GSO space station considered;

pfd_i : power flux-density produced at the point considered on the Earth's surface in dB(W/m²) in the reference bandwidth;

θ_i : angle between the direction considered towards the GSO and the direction of the interfering space station in the non-GSO system;

$G_r(\theta_i)$: gain (as a ratio) of the receive reference antenna to be considered as part of a GSO network;

G_{max} : maximum gain (as a ratio) of the above receive reference antenna;

$epfd$: computed equivalent power flux-density in dB(W/m²) in the reference bandwidth.

NOTE – Table 1 contains provisional limits corresponding to an interference level caused by one non-GSO FSS system in the frequency bands to be applied in accordance with this Resolution. These provisional limits are subject to review by ITU-R and are subject to confirmation by WRC-99.

TABLE 1

Frequency band allocated to the broadcasting-satellite service	Antenna diameter (cm)	Equivalent pfd level (dB(W/m ² /4kHz)) which may not be exceeded during the percentage of time shown		Reference antenna radiation pattern
		99.7%	100%	
11.7-12.5 GHz in Region 1, 11.7-12.2 GHz and 12.5-12.75 GHz in Region 3	30	-172.3	-169.3	Recommendation ITU-R BO.1213
	60	-183.3	-170.3	
	90	-186.8	-170.3	
12.2-12.7 GHz in Region 2	45	-174.3	-165.3	§ 3.7.2 of Annex 5 of Appendix S30/30
	100	-186.3	-170.3	
	120	-187.9	-170.3	
	180	-191.4	-170.3	
17.3-17.8 GHz in Region 2	For further study*			

* The interference from non-GSO FSS systems into GSO BSS systems operating in the frequency bands 17.3-17.8 GHz relates to the two following sharing situations:

- non-GSO FSS transmit earth station into GSO receive earth station;
- GSO BSS transmit space station into non-GSO FSS receive space stations.

Both situations need to be studied, in particular since coexistence of receive BSS earth stations and large numbers of transmit non-GSO FSS terminals would not be feasible within the same country.

1.3 The aggregate power flux-density² produced at any point in the geostationary-satellite orbit by emissions from all the earth stations in a non-GSO FSS system, for all conditions and for all methods of modulation, shall not exceed the limits given in Table 2 for the specified percentages of time. These limits relate to the power flux-density which would be obtained under free-space propagation conditions in the reference bandwidth specified in Table 2.

NOTE - Table 2 contains provisional limits corresponding to an interference level caused by one non-geostationary fixed-satellite service system in the frequency bands to be applied in accordance with this Resolution. These provisional limits are subject to review by ITU-R and are subject to confirmation by WRC-99.

TABLE 2

Frequency band (GHz)	Aggregate pfd dB(W/m ² /4 kHz)	Percentage of time during which aggregate pfd level may not be exceeded
17.3-18.1 in Regions 1 and 3 and 17.8-18.1 in Region 2	-163	100%

1.4 The limits given in Table 1 may be exceeded on the territory of any country whose administration has so agreed.

² The aggregate pfd is defined as the sum of the pfd produced at a point in the GSO by all the earth stations of a non-GSO system. The aggregate pfd is computed by means of the following formula:

$$apfd = 10 \cdot \log_{10} \left[\sum_{i=1}^{N_e} 10^{P_i/10} \cdot \frac{G_t(\theta_i)}{4 \pi d_i^2} \right]$$

where:

N_e : number of earth stations in the non-GSO system with an elevation angle greater than or equal to 0°, from which the point considered in the GSO is visible;

i : index of the earth station considered in the non-GSO system;

P_i : RF power at the input of the transmitting antenna of the earth station considered in the non-GSO system in dBW in the reference bandwidth;

θ_i : off-axis angle between the boresight of the earth station considered in the non-GSO system and the direction of the point considered in the GSO;

$G_t(\theta_i)$: transmit antenna gain (as a ratio) of the earth station considered in the non-GSO system in the direction of the point considered in the GSO;

d_i : distance in metres between the earth station considered in the non-GSO system and the point considered in the GSO;

$apfd$: aggregate power flux-density in dB(W/m²) in the reference bandwidth.

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. **S5.73/466** 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 degraded¹;
- 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,

¹ Note by the Secretariat – WRC-97 modified No. **S5.73** (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 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 **S9** and **S11** 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. **S25.11**,

notes

that certain information specified in Appendix **S4** 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 **S4**; the Bureau shall publish such information in a special section of its weekly circular requesting comments to be communicated within a period of four months after the date of publication;

1.2 notify under Nos. **S11.2** to **S11.8** all or part of the information listed in Appendix **S4**; 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 (WRC-97)

Telecommunication resources for disaster mitigation and relief operations

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that ITU, in the same spirit as reflected in Articles 40 and 46 of its Constitution and in Resolution **209 (Mob-87)**, 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 (Kyoto, 1994), in endorsing Resolution 7 of the World Telecommunication Development Conference (Buenos Aires, 1994), adopted Resolution 36 on telecommunications for disaster mitigation and disaster relief operations;
- 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;
- c) the progress made in the implementation of Resolution 36 with respect to the preparation of the Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations,

noting

with appreciation the scheduling of the Intergovernmental Conference on Emergency Telecommunications (ICET-98) from 16 to 18 June 1998 in Tampere, Finland, which is expected to adopt the Convention referred to in *recognizing c)* above,

resolves

to invite ITU-R 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,

requests the Director of the Radiocommunication Bureau

to support administrations in their work towards the implementation of Resolution 36,

instructs the Secretary-General

to work closely with the United Nations Emergency Relief Coordinator with a view to further increasing the Union's involvement in, and support to, disaster communications, and to report on the outcome of the Tampere Conference to the 1998 Plenipotentiary Conference so that that Conference or the Council may take any action that it deems necessary,

invites

the United Nations Emergency Relief Coordinator and the Working Group on Emergency Telecommunications to collaborate closely with ITU in further work towards the implementation of Resolution 36, and in particular the adoption of the Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations,

urges administrations

to give their full support to the adoption of the said Convention and its national implementation.

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 services¹**

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,

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. **S4.5**, **S4.10**, **S5.60** and **S5.62** of the Radio Regulations,

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 radio-communication 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.

* *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 (Mob-87)

Operation of the fixed and maritime mobile services in the band 90-110 kHz

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

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 and maritime mobile services having a secondary allocation in this band;
- d) that, notwithstanding No. **S5.63**¹ of the Radio Regulations, this Conference has removed the allocation for the maritime mobile service from this band,

noting

that this Conference is 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, and No. **S5.63**¹, with a view to their possible deletion,

invites the Council

to place this matter on the agenda of the next competent world radiocommunication conference.

¹ *Note by the Secretariat:* WRC-97 suppressed No. **S5.63**.

RESOLUTION 712 (Rev.WRC-95)

Consideration by a future competent World Radiocommunication Conference of issues dealing with allocations to space services

The World Radiocommunication Conference (Geneva, 1995),

considering

- a)* that the agenda of WARC-92 called for the development of new Recommendations and Resolutions relating to allocations to space services which were not placed on the agenda of that Conference;
- b)* that Recommendation ITU-R SA.363-5 recommends that frequencies below 1 GHz are technically suitable for telecommand of satellites operating below an altitude of 2 000 km;
- c)* that the United Nations Conference on Environment and Development (UNCED) (Rio de Janeiro, 1992) identified an urgent need for systematic observations of forest cover, and that such observations can best be performed using frequencies in the range 420-470 MHz;
- d)* that Resolution 35 of the Plenipotentiary Conference (Kyoto, 1994) considered that application of the latest telecommunication and information technologies, especially those associated with space systems, can be extremely useful in implementing and conducting environment protection activities such as monitoring air, river, harbour and sea pollution, remote sensing, wildlife studies, forestry development, and others;
- e)* that the status of existing allocations available for use by active space-based sensors between 1 and 25 GHz, in frequency bands shared with radiolocation or radionavigation systems, needs to be reviewed in order to facilitate worldwide usage by active space-based sensors;
- f)* that the allocations to the Earth exploration-satellite service in the frequency bands 8.025-8.4 GHz and 18.6-18.8 GHz are complex and not uniform worldwide, and that the band 18.6-18.8 GHz is vital for passive sensing of ecologically important data;
- g)* that the allocation of the frequency band 13.75-14 GHz to the fixed-satellite service by WARC-92 reduced the total bandwidth available for active space-based sensors in the frequency range 13-14 GHz, which is important for wideband sensor instruments, e.g. radar altimeters, scatterometers;
- h)* that future active Earth sensing requirements for monitoring environmental data in the 35 GHz and 95 GHz ranges have been identified;

i) that ITU-R has agreed to certain important technical parameters required for coordination of the space services under Appendix **S7**,

resolves

that, based on proposals from administrations and taking into account the results of studies in the Radiocommunication Study Groups and the 1997 Conference Preparatory Meeting (CPM-97), WRC-97 should 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 operation services in the frequency range between 100 MHz and 1 GHz;

2 provision of up to 3.5 MHz of frequency spectrum to the Earth exploration-satellite service (active sensors) in the frequency range 420-470 MHz;

3 use of existing allocations by space-based active sensors operating in the Earth exploration-satellite and space research services in frequency bands shared with the radiolocation or radionavigation services, between 1 GHz and 25 GHz, with a view to the possibility of establishing common worldwide primary allocations;

4 use of existing allocations in the frequency range from 7 GHz to 20 GHz to the Earth exploration-satellite, meteorological-satellite, space research and space operation services, with a view to the possibility of establishing common worldwide primary allocations to these services in appropriate bands, taking into account Recommendation **706**;

5 provision of up to 500 MHz of frequency spectrum around 35 GHz and up to 1 GHz of frequency spectrum around 95 GHz for use by space-based active Earth sensors;

6 inclusion of ITU-R approved technical coordination parameters in Appendix **S7**, taking into account Resolution **60** and Recommendation **711**,

invites the Radiocommunication Study Groups

to carry out the necessary studies, taking into account the present uses 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 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. **S4.10/953** 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 (WRC-95)

Use of the frequency bands 1980-2010 MHz and 2170-2200 MHz in all three Regions and 2010-2025 MHz and 2160-2170 MHz in Region 2 by the fixed and mobile-satellite services and associated transition arrangements

The World Radiocommunication Conference (Geneva, 1995),

considering

- a)* that WARC-92 allocated the bands 1980-2010 MHz and 2170-2200 MHz for the mobile-satellite service with a date of entry into force of 1 January 2005, these allocations being co-primary with fixed and mobile service allocations;
- b)* that the use of the frequency bands 1980-2010 MHz and 2170-2200 MHz in all three Regions and 2010-2025 MHz and 2160-2170 MHz in Region 2 by the mobile-satellite service (MSS) is subject to a date of entry into force of 1 January 2000 or 1 January 2005, in accordance with the provisions of Nos. **S5.389A**, **S5.389C**¹ and **S5.389D** of the Radio Regulations, as adopted by this Conference;
- c)* that these bands are shared with the fixed and mobile² 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 in response to Resolution **113 (WARC-92)*** the 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;

¹ *Note by the Secretariat:* WRC-97 modified the date referred to in No. **S5.389C**.

² This Resolution does not apply to the mobile service. In this respect, the use of these bands by the mobile-satellite service is subject to coordination with the mobile service under the provisions of Resolution **46 (Rev.WRC-97)/No. S9.11A**.

* This Resolution was abrogated by WRC-97.

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),

recognizing

a) that WARC-92 identified the bands 1885-2025 MHz and 2110-2200 MHz for worldwide use by FPLMTS³, the satellite component being limited to the frequencies 1980-2010 MHz and 2170-2200 MHz, and that the development of FPLMTS³ can offer great potential in helping the developing countries develop more rapidly their telecommunications infrastructure;

b) that in Resolution **22 (WARC-92)***, “Assistance to the Developing Countries to Facilitate the Implementation of Changes in Frequency Band Allocations Which Necessitate the Transfer of Existing Assignments”, WARC-92 resolved to request the Telecommunication Development Bureau (BDT), 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 typical⁴ of existing and planned fixed stations brought into use before 1 January 2000 in the frequency bands 1980-2010 MHz and 2170-2200 MHz in all three Regions and 2010-2025 MHz and 2160-2170 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 ITU-R replaced this term by the term “International Mobile Telecommunication-2000 (IMT-2000)”.

⁴ With respect to the notification of frequency assignments to stations in the fixed and mobile services, the characteristics of typical stations may be notified in accordance with No. **S11.17/1223** without restriction up until 1 January 2000.

* This Resolution was abrogated by WRC-97.

3 that in respect of stations of the fixed service taken into account in the application of Resolution **46 (Rev.WRC-97)/S9.11A**, administrations responsible for MSS networks operating in the bands 1980-2010 MHz and 2170-2200 MHz in all three Regions and 2010-2025 MHz and 2160-2170 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 1980-2010 MHz and 2170-2200 MHz in all three Regions and 2010-2025 MHz and 2160-2170 MHz in Region 2 MSS allocations, for example by using the channel plans of Recommendation ITU-R F.1098;

4.2 administrations are urged to take all practicable steps to phase out troposcatter systems operating in the band 1980-2010 MHz in all three Regions and 2010-2025 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 1980-2010 MHz and 2170-2200 MHz in all three Regions and 2010-2025 MHz and 2160-2170 MHz in Region 2 to non-overlapping bands, giving priority to the transfer of their frequency assignments in the band 1980-2010 MHz in all three Regions and 2010-2025 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,

requests

1 the ITU-R to conduct, as a matter of urgency, further studies, in conjunction with the Bureau, to:

1.1 develop and provide to administrations the necessary tools in a timely manner to assess the impact of interference in the detailed coordination of mobile-satellite systems;

1.2 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;

2 the Telecommunication Development Sector 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,

instructs the Director of the Radiocommunication Bureau

to submit a report on the implementation of this Resolution to world radiocommunication conferences.

RESOLUTION 721 (WRC-97)

Agenda for the 1999 World Radiocommunication Conference

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that, in accordance with Nos. 118 and 126 of the Convention (Geneva, 1992), the general scope of the agenda for a world radiocommunication conference should be established four years in advance and a final agenda shall be established two years before the conference;
- b) Article 13 of the Constitution (Geneva, 1992) regarding the competence and scheduling of world radiocommunication conferences and Article 7 of the Convention (Geneva, 1992) regarding 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-99;
- b) that in preparing this agenda, many proposals from 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 late 1999¹ 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-97, and with due regard to the requirements of existing and future services in the bands under consideration, to consider and take appropriate action in respect of the following topics:

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 See Resolution **50 (WRC-97)**.

1.2 to finalize remaining issues in the review of Appendix **S3** with respect to spurious emissions for space services, taking into account Recommendation **66 (Rev.WRC-97)** and the decisions of WRC-97 on adoption of new values, due to take effect at a future time, of spurious emissions for space services;

1.3 to consider the results of ITU-R studies in respect of Appendix **S7** on the method for the determination of the coordination area around an earth station in frequency bands shared among space services and terrestrial radiocommunication services, and take the appropriate decisions to revise this Appendix;

1.4 to consider issues concerning allocations and regulatory aspects related to Resolutions **126 (WRC-97)**, **128 (WRC-97)**, **129 (WRC-97)**, **133 (WRC-97)**, **134 (WRC-97)** and **726 (WRC-97)**;

1.5 to consider regulatory provisions and possible additional frequency allocations for services using high altitude platform stations, taking into account the results of ITU-R studies conducted in response to Resolution **122 (WRC-97)**;

1.6 issues related to IMT-2000;

1.6.1 review of spectrum and regulatory issues for advanced mobile applications in the context of IMT-2000, noting that there is an urgent need to provide more spectrum for the terrestrial component of such applications and that priority should be given to terrestrial mobile spectrum needs, and adjustments to the Table of Frequency Allocations as necessary;

1.6.2 identification of a global radio control channel to facilitate multimode terminal operation and worldwide roaming of IMT-2000;

1.7 review of 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, taking into account Resolution **346 (WRC-97)**;

1.8 to consider regulatory and technical provisions to enable earth stations located on board vessels to operate in the fixed-satellite service (FSS) networks in the bands 3700-4200 MHz and 5925-6425 MHz, including their coordination with other services allocated in these bands;

1.9 to take into account the results of ITU-R studies in evaluating the feasibility of an allocation in the space-to-Earth direction to the mobile-satellite service (MSS) in a portion of the 1559-1567 MHz frequency range, in response to Resolutions **213 (Rev.WRC-95)** and **220 (Rev.WRC-97)**;

1.10 to consider results of ITU-R studies carried out in accordance with Resolution **218 (WRC-97)** and take appropriate action on this subject;

1.11 to consider constraints on existing allocations and to consider additional allocations on a worldwide basis for the non-geostationary (non-GSO) MSS below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolutions No. **214 (Rev.WRC-97)** and **219 (WRC-97)**;

1.12 to consider the progress of studies on sharing between feeder links of non-GSO MSS networks and GSO FSS networks in the bands 19.3-19.7 GHz and 29.1-29.5 GHz, taking into account Resolution **121 (Rev. WRC-97)**;

1.13 on the basis of the results of the studies in accordance with Resolutions **130 (WRC-97)**, **131 (WRC-97)** and **538 (WRC-97)**:

1.13.1 to review and, if appropriate, revise the power limits appearing in Articles **S21** and **S22** in relation to the sharing conditions among non-GSO FSS, GSO FSS, GSO broadcasting-satellite service (BSS), space sciences and terrestrial services, to ensure the feasibility of these power limits and that these limits do not impose undue constraints on the development of these systems and services;

1.13.2 to consider the inclusion in other frequency bands of similar limits in Articles **S21** and **S22**, or other regulatory approaches to be applied in relation to sharing situations;

1.14 to review the results of the studies on the feasibility of implementing non-GSO MSS feeder links in the 15.43-15.63 GHz in accordance with Resolution **123 (WRC-97)**;

1.15 issues related to the radionavigation-satellite service:

1.15.1 to consider new allocations to the radionavigation-satellite service in the range from 1 GHz to 6 GHz required to support developments;

1.15.2 to consider the addition of the space-to-space direction to the radionavigation-satellite service allocations in the bands 1 215-1 260 MHz and 1 559-1 610 MHz;

1.15.3 to consider the status of allocations to services other than the radionavigation-satellite service (Nos. **S5.355** and **S5.359**) in the band 1 559-1 610 MHz;

1.16 to consider allocation of frequency bands above 71 GHz to the Earth exploration-satellite (passive) and radio astronomy services, taking into account Resolution **723 (WRC-97)**;

1.17 to consider possible worldwide allocation for the Earth exploration-satellite (passive) and space research (passive) services in the band 18.6-18.8 GHz, taking into account the results of the ITU-R studies;

1.18 to consider the use of new digital technology for the maritime mobile service in the band 156-174 MHz and consequential revision of Appendix **S18**, taking into account Resolution **342 (WRC-97)**;

1.19 to consider the report of the Inter-conference Representative Group (IRG) submitted by the Director of the Radiocommunication Bureau and determine whether it is possible to undertake replanning in accordance with Resolution **532 (WRC-97)** for completion by a subsequent competent conference;

1.20 to consider the issues related to the application of Nos. **S9.8, S9.9** and **S9.17** and the corresponding parts of Appendix **S5** with respect to Appendices **S30** and **S30A**, with a view to possible deletion of Articles 6 and 7 of Appendices **S30** and **S30A**, also taking into consideration Recommendation **35 (WRC-95)**;

1.21 to consider the Report from the Bureau on results of the analysis in accordance with Resolution **53 (WRC-97)** and take appropriate actions;

2 to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations which have been communicated by the 1999 Radiocommunication Assembly, in accordance with Resolution **28 (WRC-95)**; and 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-97)**;

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 (WRC-97)**, 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 (Geneva, 1992);

6 to identify those items requiring urgent actions by the radiocommunication study groups in preparation for WRC-01;

7 in accordance with Article 7 of the Convention (Geneva, 1992):

7.1 to consider and approve the Report of the Director of the Radiocommunication Bureau on the activities of the Radiocommunication Sector since WRC-97;

7.2 to recommend to the Council items for inclusion in the agenda for WRC-01, and to give its views on the preliminary agenda for the 2003 World Radiocommunication Conference and on possible agenda items for future conferences,

further resolves

8 to recommend to the Council that extra budgetary and conference resources be provided so that the following items can be included in this agenda for WRC-99:

- 8.1 to consider the regulatory and technical provisions for the quasi-geostationary satellite networks;
- 8.2 to examine the spectrum requirements for telemetry, tracking, and telecommand of FSS networks operating with service links in the frequency bands above 17 GHz;
- 8.3 to review the use of the frequency band 415-526.5 kHz by the aeronautical radionavigation and maritime mobile services;
- 8.4 to review the use of the HF bands by the aeronautical mobile (R) and maritime mobile services with a view to meeting the changing needs of these services;
- 8.5 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 cover aeronautical applications as stipulated in Resolution **216 (WRC-97)**;
- 8.6 to consider the provision of up to 3 MHz of frequency spectrum for the implementation of telecommand links in the space research and space operation services in the frequency range between 100 MHz and 1 GHz, taking into account Resolution **723 (WRC-97)**;
- 8.7 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 (WRC-97)**;
- 8.8 consideration of changes to the allocations in Region 3 for the band 1 350-1 400 MHz to permit co-primary use by the fixed service,

invites the Council

to finalize the agenda and arrange for the convening of WRC-99 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-99,

instructs the Secretary-General

to communicate this Resolution to concerned international and regional organizations.

RESOLUTION 722 (WRC-97)

Preliminary agenda for the 2001 World Radiocommunication Conference

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that, in accordance with Nos. 118 and 126 of the Convention (Geneva, 1992), the general scope of the agenda for the WRC-01 should be established four years in advance;
- b) Article 13 of the Constitution (Geneva, 1992) regarding the competence and scheduling of world radiocommunication conferences and Article 7 of the Convention (Geneva, 1992) regarding 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 of WRC-01, to be held in late 2001:

- 1 to take appropriate action in respect of those urgent issues that were specifically requested by WRC-99;
- 2 on the basis of proposals from administrations and the Report of the Conference Preparatory Meeting, and taking account of the results of WRC-99, to consider and take appropriate action in respect of the following topics:
 - 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 consideration of Article **S25** concerning the amateur and amateur-satellite services;
 - 2.3 issues related to Appendix **S3**:
 - 2.3.1 to consider the results of studies regarding the boundary between spurious and out-of-band emissions;
 - 2.3.2 to consider the inclusion of general limits for out-of-band emissions in the Radio Regulations, in particular with regard to whether it is appropriate to do so, taking into account the results of ITU-R studies;
 - 2.4 review of the frequency and channel arrangements in the MF and HF bands allocated on a primary basis to the maritime mobile service, taking into account the use of new digital technology, in accordance with Resolution **347 (WRC-97)**;

- 2.5 to review in Appendix **S2** the Table of transmitter frequency tolerances, taking into account the frequency tolerance limits specified in Recommendation ITU-R SM.1045;
- 2.6 to consider the status of allocations to the radiolocation service in the bands around 3 GHz and around 5.5 GHz, the date of a conference is under discussion;
- 2.7 sharing between the fixed-satellite service (FSS) and fixed service in the 19 GHz band, when used bidirectionally by the FSS to provide feeder links for non-geostationary-satellite orbit (non-GSO) mobile-satellite service (MSS) systems;
- 2.8 to consider spectrum requirements for wideband aeronautical telemetry in the band between 3 GHz and 30 GHz;
- 2.9 review of allocations to the space-research service (deep space) (space-to-Earth) and the inter-satellite service in the frequency range 32-32.3 GHz with a view to improving the sharing conditions between these services;
- 2.10 to consider Appendix **S13** and Resolution **331 (Rev.WRC-97)** with a view to their deletion and, if appropriate, consider related changes to Chapter **SVII** and other provisions of the Radio Regulations as necessary, taking into account the continued transition to the Global Maritime Distress and Safety System (GMDSS);
- 2.11 to consider the results of studies, and take necessary actions relating to:
- 2.11.1 the exhaustion of the maritime mobile service identity numbering resource (Resolution **344 (WRC-97)**);
- 2.11.2 shore-to-ship distress communication priorities (Resolution **348 (WRC-97)**);
- 2.12 consideration of the need to realign the allocations to the amateur, amateur-satellite and broadcasting services around 7 MHz on a world-wide basis, taking into account Recommendation **718 (WARC-92)**;
- 2.13 examination of 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, and to consider bringing forward the date of availability of the HF bands allocated by WARC-92 to the broadcasting service in response to Resolution **29 (WRC-97)** and Resolution **537 (WRC-97)**;
- 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 Resolution **528 (WARC-92)**;
- 3.2 possible allocations in the frequency bands above 275 GHz;
- 3.3 potential for sharing around 4 300 MHz between radio altimeters and space-based passive earth sensors;
- 3.4 additional allocations on a worldwide basis for the non-GSO MSS with service links operating below 1 GHz in accordance with Resolution **728 (WRC-97)**;

3.5 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 (WRC-97)**;

3.6 use of frequency adaptive systems in the MF/HF bands in accordance with Resolution **729 (WRC-97)**;

3.7 allocation of the frequency band 14.5-14.8 GHz to the FSS (Earth-to-space) in Region 3 (expansion of FSS to include other than feeder links of the broadcasting-satellite service);

4 to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations which have been communicated by the 2001 Radiocommunication Assembly, in accordance with Resolution **28 (WRC-95)**; and decide whether or not to update the corresponding references in the Radio Regulations, in accordance with the principles contained in the Annex to Resolution **27 (Rev.WRC-97)**;

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 (WRC-97)**, 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 (Geneva, 1992);

8 to identify those items requiring urgent action by the radiocommunication study groups;

9 in accordance with Article 7 of the Convention (Geneva, 1992):

9.1 to consider and approve the Report of the Director of the Radiocommunication Bureau on the activities of the Radiocommunication Sector since WRC-99;

9.2 to recommend to the Council items for inclusion in the agenda for the 2003 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-01,

instructs the Secretary-General

to communicate this Resolution to concerned international and regional organizations.

RESOLUTION 723 (WRC-97)

**Consideration by a future competent world radiocommunication conference
of issues dealing with allocations to science services**

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that WRC-97 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 additional frequency bands above 71 GHz are needed to satisfy user requirements for passive sensing of the Earth's environmental conditions,

resolves

that, on the basis of proposals from administrations and taking into account the results of studies in Radiocommunication Study Groups and the 1999 Conference Preparatory Meeting, WRC-99 should 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) allocation of frequency bands above 71 GHz to the Earth exploration-satellite (passive) and space research (passive) services and the radio astronomy service,

invites Radiocommunication Study Groups

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 726 (WRC-97)

Frequency bands above 30 GHz available for high-density applications in the fixed service

The World Radiocommunication Conference (Geneva, 1997),

considering

- a)* that there is a dramatically increasing demand for high-density applications in the fixed service resulting from the deployment of new mobile networks and from the rapid worldwide deregulation in the provision of local broadband services, including multimedia;
- b)* that the frequency range from 30 GHz to about 50 GHz is the range preferred to satisfy initial requirements, as indicated in *considering a)*, while the bands above about 50 GHz are preferred for similar applications but which take technical advantage of high atmospheric absorption;
- c)* that the lower part of the spectrum above 30 GHz has advantages for the fixed service in areas where longer path lengths are necessary;
- d)* that the 38 GHz band is already heavily used by many administrations for high-density applications in the fixed service;
- e)* that the needs of other services to which the relevant frequency bands are already allocated must be taken into account;
- f)* that the band 37-37.5 GHz is being planned for use by the space research service (space-to-Earth) to provide moon-to-Earth and planetary communication links;
- g)* that the band 37-38 GHz is being planned for use by the space research service to provide space based very long baseline interferometry;
- h)* that the deployment of high-density applications in the fixed service in some bands potentially presents sharing difficulties with other primary services allocated to the same band, e.g. the fixed-satellite service;
- i)* that operations in the space services, such as in the fixed-satellite service, in those bands used by high-density applications in the fixed service may lead to sharing difficulties;
- j)* that there is a need for global harmonization of new and existing allocations of radio frequency bands to facilitate coordination between administrations and encourage development of competitive products, through economies of scale, and the worldwide introduction of new telecommunication services, including the provision of reliable global information infrastructure access at an affordable cost,

resolves

that administrations should take into account that the bands 31.8-33.4 GHz*, 51.4-52.6 GHz, 55.78-59 GHz and 64-66 GHz are available for high-density applications in the fixed service, when considering allocations or other regulatory provisions in relation to these bands,

requests ITU-R

1 to undertake studies leading to the identification of system characteristics of high-density systems in the fixed service in the bands listed in the *resolves*;

2 to undertake, as a matter of urgency, studies of technical and operational criteria and of methods to facilitate sharing between high-density systems in the fixed service and other services in the bands listed in the *resolves*,

urges administrations

to participate actively in the aforementioned studies by submitting contributions to ITU-R.

* The date of provisional application of this allocation shall be in conformity with Resolution **126 (WRC-97)**.

RESOLUTION 727 (WRC-97)

Use of the frequency band 420-470 MHz by the earth exploration-satellite (active) service

The World Radiocommunication Conference (Geneva, 1997),

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 this Conference, 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 this Conference considered a proposal for a secondary allocation for the earth exploration-satellite (active) service within the frequency band 432-438 MHz;
- b) that the Report of the 1997 Conference Preparatory Meeting (CPM-97) stated that this Conference may deem it appropriate to defer consideration of this agenda item to WRC-99, by which time all relevant studies should be completed;
- c) that CPM-97 concluded that spaceborne sensors cannot be considered technically compatible with terrestrial tracking radars without restriction on the spaceborne sensors;
- d) 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 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 the 1999 Conference Preparatory Meeting (CPM-99) on the specific emission and operational characteristics used by the Earth exploration-satellite (active) service 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 the CPM-99 Report, WRC-99 should consider provision of up to 6 MHz of frequency spectrum to the Earth exploration-satellite (active) service in the frequency band 420-470 MHz.

RESOLUTION 728 (WRC-97)

Studies relating to consideration of allocations in the broadcasting band 470-862 MHz to non-geostationary mobile-satellite services

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) that the agenda of WRC-97 included consideration of the adoption of additional allocations for non-geostationary mobile-satellite services (non-GSO MSSs);
- b) that the Report of the 1997 Conference Preparatory Meeting (CPM-97) stated that the Radiocommunication Bureau has identified at least 23 non-GSO MSS networks at frequencies below 1 GHz, at some stage of coordination under Resolution 46, and that many of the proposed networks cannot be implemented in the existing allocations because there is not enough spectrum;
- c) that CPM-97 considered the protection requirements for analogue television in the band 470-862 MHz against a narrow-band MSS signal in the most sensitive and least sensitive portions of an analogue television channel and the protection requirements for a digital television channel, based on existing Recommendations ITU-R BT.655-4, ITU-R BT.417-4 and ITU-R IS.851-1;
- d) that CPM-97 stated that the protection ratios for a narrow-band interfering signal in the least sensitive parts of an analogue television channel are to be verified by further studies;
- e) that CPM-97 stated the region of lower protection requirements and commensurately higher permissible interfering power flux-density levels as being 100 kHz from the band edges of an analogue television channel, at least in some countries;
- f) that CPM-97 stated that the interfering effects of a non-GSO MSS transmission will depend on its specific characteristics (e.g. duty-cycle, duration, periodicity, etc.), that interference contributions from sources other than MSS (even those from other broadcasting stations) have to be taken into account, that slightly lower values of field strength to be protected may need to be assumed in countries where television networks are relatively sparse, and that studies on sharing are necessary;
- g) that the permissible aggregate interfering power flux-density resulting from these protection requirements, in some portions of an analogue television channel, may be useful in determining the feasibility of sharing with non-GSO MSS transmitter space-to-Earth links;
- h) that these bands are also allocated in part to fixed and mobile terrestrial systems and radionavigation systems;

i) that, in many countries, the channels assigned for analogue television may also be used for digital television, and that during the period of parallel operation of analogue and digital television networks the usage of this band for television will increase,

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 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;

2 to invite a future competent conference to 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 non-GSO MSS, taking into account, in particular, *considering h)* and *i)* above,

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;

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. **S5.155**, **S5.155A** and **S5.155B**;

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 **S11**,

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.

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 licences¹

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. **S18.8**,

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),

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 (<i>optional</i>)		

	Equipment	Type or description of equipment	Frequencies
5	Transmitters		**
6	Other equipment (<i>optional</i>)		

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 **S19** 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 **S19**, 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 **S19**, 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 territories¹**

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. **S23.2** and **S.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.

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. **S33.28** and Appendix **S13** (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.

* This Report is no longer in force.

RECOMMENDATION 32 (Orb-88)

International monitoring of emissions originating from space stations¹

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 geostationary-satellite orbit and the radio-frequency spectrum are limited natural resources and are being increasingly utilized by space services;
- b) that it is desirable to ensure efficient and economical use of the radio-frequency spectrum and geostationary-satellite orbit and also to eliminate harmful interference;
- c) the provisions of the Radio Regulations, under which the Radiocommunication Bureau shall review the entries in the Master International Frequency Register with a view to bringing them into conformity, to the maximum extent practicable, with the actual use being made of the radio spectrum;
- d) that monitoring information obtained should assist the Bureau in discharging that function;
- e) Recommendation 2* of the WARC-79, relating to the examination by world radio-communication conferences of the situation with regard to occupation of the frequency spectrum in space radiocommunications;
- f) that facilities for monitoring of emissions originating from space stations may be expensive,

noting

that the ITU-R is studying the question of monitoring of radio emissions from spacecraft at fixed monitoring stations and Recommendation ITU-R SM.1054 contains current results of these studies,

invites ITU-R

to continue the studies in collaboration with the Bureau, and to provide technical guidelines concerning the space monitoring facilities,

¹ WRC-97 made editorial amendments to this Recommendation.

* This Recommendation was abrogated by WRC-97.

recommends administrations

- 1 to participate in the ITU-R studies concerning the possible development of guidelines for space monitoring facilities;
- 2 to consider the various aspects of monitoring the emissions originating from space stations to enable the provisions of Article **S16** to be applied.

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 **S10**) 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 **S30/30** and **S30A/30A**;
- b) that the VGE foresaw the need to decide upon that Recommendation before considering the applicability of Article **S10**;
- c) that Appendix **S6** of the VGE Report, which is associated with Article **S10**, would have to be developed further if Article **S10** was to apply to Appendices **S25/25**, **S30/30** and **S30A/30A**;
- d) that this Conference has developed a modified version of Article **S10** aimed at resolving the aforementioned difficulties, as set out in the Annex hereto;
- e) that the modification procedure for Appendix **S25/25**, as contained in Article **16** has been satisfactorily applied for several years;

- f) that this Conference, in reviewing the VGE Report, has decided to incorporate the existing modification procedure for Appendix **S25/25** 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 **S10** could be applied to Appendices **S30/30** and **S30A/30A**;
- h) that, in the light of the foregoing and having regard to the VGE Report, no further action is required on Appendix **S6**, and the provisions of Appendices **S30/30** and **S30A/30A** shall continue in force;
- i) that this Conference, in reviewing the VGE Report, has decided not to modify Appendices **S26/26**, **S27/27** and **S30B/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 Plan¹. If the assignment is not in conformity, the administration shall apply the procedure² to effect an appropriate modification to the Plan by seeking the agreement of the administrations, which are identified in accordance with Appendix **S6**, as having planned allotments or assignments which may be affected by the proposed modification.

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 **S4**. 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 **S6** 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 **S6** 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.

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.

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 **S16**;
- 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 **S21** and **S22** to be applied.

RECOMMENDATION 61

Relating to technical standards for the assessment of harmful interference in the frequency bands above 28 MHz¹

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the definition of harmful interference (No. **S1.169**), being of a qualitative nature, leads to a purely subjective estimation of the nuisance;
- b)* that, for the accomplishment of its regulatory tasks, the Radio Regulation Board has adopted in its Rules of Procedure, for the frequency bands below 28 MHz, values for the ratio between the wanted signal and the interfering signal, below which harmful interference may be expected;
- c)* that “harmful interference” implies a considerable degree, or probability, of interference;
- d)* that, as a consequence, it is desirable to determine the level of interference by which any emission, radiation or induction affects a radiocommunication service beyond specific limits established to ensure the quality and reliability of performance required by the nature of the service;
- e)* that the assessment of interference levels is related to various factors such as the nature of the services concerned, number of interference sources, percentages of time during which the interfering signal affects the wanted signal,

noting

- a)* that the Bureau has been considering the maximum allowable values of interference given in the pertinent ITU-R Recommendations to be values which ensure a satisfactory service;
- b)* that, however, the Bureau does not possess data on the extent to which these recommended values and the associated percentages of time may be exceeded without affecting a service beyond the specific limits established to ensure the quality and reliability of performance required by the nature of the service,

¹ WRC-97 made editorial amendments to this Recommendation.

invites the ITU-R

to continue to study this subject and to recommend the technical criteria for the frequency bands above 28 MHz, allocated to space radiocommunication, radio astronomy, and the terrestrial radiocommunication services concerned, in order to enable the Bureau and administrations to apply such criteria for these bands.

RECOMMENDATION 63

Relating to the provision of formulae and examples for the calculation of necessary bandwidths¹

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that Appendix **S1**, 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 required¹

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-97)

Studies of the maximum permitted levels of unwanted emissions

The World Radiocommunication Conference (Geneva, 1997),

considering

- a)* that Appendix **S3** specifies the maximum permitted levels of spurious emissions, in terms of the mean power level of any spurious component supplied by a transmitter to the antenna transmission line;
- b)* that the principal objective of Appendix **S3** is to specify the maximum permitted levels of spurious emissions that, while being achievable, provide protection against harmful interference;
- c)* that excessive levels of unwanted emissions may give rise to harmful interference;
- d)* that while out-of-band emissions can also give rise to harmful interference, the Radio Regulations do not provide general limits for these emissions;
- e)* that while Appendix **S3** applies generally to the mean power of a transmitter and its spurious emissions, it also takes account of a variety of emissions where interpretation of the term “mean power”, and thus its measurement, would be difficult, particularly in the cases of digital modulation broadband systems, pulsed modulation and narrow-band high-power transmitters;
- f)* that while Appendix **S3** covers spurious emissions for all radio services, those listed for space services are included only as design objectives;
- g)* that unwanted emissions from transmitters operating in space stations may cause harmful interference, particularly emissions from wideband amplifiers which cannot be adjusted after launch;
- h)* that unwanted emissions may cause harmful interference to safety services and radio astronomy and space services using passive sensors;

i) that, for technical or operational reasons, more stringent spurious emission limits than the general limits in Appendix **S3** may be required to protect specific services, such as safety services and passive services in specific bands;

j) that broadband digital modulation may cause unwanted emissions at frequencies far from the carrier frequency,

noting

a) that safety services and passive services have in many cases been allocated frequencies adjacent or close to those of services employing high-power transmitters;

b) that some administrations have adopted more stringent limits for spurious emissions than those specified in Appendix **S3**,

recommends that ITU-R

1 study, as a matter of urgency, the question of spurious emissions resulting from space service transmissions, and, on the basis of those studies, develop Recommendations for maximum permitted levels of spurious emissions in terms of mean power of spurious components supplied by the transmitter to the antenna transmission line;

2 submit a report to WRC-99 on the results of its studies with a view to reviewing and including spurious emission limits for space services in Appendix **S3**;

3 continue the study of spurious emission levels in all frequency bands, emphasizing the study of those frequency bands, services and modulation techniques not presently covered by Appendix **S3**;

4 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;

5 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;

6 study the reasonable boundary of spurious emissions and out-of-band emissions with a view to defining such a boundary in Article **S1**;

7 study those frequency bands and instances where, for technical or operational reasons, more stringent spurious emission limits than the general limits in Appendix **S3** may be required to protect safety services and passive services such as radio astronomy, and the impact on all concerned services of implementing or not implementing such limits;

8 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;

9 report to a future competent world radiocommunication conference the results of studies under *recommends that ITU-R 3, 4 and 5* above, with a view to recommending whether or not it is appropriate to include general limits for out-of-band emissions in the Radio Regulations;

10 report the results of studies under *recommends that ITU-R 6, 7 and 8* above to a competent world radiocommunication conference(s).

RECOMMENDATION 71

Relating to the standardization of the technical and operational characteristics of radio equipment¹

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.

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. **S5.410** and **S21.16**),

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. S22.2/2613 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. **S22.2/2613** 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. **S22.2/2613** 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.

RECOMMENDATION 105 (WRC-95)

Further work by ITU-R on determination of the coordination area around earth stations operating with geostationary-satellite networks in the fixed-satellite service and earth stations providing feeder links to non-geostationary-satellite networks in the mobile-satellite service operating in opposite directions of transmission

The World Radiocommunication Conference (Geneva, 1995),

considering

- a)* that WRC-95 has identified certain frequency allocations to the fixed-satellite service (FSS) for use by feeder links of non-geostationary mobile-satellite service (non-GSO MSS) networks;
- b)* that these frequency bands are also used by stations in the FSS operating with geostationary satellites (GSO), in the opposite direction of transmission from non-GSO MSS feeder links;
- c)* that, in order to avoid mutual interference between GSO and non-GSO MSS feeder-link earth stations operating in opposite directions of transmission, there is a need to determine the coordination area of such earth stations;
- d)* that Recommendation ITU-R IS.849, supported by Recommendation ITU-R IS.847, can be used to determine the coordination area of GSO and non-GSO MSS feeder-link earth stations operating in opposite directions of transmission;
- e)* that, in order to utilize these Recommendations, the parameters of typical transmitting and receiving non-GSO MSS feeder-link earth stations operating in these frequency bands are required;
- f)* that the required parameters could not be made available until the frequency allocations to the FSS, for use by non-GSO MSS feeder links, were known,

noting

that WRC-97, under its agenda, will review the procedures set forth in Appendix **S7/28**,

recommends

that ITU-R conduct the necessary studies, as a matter of urgency, in order to develop the appropriate technical coordination parameters and/or Recommendations necessary for the determination of coordination areas around earth stations operating with GSO networks in the FSS and earth stations providing feeder links to non-GSO MSS networks,

invites

administrations to participate in the work of ITU-R on this subject,

invites the Director of the Radiocommunication Bureau

to report on the progress of these studies to WRC-97.

RECOMMENDATION 316 (Rev.Mob-87)

Use of ship earth stations within harbours and other waters under national jurisdiction¹

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,

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 S18/18 VHF frequency spectrum for maritime mobile communications

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

considering

- a) that growth in the use of Appendix **S18/18** 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 **S18/18** 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 **S18/18**, 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 S17/32 and Resolution 300 (Rev.Mob-87)¹

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

considering

- a) that Appendix **S17/32** 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 **S52/60** and Resolution **300 (Rev.Mob-87)**;
- c) that the spacing between the frequencies listed in Appendix **S17/32** is 500 Hz;
- d) that the present Conference has decided to adopt No. **S52.104/4321B** 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. **S52.104/4321B**);
- 3 to present the results of its study to the next competent conference.

¹ WRC-97 made editorial amendments to this Recommendation.

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) service¹

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 **S11** of the Radio Regulations;
- 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.

¹ WRC-97 made editorial amendments to this Recommendation.

RECOMMENDATION 405

Relating to a study of the utilization of the aeronautical mobile-satellite (R) service¹

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the continuing efforts of the aeronautical mobile (R) service to obtain improvements in communications commensurate with increases in the number, size and speed of aircraft;
- b) the efforts of the ITU to reduce congestion in the bands between 4 MHz and 27.5 MHz;
- c) the need to effect conservation in the use of the high frequency spectrum,

noting

- a) that successful application of space radiocommunication techniques to the communication needs of international civil aviation offers the possibility of substantially improving aeronautical mobile (R) service communications while avoiding congestion in the bands between 4 MHz and 27.5 MHz;
- b) that tests have demonstrated the capability of effecting communication between aircraft and aeronautical stations by relay via a geostationary satellite;
- c) that the state of the art in space radiocommunication techniques is rapidly advancing;
- d) that the technical potential is such that space radiocommunication techniques could provide a capability for accommodating, in the near future, many of the aeronautical mobile (R) service communication requirements over major world air routes on all but the polar routes;
- e) that before administrations will be willing to undertake a programme to implement space radiocommunication techniques they will need a comprehensive investigation into those techniques and a statement of the measures that need to be taken;
- f) that the ability of administrations to undertake such a programme is intimately linked to the economic implications involved;

¹ WRC-97 made editorial amendments to this Recommendation.

g) that the International Civil Aviation Organization (ICAO) is the international body primarily concerned with the establishment of standards and recommended practices governing radiocommunication systems and techniques used to support international civil aviation;

h) that the ITU-R has studied the application of space radiocommunication techniques in the aeronautical mobile (R) service but these studies may need revision,

invites the ITU-R

to continue its studies on the application of space radiocommunication techniques in the aeronautical mobile (R) service in cooperation with ICAO,

recommends

1 that administrations, bearing in mind the economic and operational aspects involved, should take account of the possibilities of satisfying the communication needs of the aeronautical mobile (R) service on major world air routes by the use of space radiocommunication techniques;

2 that administrations should give further study to these questions taking as a basis for their consideration the factors listed in the Annex hereto.

ANNEX TO RECOMMENDATION 405

NOTE – The list of factors which follows is not claimed to be exhaustive nor is it intended to limit consideration of any other aspects pertinent to the use of the aeronautical mobile-satellite (R) service.

1 The technical parameters of the satellite and aircraft receiving and transmitting system, including:

- a) required received (carrier) power at the satellite (from the aircraft);
- b) required received (carrier) power at the aircraft (from the satellite);
- c) satellite effective radiated power (per channel);
- d) aircraft effective radiated power (per channel);
- e) type of emission which should be employed;
- f) bandwidth of each channel;
- g) channelling arrangement;
- h) polarization requirements;
- i) need for omni-directional aircraft antennae; sea/ground reflections;
- j) required separation between transmit and receive frequencies at the satellite;

- k) requirement on the satellite for capability of aircraft to use each channel independently (multiple/random access);
- l) requirements in relation to system reliability;
- m) other considerations.

2 The number and location of satellites, including:

- a) in regard to provision of service, disposition of air routes and the number of flights over each air route;
- b) group of air routes which may be served via a common satellite;
- c) number of satellites needed to provide service to each group of air routes;
- d) location of each of the satellites;
- e) number of channels needed aboard each satellite;
- f) other considerations.

3 Technical performance requirements for aeronautical earth stations, including:

- a) suitable transmitting and receiving antennae characteristics: gain, beamwidth, siting, etc.;
- b) minimum effective radiated power;
- c) development and utilization of low-cost earth station (terminal) facilities;
- d) need for a selective calling system (SELCAL);
- e) other considerations.

4 Method of operation and location of aeronautical earth stations, including:

- a) the method of operation: where multiple frequencies are provided on the satellite, the need, or absence of need, to continue the present practice of providing route separation by use of different/separate frequencies; that is:
 - should all (R) frequencies on the satellite be available at all earth stations; *or*
 - should the communication load be distributed between available frequencies, each of which is limited to a specific geographic area; *or*
 - some other arrangement;
- b) as appropriate, to list (by frequency) each of the earth stations which should employ each satellite frequency;
- c) other considerations.

5 Provisions for handling aeronautical point-to-point communications:

- a) technical system performance parameters of the terminal equipment;
- b) technical system performance parameters of the satellite equipment;
- c) requirement on the satellite for capability of terminals to have independent access to relay channels through the satellite (multiple/random access);

- d)* frequency bands to be used;
- e)* required separation between transmit and receive frequencies on the satellite;
- f)* development and utilization of low-cost terminal facilities;
- g)* the entity or entities which should provide, own or operate the satellites and terminal facilities as well as the extent to which aeronautical point-to-point communications should be handled;
- h)* other considerations.

6 Estimated costs of a satellite system to include: land-based, airborne and satellite-borne facilities.

7 Operational aspects of a satellite system, including all facilities mentioned in § 6 above, particularly:

- a)* the environment within which the system must work;
- b)* the evolutionary process of introducing the system.

RECOMMENDATION 503 (Rev.WRC-97)

High-frequency broadcasting

The World Radiocommunication Conference (Geneva, 1997),

considering

- a) the congestion in the HF broadcasting bands;
- b) the extent of adjacent channel interference;

noting

the possibility of improving the situation by implementing pertinent ITU-R Recommendations,

recommends that administrations

1 pay special attention to the provisions for “out-of-band spectrum” contained in Recommendation ITU-R SM.328-9;

2 encourage, to the maximum extent possible, manufacturers to design and build HF broadcasting receivers that conform to Recommendation ITU-R SM.332-4 concerning the selectivity of receivers,

invites administrations

to take advantage, to the maximum extent practicable, of synchronized frequency transmitter operation, taking into account Recommendation ITU-R BS.702-1,

invites ITU-R

to carry out further studies in relation to the Recommendations mentioned above, taking into account the requirements of HF broadcasting, with a view to updating these three Recommendations whenever necessary.

RECOMMENDATION 506

**Relating to the harmonics of the fundamental frequency
of broadcasting-satellite stations¹**

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. **S3.8/306** of the Radio Regulations,

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 507

Relating to spurious emissions in the broadcasting-satellite service¹

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that space stations in the broadcasting-satellite service operating at high power levels are likely to cause interference to services in adjacent and in harmonically related frequency bands due to spurious emissions;
- b) that, in the planning of the broadcasting-satellite service, account must be taken of the need to reduce to acceptable levels the interference to:
- the services operating in the bands adjacent to the lower and upper edges of the 12 GHz band allocated to the broadcasting service;
 - the radio astronomy service, which has an allocation at 23.6-24 GHz;
- c) the studies being pursued by the ITU-R under the appropriate Question,

invites the ITU-R

to continue, as a matter of urgency, the study of the technical and operational aspects of spurious emissions from space stations in the broadcasting-satellite service.

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 **S11** 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 **S11**;
- 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,

* 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 **S11** 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 **S11**, Part B, Section 3, is assumed.

5 SSB signals with 6 dB carrier reduction relative to peak envelope power assume equivalent sideband power as specified in Appendix **S11**, Part B, § 1.2.

* 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 $f_{\text{unwanted}} - f_{\text{wanted}}, \Delta f$ (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 Δf less than -20 kHz, as well as Δf greater than 20 kHz, need not be considered.

RECOMMENDATION 518 (HFBC-87)

HF broadcast receivers

The World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1987),

considering

- a) that a large number of receivers fail to tune over all the HF bands allocated exclusively to the broadcasting service or have imprecise analogue displays for broadcasting frequencies (a subject of complaint by numerous HF broadcasters);
- b) that to reduce congestion in certain bands and to improve spectrum utilization, the appropriate HF bands, including the highest bands (21 MHz and 26 MHz), should be used;
- c) that a precise frequency display facilitates the tuning of receivers and so encourages the public to listen to HF broadcasts,

recommends administrations

to draw the attention of manufacturers to this matter, to ensure that future low-cost broadcast receivers are equipped to cover all HF broadcasting bands and, if possible, to provide digital frequency display,

instructs the Secretary-General

to communicate this Recommendation to the International Electrotechnical Commission (IEC).

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 **S45/45**;
- 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 S30/30 and S30A/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 **S30/30** and **S30A/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 **S30/30** and **S30A/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 **S30/30** and **S30A/30A**:

1.1 e.i.r.p. planning values: a general reduction of 5 dB from the levels listed in Appendix **S30/30**;

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;

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 **S30/30** and **S30A/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 **S12** 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 groups¹,

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;

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,

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 service¹

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,

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 2025-2110 MHz and 2200-2290 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 2025-2110 MHz and 2200-2290 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. **S5.391** 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 2025-2110 MHz and 2200-2290 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 2025-2110 MHz and 2200-2290 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 service¹**

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 origin¹

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,

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 MHz¹**

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	$\delta \leq 20^\circ$
-121 + 0.4 ($\delta - 20$) dB(W/m ²)	for	$20^\circ < \delta \leq 60^\circ$
-105 dB(W/m ²)	for	$60^\circ < \delta \leq 90^\circ$

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	$\delta \leq 20^\circ$
-130 + 0.4 ($\delta - 20$) dB(W/m ²)	for	$20^\circ < \delta \leq 60^\circ$
-114 dB(W/m ²)	for	$60^\circ < \delta \leq 90^\circ$

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	$\delta \leq 20^\circ$
-129 + 0.4 ($\delta - 20$) dB(W/m ²)	for	$20^\circ < \delta \leq 60^\circ$
-113 dB(W/m ²)	for	$60^\circ < \delta \leq 90^\circ$

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 706

**Frequency sharing by the Earth exploration-satellite service
(passive sensors) and the space research service (passive sensors)
with the fixed, mobile except aeronautical mobile, and fixed-satellite
services in the band 18.6-18.8 GHz**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that allocations have been made in various frequency bands to the earth exploration-satellite and space research services for the operation of passive sensors on board spacecraft;
- b) that the allocations made in the band 18.6-18.8 GHz are shared with the fixed, mobile except aeronautical mobile and fixed-satellite services;
- c) that application of the sharing criteria contained in ex-CCIR Report 694* could restrict the development of the fixed, mobile except aeronautical mobile and fixed-satellite services,

invites the ITU-R

- 1 to review the content of ex-CCIR Report 694* by all the Study Groups concerned (particularly Study Groups 4 and 9);
- 2 to continue the studies which gave rise to ex-CCIR Report 609-1*, taking into account the requirements of the Earth exploration-satellite service (passive sensors) and the space research service (passive sensors);
- 3 to study the minimum restrictions which could be applied to the fixed, mobile except aeronautical mobile, and fixed-satellite (space-to-Earth) services in order to ensure the satisfactory operation of passive sensors;
- 4 to study the maximum restrictions which might be tolerated by the fixed, mobile except aeronautical mobile, and fixed-satellite services without jeopardizing the operation of all the services likely to use this frequency band.

* This Report is no longer in force.

RECOMMENDATION 707

Relating to the use of the frequency band 32-33 GHz shared between the inter-satellite service and the radionavigation service¹

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. **S5.548** has been incorporated into Article **S5**,

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 **S21**.

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 service¹

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. **S5.558**, 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.

¹ WRC-97 made editorial amendments to this Recommendation.

² “**S5.558** 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. **S5.43**).”

* *Note by the Secretariat:* WRC-97 modified the allocation to the mobile service in this frequency band.

RECOMMENDATION 710

Relating to the use of airborne radars in the frequency bands shared between the inter-satellite service and the radiolocation service¹

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. **S5.559**, 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.

¹ WRC-97 made editorial amendments to this Recommendation.

² “**S5.559** 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. **S5.43**).”

RECOMMENDATION 711

Relating to the coordination of earth stations

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that under the terms of Article **S9**, frequency assignments to earth stations in certain bands shared with equal rights between terrestrial radiocommunication services and space radiocommunication services must be coordinated with a view to preventing mutual harmful interference;
- b) that the calculation method described in Appendix **S7** applies solely to frequencies in the 1 GHz to 40 GHz range;
- c) that Tables I and II of this Appendix do not show numerical values for all the necessary parameters of certain space radiocommunication services and terrestrial radiocommunication services sharing frequency bands with equal rights,

invites the ITU-R

to continue as a matter of urgency its study:

- a) of data not included in Tables I and II of Appendix **S7**, relating to the space radiocommunication services and terrestrial radiocommunication services sharing frequency bands with equal rights;
- b) of the formulation of calculation methods for determining the coordination area of earth stations at frequencies below 1 GHz and above 40 GHz,

recommends to administrations

that until the next competent world administrative radio conference they should use:

- a) any ITU-R Recommendation, if applicable, for the values missing from Tables I and II of Appendix **S7**;
- b) the methods of determining the coordination area for frequencies below 1 GHz and above 40 GHz, which may be the subject of an ITU-R Recommendation.

RECOMMENDATION 715 (Orb-88)

**Multi-band and/or multiservice satellite networks using
the geostationary-satellite orbit¹**

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,

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 service¹

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 orbit¹

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,

recommends administrations

to participate actively in these studies,

¹ WRC-97 made editorial amendments to this Recommendation.

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.

RECOMMENDATION 720 (WRC-95)

The flexible and efficient use of the radio spectrum by fixed and some mobile services in the MF and HF bands using block allocations for adaptive systems

The World Radiocommunication Conference (Geneva, 1995),

considering

- a) that WRC-97 is recommended to consider improvements in the regulation and frequency management of the fixed service and of some of the mobile services in the frequency range between about 1.6 and 28 MHz;
- b) that No. **S4.1** requires, *inter alia*, that Member States[‡] shall endeavour to limit the number of frequencies and the spectrum space used to the minimum essential and to apply the latest technical advances as soon as possible;
- c) that HF fixed and mobile services are meeting increasing congestion and interference;
- d) that new frequency management techniques are becoming available, employing newly available equipment techniques which could improve the spectrum utilization and quality of systems operating at HF,

noting

that Question ITU-R 204/1 is being studied by Radiocommunication Study Group 1,

recognizing

that further studies are essential to permit the introduction of frequency agile equipment coupled with the power of digital signal processing for frequency control and error-correction techniques,

instructs the Director of the Radiocommunication Bureau

to ensure, in consultation with the Radiocommunication Study Group Chairmen, that the studies now in hand are completed as a matter of urgency and in time for WRC-97,

recommends

that administrations participate actively in these studies.