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INTERNATIONAL TELECOMMUNICATION UNION

General Secretariat

Radio Regulations

Edition of 1982

2

**Appendices to
the Radio
Regulations.
Resolutions and
Recommendations.**

Geneva 1982

ISBN 92-61-01221-3

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Printed in Switzerland

APPENDICES TO THE RADIO REGULATIONS

APPENDIX 1

(See Article 12)

Introduction

This Appendix contains six sections and one annex:

Section A – Basic Characteristics to Be Furnished for Notification under Nos. 1214 to 1217 of the Radio Regulations

Section B – Basic Characteristics to Be Furnished for Notification under No. 1219 of the Radio Regulations

Section C – Basic Characteristics to Be Furnished for Notification under Nos. 1223 to 1227 of the Radio Regulations

Section D – Information to Be Furnished for Notification under No. 1218 of the Radio Regulations

Section E – Form of Notice

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I. General Notes

II. Notes Concerning Information to Be Entered in the Notice Pertaining to Specific Columns of the Master Register

Annex: Map of Geographical Zones for Broadcasting

**Section A. Basic Characteristics to Be Furnished
for Notification under Nos. 1214 to 1217
of the Radio Regulations**

Column 1 Assigned frequency.

Column 2c Date of bringing into use.

Column 3 Call sign (identification).

*This is not a basic characteristic for stations referred to in
No. 2055.1.*

Column 4a Name of the transmitting station.

Column 4b Country or geographical area in which the transmitting
station is located.

Column 4c Longitude and latitude of the transmitter site.

Column 5a Name of the receiving station.

*This is not a basic characteristic for broadcasting, land,
radionavigation land, radiolocation land or standard
frequency and time signal stations, or for ground-based
stations in the meteorological aids service.*

Column 5b Country or geographical area in which the receiving station
is located.

*This is not a basic characteristic for broadcasting, land,
radionavigation land, radiolocation land or standard
frequency and time signal stations, or for ground-based
stations in the meteorological aids service.*

Column 5c Longitude and latitude of the site of the receiving station.

This is not a basic characteristic for broadcasting, land, radionavigation land, radiolocation land or standard frequency and time signal stations, or for ground-based stations in the meteorological aids service.

Column 5d Locality or area(s) of the receiving stations.

This is a basic characteristic only for broadcasting, land, radionavigation land, radiolocation land and standard frequency and time signal stations.

Columns 5e and 5f are to be used only if the area is not adequately defined in Column 5d.

Column 5e Longitude and latitude of the centre of the circular receiving area.

This is a basic characteristic only for land, radionavigation land, radiolocation land and standard frequency and time signal stations.

To be used only if the area is not adequately defined in Column 5d.

Column 5f Nominal radius (km) of the circular receiving area.

This is a basic characteristic only for land, radionavigation land, radiolocation land and standard frequency and time signal stations.

To be used only if the area is not adequately defined in Column 5d.

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Column 6	Class of station and nature of service.
Column 7a	Class of emission, necessary bandwidth and description of transmission.
Column 7b	Class of operation of the assignment. <i>This is a basic characteristic only for the assignments to stations of the fixed service in the frequency bands allocated to this service between 3 000 kHz and 27 500 kHz.</i>
Column 8	Power (dBW).
Column 9a	Azimuth of maximum radiation.
Column 9b	Elevation angle of maximum directivity. <i>This is a basic characteristic only for stations in the bands above 1 GHz allocated on a shared basis to the space radiocommunication and terrestrial radiocommunication services and shall be provided to an accuracy of one tenth of a degree¹.</i>
Column 9c	Angular width of radiation main lobe. <i>This is not a basic characteristic if the Column 9j data are supplied.</i>

¹ These data shall be provided to an accuracy of one tenth of a degree only if the station is within the coordination area of an earth station or if the direction of the maximum radiation is within three degrees of the geostationary-satellite orbit.

Column 9d Polarization.

This is a basic characteristic only for stations in the bands above 1 GHz allocated on a shared basis to the space radiocommunication and terrestrial radiocommunication services and for broadcasting stations in the VHF/UHF bands in the African and European Broadcasting Areas.

Column 9e Height of antenna (metres) for a simple vertical antenna.

This is a basic characteristic for broadcasting stations in the LF/MF bands in Region 1 and MF bands in Region 3.

Column 9f Maximum effective height of the antenna.

This is a basic characteristic for broadcasting stations in the VHF/UHF bands in the African and European Broadcasting Areas and is defined in the Final Acts of the relevant conferences.

This is a basic characteristic for terrestrial stations operating in the bands above 1 GHz that are shared between space and terrestrial services and shall be indicated in metres above mean sea level.

Column 9g Maximum antenna gain (isotropic, relative to a short vertical antenna or relative to a half-wave dipole, as appropriate).

This is not a basic characteristic if the effective radiated power or the e.i.r.p. is notified in Column 8 or if the Column 9j data are supplied.

Column 9h Azimuths defining the sectors of limited radiation in degrees (clockwise) from True North.

This is a basic characteristic for broadcasting stations in the LF/MF bands in Region 1 and MF bands in Region 3.

Column 9i Maximum agreed radiation in the sectors.

This is a basic characteristic for broadcasting stations in the LF/MF bands in Region 1 and MF bands in Region 3.

Column 9j Type of antenna (see CCIR Book "Antenna Diagrams").

This is not a basic characteristic if the Columns 9c and 9g data are supplied.

Column 10b Regular hours (UTC) of operation of the frequency assignment.

Column 11 Coordination with other administrations.

This is a basic characteristic for the bands and services concerned.

Supplementary information:

- a) in any case where there are one or more *reference frequencies* in a particular transmission (e.g. in the case of the frequency of the reduced carrier in an independent or single-sideband emission, or the frequencies of the sound and vision carriers in a television emission), such reference frequencies shall be supplied;

- b) any coordination required by Nos. 1148 to 1154;
- c) the name of any administration with which an agreement has been effected to exceed the limits prescribed in these Regulations and the contents of such agreement.

**Section B. Basic Characteristics to Be Furnished for Notification
under No. 1219 of the Radio Regulations**

Column 1	Assigned frequency.
Column 2c	Date of bringing into use.
Column 4a	Name of the transmitting station: indicate the letter "M" (for Mobile).
Column 4b	Country or geographical area in which the transmitting mobile stations are located.
Column 4c	The geographical coordinates (longitude and latitude in degrees and minutes) of the centre of the circular transmitting area.
Column 4d	The nominal radius (km) of the circular transmitting area.
Column 4e	Indicate a standard defined area using the symbols contained in standard references, e.g. MWARA, RDARA, geographical zones, etc. (see also the Preface to the International Frequency List).

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Column 5a	Name of the receiving land station.
Column 5b	Country or geographical area in which the receiving station is located.
Column 5c	The geographical coordinates (longitude and latitude in degrees and minutes) of the site of the receiving station.
Column 6	Class of mobile stations and nature of service.
Column 7a	Class of emission of mobile stations and necessary bandwidth and description of transmission.
Column 8	Power (dBW).
Column 10b	Regular hours (UTC) of operation of the frequency assignment.

Supplementary information:

- a)* any coordination required by Nos. 1148 to 1154;
- b)* the name of any administration with which an agreement has been effected to exceed the limits prescribed in these Regulations and the contents of such agreement.

Section C. Basic Characteristics to Be Furnished for Notification under Nos. 1223 to 1227 of the Radio Regulations

Column 1	Assigned frequency.
Column 2c	Date of bringing into use.

Column 4b **Country or geographical area in which the transmitting station is located.**

For the remainder of Column 4 complete either 4e alone or 4c and 4d.

Column 4c **The geographical coordinates (longitude and latitude in degrees and minutes) of the centre of the circular transmitting area.**

Column 4d **The nominal radius (km) of the circular transmitting area.**

Column 4e **Indicate a standard defined area using the symbols appearing in the Preface to the International Frequency List.**

Column 6 **Class of station and nature of service.**

Column 7a **Class of emission, necessary bandwidth and description of transmission.**

Column 8 **Power (dBW).**

Column 10b **Regular hours (UTC) of operation of the frequency assignment.**

Supplementary information:

the name of any administration with which an agreement has been effected to exceed the limits prescribed in these Regulations and the contents of such agreement.

**Section D. Information to Be Furnished for Notification
under No. 1218 of the Radio Regulations**

1. *General instructions*

a) The assistance of the IFRB concerns the selection of a frequency or frequencies for assignment to a station in the fixed service in frequency bands between 3 000 kHz and 27 500 kHz allocated to that service.

b) The administration shall give:

- a general description of the problems experienced;
- the necessary technical information and any other information that could guide the subsequent search by the IFRB.

c) The instructions appearing in Section F may also be relevant.

2. *Information to be furnished by the administration*

Column 1 Frequency.

1. If the request concerns the selection of a frequency or a set of frequencies for a radio circuit, leave this column blank or indicate the preferred band.
2. If the request concerns a predetermined frequency, indicate that frequency.

Column 2c Date of bringing into use.

Indicate the proposed date of bringing the frequency assignments into use.

Column 3 Call sign (identification).

<i>Column 4</i>	Particulars of the transmitting station.
<i>Column 4a</i>	Indicate the name of the locality by which the transmitting station is known or in which it is situated.
<i>Column 4b</i>	Indicate the country or geographical area in which the station is located. Symbols from the Preface to the International Frequency List should be used.
<i>Column 4c</i>	Indicate the geographical coordinates (longitude and latitude in degrees and minutes) of the transmitter site.
<i>Column 5</i>	Particulars of the receiving station.
<i>Column 5a</i>	Name of the receiving station. Indicate the name of the locality by which the receiving station is known or in which it is situated. Provided that, for a given area, the reception area is well defined and sufficiently small to make it easy to forecast the conditions of use of the frequency from the propagation point of view, it is necessary to notify only sufficient stations to define the reception area.
<i>Column 5b</i>	Country or geographical area in which the receiving station is located.
<i>Column 5c</i>	Indicate the geographical coordinates (longitude and latitude in degrees and minutes) of the site of the receiving station.
<i>Column 6</i>	Class of station and nature of service. Indicate the class of station and nature of service performed using the symbols shown in Appendix 10.

Column 7a Class of emission, necessary bandwidth and description of transmission.

Indicate, for each locality or area of reception shown in Column 5a, the class of emission, necessary bandwidth and description of transmission, in accordance with Article 4 and Appendix 6.

Column 8 Power (dBW).

1. The power supplied to the antenna transmission line shall be notified as follows, according to the class of emission, and shall be provided in dBW:
 - a) mean power (*PY*) for the amplitude modulated emissions using unkeyed full carrier and for all frequency modulated emissions (see No. 152);
 - b) peak envelope power (*PX*) for all classes of emission other than those referred to in *a*) (see No. 151);
 - c) leave blank when the power is to be calculated by the IFRB.
2. The power normally used to each locality or area of reception shown in Column 5a shall be indicated.

Column 9 Transmitting antenna characteristics (give as much information as is available).

Column 9a Azimuth of maximum radiation.

1. If a directive transmitting antenna is used, indicate the azimuth of maximum radiation of the transmitting antenna in degrees (clockwise) from True North.
2. If a transmitting antenna with non-directional characteristics is used, insert "ND".

- Columns 9c and 9g** If the radiation characteristics of the antenna concerned differ from those recommended by the CCIR, Columns 9c and 9g should be completed. Where the radiation characteristics are to be found in the CCIR Book "Antenna Diagrams", indicate an appropriate reference in Column 9j.
- Column 9c** Angular width of radiation main lobe.
- The total angle measured horizontally in a plane containing the direction of maximum radiation, in degrees, within which the power radiated in any direction does not fall more than 3 dB below the power radiated in the direction of maximum radiation, should be indicated.
- Column 9g** Antenna gain.
- The relative gain of the antenna in the direction of maximum radiation for the assigned frequency should be indicated (see No. 154).
- Column 9j** Type of antenna (see CCIR Book "Antenna Diagrams").
- Indicate the appropriate reference from the CCIR Book "Antenna Diagrams". See Columns 9c and 9g above.
- Column 10** Hours of operation.
- Column 10a** Maximum hours (UTC) of operation of the circuit to each locality or area.
- As complementary information, indicate by the letter "I" any part of the period during which the operation of the circuit is intermittent.

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Column 10b Regular hours (UTC) of operation of the frequency assignment.

Indicate the time in Coordinated Universal Time (UTC) by a group of four figures (0000 to 2359). Otherwise indicate the hours of operation as day service (HJ), night service (HN), or transition period service (HT).

Column 11 Coordination with other administrations.

If applicable indicate the country or geographical area with which the relevant coordination has been successfully completed.

Column 12a Operating administration or company.

Column 12b Postal and telegraphic addresses of the administration responsible for the station.

Supplementary information:

if available, provide any receiving antenna data.

Section E. Form of Notice

The Board shall develop and keep up to date a form of notice to meet fully the statutory provisions of this Appendix and related decisions of future conferences.

Section F. General Instructions

1. A separate notice shall be sent to the International Frequency Registration Board for notifying:
 - each new frequency assignment;
 - any change in the characteristics of a frequency assignment recorded in the Master International Frequency Register (hereinafter called the *Master Register*);
 - any total deletion of a frequency assignment recorded in the Master Register.
2. When a frequency assignment is used by a station to perform different services, a separate notice shall be submitted for each type of service (e.g. FA, FB, FC, FX, etc.).
3. Frequencies prescribed by these Regulations for common use, as specified in the Preface to the International Frequency List, should not be notified (see No. 1220).
4. Separate entries, in Columns 5a to 10, should be made for the various characteristics when they do not apply to the assignment as a whole, for instance when the class of emission or the power differs according to the localities or areas of reception.
5. For television broadcasting stations in Region 1, separate notices shall be submitted for the sound and vision channels. In such cases, the notice shall relate to the sound and vision carrier frequencies.

I. General Notes

- (a) The name of the notifying administration should be indicated.

- (b) Indicate in this box by the letter "X" when the notice reflects:
- the first use of a frequency by a station; *or*
 - the first use of an additional frequency by a station.
- (c) Indicate in this box by the letter "X" when the notice reflects a change in the characteristics of a frequency assignment recorded in the Master Register.
- (1) In the case where existing particulars (including the frequency) are changed, the new characteristics in the appropriate place should be underlined; the original characteristics which have been changed should be shown in brackets underneath or at the side.
 - (2) In the case where the change is an addition to existing particulars, the additional characteristics should be shown in the appropriate place and should be underlined.
 - (3) In the case where the change is a cancellation of a particular characteristic or characteristics, this should be shown in the appropriate place by a dash and, underneath or at the side, the characteristics which have been cancelled should be shown in brackets.
- (d) Indicate in this box by the letter "X" when the notice reflects a deletion of an assignment, in all of its notified characteristics.
- (e) The serial number of the notice and the date on which the notice is sent to the Board shall be shown here.

II. Notes Concerning Information to Be Entered in the Notice Pertaining to Specific Columns of the Master Register

Column 1 **Assigned frequency.**

1. Indicate the assigned frequencies ^{1, 2, 3} as defined in Article 1: in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive, and in GHz above 10 500 MHz.
2. *This information is a basic characteristic.*

Column 2c **Date of bringing into use.**

1. In the case of a new assignment, insert the date (actual or foreseen, as appropriate) of bringing the frequency assignment into use.
2. Whenever the assignment is changed in any of its basic characteristics as defined in this Appendix, except in the case of a change in Column 3, 4a, 10a or 11, the date to be indicated shall be that of the latest change (actual or foreseen, as appropriate).
3. *This information is a basic characteristic.*

¹ For television broadcasting stations in Region 1, the frequencies to be notified are those of the sound and vision carriers.

² For radiotelephone stations in the maritime mobile service, see No. 4194.

³ For stations in the aeronautical mobile (R) service, see Appendix 27 Aer2 revised paragraph 27/72.

Column 3 Call sign (identification).

1. Indicate the call sign or other identification used in accordance with Article 25.
2. *This information is a basic characteristic, except for stations referred to in Nos. 1224 to 1227 and 2055.1 or when the frequency assignment is used for reception in the circumstances described in No. 1219.*

Column 4 Particulars of the transmitting station.

When the frequency assignment is used in the circumstances described in Nos. 1214 to 1217, the basic characteristics to be provided in Column 4 are as follows:

Column 4a Indicate the name of the locality by which the transmitting station is known or in which it is situated.

Column 4b Indicate the country or geographical area in which the station is located. Symbols from the Preface to the International Frequency List shall be used.

Column 4c Indicate the geographical coordinates (longitude and latitude in degrees and minutes) of the transmitter site. For frequency assignments above 1 GHz in the bands shared between terrestrial radiocommunication and space radiocommunication services, indicate the geographical coordinates (longitude and latitude in degrees, minutes and seconds with an accuracy of one tenth of a minute¹ or, as an alternative, indicate the longitude and latitude in degrees and minutes and, in Column 9a, the azimuth of maximum radiation of the antenna to an accuracy of one tenth of a degree).

¹ The seconds with an accuracy of one tenth of a minute need only be notified if the station is within the coordination area of an earth station.

When the frequency assignment is used for reception in the circumstances described in No. 1219, the basic characteristics to be provided in Column 4 are as follows:

- Column 4a** Name of the transmitting station: indicate the letter "M" (for Mobile).
- Column 4b** Indicate the country or geographical area in which the transmitting mobile stations are located. If the stations are not located within a country, indicate the country responsible. Symbols from the Preface to the International Frequency List shall be used.
- Column 4c** Indicate the geographical coordinates (longitude and latitude in degrees and minutes) of the centre of the circular transmitting area.
- Column 4d** Indicate the nominal radius (km) of the circular transmitting area.
- Column 4e** Indicate a standard defined area using the symbols contained in standard references, e.g. MWARA, RDARA, geographical zones, etc. (see also the Preface to the International Frequency List).

When the frequency assignment is used in the circumstances described in Nos. 1223 to 1227, the basic characteristics to be provided in Column 4 are as follows:

- Column 4b** Indicate the country or geographical area in which the station is located. Symbols from the Preface to the International Frequency List shall be used.

For the remainder of Column 4 complete either 4e alone or 4c and 4d.

- Column 4c** Indicate the geographical coordinates (longitude and latitude in degrees and minutes) of the centre of the circular transmitting area.

Column 4d Indicate the nominal radius (km) of the circular transmitting area.

Column 4e Indicate a standard defined area using the symbols appearing in the Preface to the International Frequency List.

Column 5 Particulars of the receiving station.

When the frequency assignment is used in the circumstances described in Nos. 1214 to 1217, the basic characteristics to be provided in Column 5 are as follows:

Column 5a Name of the receiving station. Indicate the name of the locality by which the receiving station is known or in which it is situated.

1. Provided that, in the fixed service, the reception area is well defined and sufficiently small to make it easy to forecast the conditions of use of the frequency from the propagation point of view, it is necessary to notify only sufficient stations to define the reception area.
2. However, for broadcasting, land, radionavigation land, radiolocation land and standard frequency and time signal stations, and for ground-based stations in the meteorological aids service, it is not necessary to indicate any information in this column.
3. In the case of a network composed of stations intercommunicating on the same frequency, the symbol ZN shall be entered in Column 5a. When the same frequency is used for two or more networks of the same administration, each network should be identified by a separate letter following the network symbol ZN, e.g. ZN-A, ZN-B, etc.

4. In the case of a network, as well as in the case where a frequency is used in a specific area by numerous stations under the jurisdiction of the same administration, it is necessary to notify only sufficient stations to define the area of operation, provided that that area is well defined and sufficiently small to make it easy to forecast the conditions of the use of the frequency from the propagation point of view.

Column 5b Country or geographical area in which the receiving station is located. Symbols from the Preface to the International Frequency List shall be used.

However, for broadcasting, land, radionavigation land and standard frequency and time signal stations, and for ground-based stations in the meteorological aids service, it is not necessary to indicate any information in this column.

Column 5c Indicate the geographical coordinates (longitude and latitude in degrees and minutes) of the site of the receiving station.

However, for broadcasting, land, radiolocation land or standard frequency and time signal stations, or for ground-based stations in the meteorological aids service, it is not necessary to indicate any information in this column.

Column 5d Locality or area(s) of the receiving station(s).

1. For broadcasting stations, the area of reception shall be indicated. Each area should be expressed either:

— as interior (INTR);

- or the symbol designating a country or countries or geographical area(s) (Preface to the International Frequency List);
- or one of the geographical zones appearing on the map annexed to this Appendix. If the area of reception cannot be defined in the above manner, Columns 5e and 5f shall be completed.

This is not a basic characteristic for broadcasting stations in the LF/MF or VHF/UHF bands unless specified in a relevant regional agreement.

2. For land, radionavigation land, radiolocation land, standard frequency and time signal stations, and for ground-based stations in the meteorological aids service, indicate an area only if it is standardly described. If the area of reception is not standardly defined, describe the area in Columns 5e and 5f.

Column 5e Longitude and latitude of the centre of the circular receiving area.

1. Indicate the geographical coordinates (in degrees and minutes).
2. This column is not to be used if the area of reception is adequately defined in Column 5d. If Column 5e is used, a corresponding entry must be made in Column 5f.

Column 5f Nominal radius of the circular receiving area.

1. Indicate the radius (km) of the circular receiving area.
2. This column is not to be used if the area of reception is adequately defined in Column 5d. If Column 5f is used, a corresponding entry is required in Column 5e.

When the frequency assignment is used in the circumstances described in No. 1219, the basic characteristics to be provided in Column 5 are as follows:

Column 5a Name of the receiving station. Indicate the name of the locality by which the receiving station is known or in which it is situated.

Column 5b Country or geographical area in which the receiving station is located. Symbols from the Preface to the International Frequency List shall be used.

Column 5c Indicate the geographical coordinates (longitude and latitude in degrees and minutes) of the site of the receiving station.

When the frequency assignment is used in the circumstances described in Nos. 1223 to 1227, no entry is required in Column 5.

Column 6 Class of station and nature of service.

1. Indicate the class of station and nature of service performed, using the symbols shown in Appendix 10.
2. When the frequency assignment is used for reception in the circumstances described in No. 1219, the class of station and nature of service applicable to the mobile stations should be indicated.
3. *This information is a basic characteristic.*

Column 7 Class of emission and class of operation.

Column 7a Class of emission, necessary bandwidth and description of transmission.

1. Indicate, for each locality or area of reception shown in Column 5a, the class of emission, necessary bandwidth and description of transmission, in accordance with Article 4 and Appendix 6.

2. When the frequency assignment is used for reception in the circumstances described in No. 1219, the particulars to be indicated are those applicable to the mobile stations.
3. *This information is a basic characteristic.*

Column 7b Class of operation of the assignment.

This is a basic characteristic. For assignments to stations of the fixed service in the frequency bands allocated to this service between 3 000 kHz and 27 500 kHz, indicate the class of operation of the assignment by the symbols A, B or C, as follows:

- Symbol A — Assignment for regular operational use which is not provided by another satisfactory means of telecommunication.
- Symbol B — Assignment for use as a standby to some other means of telecommunication.
- Symbol C — Assignment for occasional use on a reserve basis and not requiring internationally recognized protection from harmful interference.

Column 8 Power (dBW).

1. The power supplied to the antenna transmission line shall be notified as follows, according to the class of emission, and shall be provided in dBW:
 - a) carrier power (*PZ*) for A3E sound broadcasting (see No. 153);

Column 9 Transmitting antenna characteristics.

Column 9a Azimuth of maximum radiation.

1. If a directive transmitting antenna is used, indicate the azimuth of maximum radiation of the transmitting antenna in degrees (clockwise) from True North.
2. If a transmitting antenna with non-directional characteristics is used, insert "ND" in this column.
3. For frequency assignments above 1 GHz in the bands shared between terrestrial radiocommunication and space radiocommunication services, the azimuth shall be provided to an accuracy of one tenth of a degree¹ in those cases where the required accuracy in the geographical coordinates (to a tenth of a minute²) has not been specified in Column 4c.
4. *This information is a basic characteristic, except for stations referred to in Nos. 1223 to 1227, or when the frequency assignment is used for reception in the circumstances described in No. 1219.*

Column 9b Elevation angle of maximum directivity.

This is a basic characteristic only for stations in the bands above 1 GHz allocated on a shared basis to the space radiocommunication and terrestrial radiocommunication services and shall be provided to an accuracy of one tenth of a degree¹.

¹ These data shall be provided to an accuracy of one tenth of a degree only if the station is within the coordination area of an earth station or if the direction of the maximum radiation is within three degrees of the geostationary-satellite orbit.

² The seconds with an accuracy of one tenth of a minute need only be notified if the station is within the coordination area of an earth station.

**Columns 9c
and 9g**

If the radiation characteristics of the antenna concerned differ from those recommended by the CCIR, Columns 9c and 9g should be completed. Where the radiation characteristics are to be found in the CCIR Book "Antenna Diagrams", indicate an appropriate reference in Column 9j.

Column 9c

Angular width of radiation main lobe.

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

Column 9d

Polarization.

This is a basic characteristic for stations in the bands above 1 GHz allocated on a shared basis to the space radiocommunication and terrestrial radiocommunication services and for broadcasting stations in the VHF/UHF bands in the African and European Broadcasting Areas.

Column 9e

Height of antenna (metres) for a simple vertical antenna.

This is a basic characteristic for broadcasting stations in the LF/MF bands in Region 1 and MF bands in Region 3.

Column 9f

Maximum effective height of the antenna.

This is a basic characteristic for broadcasting stations in the VHF/UHF bands in the African and European

Broadcasting Areas and is defined in the Final Acts of the relevant conferences.

This is a basic characteristic for terrestrial stations operating in the bands above 1 GHz that are shared between space radiocommunication and terrestrial radiocommunication services and shall be indicated in metres above mean sea level.

Column 9g Maximum antenna gain (isotropic, relative to a short vertical antenna or relative to a half-wave dipole, as appropriate).

1. The relative gain of the antenna in the direction of maximum radiation for the assigned frequency should be indicated (see No. 154).
2. *This is not a basic characteristic if the effective radiated power or the e.i.r.p. is notified in Column 8.*

Column 9h Azimuths defining the sectors of limited radiation in degrees (clockwise) from True North.

1. Indicate the azimuths defining the sectors of limited radiation in degrees (clockwise) from True North.
2. *This is a basic characteristic for broadcasting stations in the LF/MF bands in Region 1 and MF bands in Region 3.*

Column 9i Maximum agreed radiation in the sectors.

1. Indicate the maximum agreed radiation in the sector, in dB relative to a cymomotive force (c.m.f.) of 300 V or an effective monopole radiated power (e.m.r.p.) of 1 kW,

determined from the nominal power of the transmitter and the theoretical gain of the antenna without allowing for miscellaneous losses.

2. *This is a basic characteristic for broadcasting stations in the LF/MF bands in Region 1 and MF bands in Region 3.*

Column 9j Type of antenna (see CCIR Book "Antenna Diagrams").

Indicate the appropriate reference from the CCIR Book "Antenna Diagrams". See Columns 9c and 9g above.

Column 10 Hours of operation.

Column 10a Maximum hours (UTC) of operation of the circuit to each locality or area.

1. When the frequency assignment is used for reception in the circumstances described in No. 1219, the maximum hours of operation are those relating to the mobile stations.
2. As complementary information, indicate by the letter "I" any part of the period during which the operation of the circuit is intermittent.
3. *This information is not a basic characteristic.*

Column 10b Regular hours (UTC) of operation of the frequency assignment.

1. If known, indicate the regular hours of operation of the frequency assignment in UTC. Otherwise indicate the hours of operation as day service (HJ), night service (HN), or transition period service (HT).
2. *This is a basic characteristic.*

Column 11 Coordination with other administrations.

1. Identify the country or geographical area with which coordination has been successfully completed and indicate the provision (No. of the Radio Regulations, regional agreement, or other arrangement) requiring such coordination.
2. *This is a basic characteristic for the bands and services concerned.*

Column 12a Operating administration or company *.

This information is not a basic characteristic, but it is recommended it be supplied in cases where the same agency operates in more than one country.

Column 12b Postal and telegraphic addresses of the administration responsible for the station *.

1. The addresses required are those to which communication should be sent on urgent matters regarding interference, quality of emissions and questions referring to the technical operation of the circuit (see Article 22).
2. *This information is not a basic characteristic.*

Supplementary Information

Any supplementary information supplied by the administration should be indicated within the frame provided on the notice.

1. If the assignment is made in application of a regional or service agreement, the relevant agreement shall be indicated in the appropriate place; otherwise, insert the indication "Nil".

* Where this information already appears in the Preface to the International Frequency List, the appropriate reference number or letter may be used.

2. Indicate after the symbol COORD/ the name of any administration with which coordination has been effected for the use of the frequency; if no coordination has been effected, the indication "Nil" should be inserted. In the case of a notification under Nos. 1223 to 1227 in a frequency band above 28 000 kHz, the area or areas of the actual use to which the coordination refers should be indicated.

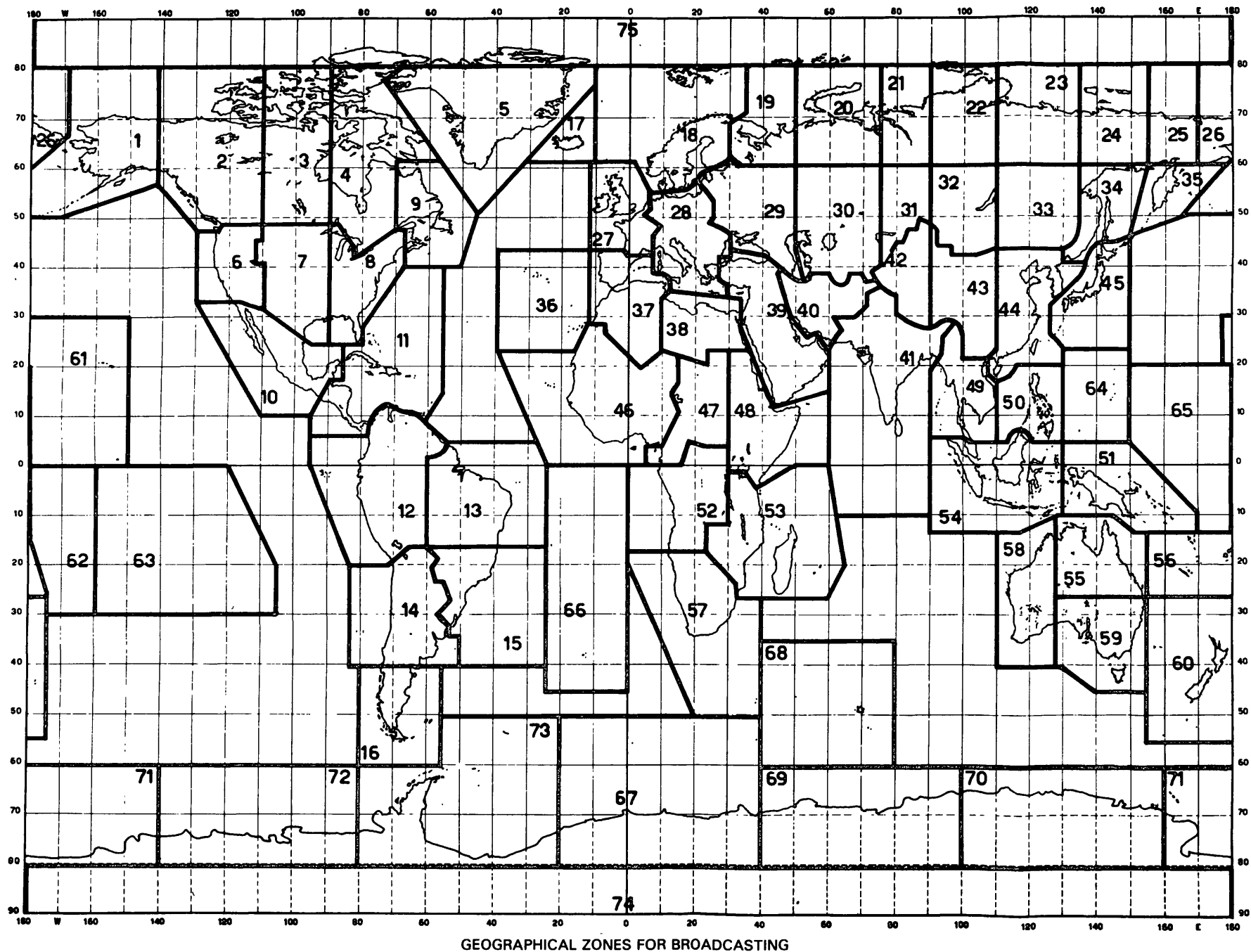
3. In any case where there are one or more reference frequencies in a particular transmission (e.g. in the case of the frequency of the reduced carrier in an independent or single-sideband emission, or the frequencies of the sound and vision carriers in a television emission), such reference frequencies shall be supplied. In the case of television broadcasting stations in Region 1, each notice shall include, as supplementary information, both the frequency of the other carrier and the assigned frequency.

4. Any other information which the administration considers to be relevant should be indicated, such as, for example, an indication that the assignment concerned would be operating in accordance with No. 342 of these Regulations, or information concerning the use of the notified frequency if such use is restricted or if the frequency is not used during all the time which is possible according to propagation conditions.

5. *Only the information specified in paragraph 3 above is a basic characteristic; it is recommended, however, that the information under paragraphs 1 and 2 above be supplied. However, in the case of stations in the terrestrial radiocommunication services referred to in Nos. 1148 to 1154, the name of any administration with which coordination of the use of the frequency has been sought and the name of any administration with which such coordination has been effected are basic characteristics.*

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GEOGRAPHICAL ZONES FOR BROADCASTING

(a) Notifying frequency

Form of Notice*

For Use when Submitting to the International Frequency Registration Board
a Seasonal High Frequency Broadcasting Schedule
or a Change Thereto
(see Article 17)



6 Class of station

(b) Assignment for the particular season

(c) Change of characteristics of an assignment for the season

(d) Deletion of an assignment for the season

(e) { Notice No.: _____
Date: _____

kHz

kHz

MHz

Season

MARCH

MAY

SEPT

NOV.

Year

Other date

1a Assigned frequency

1b Alternative frequency

1c Frequency band

2c Date of putting into use in the particular season

3 Call sign (Identification)

4a Name of transmitting station

4b Country

4c Longitude and latitude of the transmitter site

Zone(s) or area(s) of reception 5a	Class of emission and necessary bandwidth 7	Power (kW) 8	Transmitting antenna characteristics					Hours of operation (UTC) 10	Other frequencies simultaneously utilized for same programme to the same area(s) 11	Supplementary information
			Azimuth of max radiation 9a	Angular width of radiation main lobe 9b	Antenna gain in dB 9c	Angle of elevation 9d	Type of antenna 9e			

12b _____ Name of postal address

_____ of administration (Article 22)

_____ Telegraphic address

COORD/ _____

Other information _____

* The actual size of the notice is a matter for individual administrations.

Section A. Form of Notice
(See Article 17)
APPENDIX 2

Section B. General Instructions

1. A separate notice shall be sent to the IFRB for notifying:
 - each frequency assignment to be put into use for a particular season;
 - any change in the characteristics of a frequency assignment in the High Frequency Broadcasting Schedule, for the season;
 - any deletion of a frequency assignment in the High Frequency Broadcasting Schedule, for the season.
2. Separate entries, in Columns 5a and 8 to 11, should be made for the various characteristics when they do not apply to the assignment as a whole, for instance when the power, antenna characteristics or hours of operation differ according to the zones or areas of reception.

I. General Notes

- (a) The name of the notifying administration should be indicated.
- (b) Indicate in this box by the letter “X” when the notice reflects the first frequency usage by a station in a particular season.
- (c) Indicate in this box by the letter “X” when the notice reflects a change in the characteristics of a frequency assignment in the High Frequency Broadcasting Schedule, for the season.
 - (1) In the case where existing particulars are changed, the new characteristics in the appropriate place should be underlined; the original characteristics which have been changed should be shown in brackets underneath or at the side.
 - (2) In the case where the change is an addition to existing particulars, the additional characteristics should be shown in the appropriate place and should be underlined.
 - (3) In the case where the change is a cancellation of a particular characteristic or characteristics, this should be shown in the appropriate place by a dash and, underneath or at the side, the characteristics which have been cancelled should be shown in brackets.

- (d) Indicate in this box by the letter "X" when the notice reflects a deletion of an assignment, in all of its notified characteristics, for the season.
- (e) The serial number of the notice and the date on which the notice is sent to the Board shall be shown here.

**II. Notes Concerning Information to Be Entered
in the Specific Columns of the Notice**

- Column 1** Frequency.
- 1a* Indicate the assigned frequency as defined in Article 1, in kHz;
 - 1b* Indicate any suggested alternative frequency or frequencies in kHz; *or*
 - 1c* Indicate the desired band in MHz, if a specific frequency is not given under *1a* and *1b* above.
- Column 2c** Date of putting into use, in the particular season.
- 1. If the assignment is to be brought into use on the implementation date of the seasonal schedule, indicate the last two digits of the year in the box(es) of the season(s) for which the assignment is to be used.
 - 2. If the assignment is to be brought into use or changed by any date other than the implementation date of the particular seasonal schedule, this date shall be entered in the space provided.
- Column 3** Call sign (identification).
- Indicate the call sign or other station identification used in accordance with Article 25.
- Column 4** Name and location of transmitting station.
- 4a* Indicate the name of the locality by which the transmitting station is known or in which it is situated.

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- 4b** Indicate the country in which the station is located. Symbols from the Preface to the International Frequency List should be used.
- 4c** Indicate the geographical coordinates (in degrees and minutes) of the transmitter site.

Column 5a Zone(s) or area(s) of reception.

1. Indicate in this column the zone(s) of reception as shown in the map annexed to Appendix 1.
2. If the reception area is smaller than an entire zone, it should be indicated as a country or part of a country using symbols from the Preface to the International Frequency List, as far as possible.
3. Indicate, as supplementary information, the maximum service range (in km) when this is considered necessary.

Column 7 Class of emission and necessary bandwidth.

Indicate the class of emission and necessary bandwidth in accordance with Article 4 and Appendix 6.

Column 8 Power (in kW).

Indicate the carrier power supplied to the transmission line.

Transmitting Antenna Characteristics

Column 9a Azimuth of maximum radiation.

1. If a directive transmitting antenna is used, indicate the azimuth of maximum radiation of the transmitting antenna in degrees (clockwise) from True North.
2. If a transmitting antenna with non-directional characteristics is used, insert "ND" in this column.

<i>Column 9b</i>	Angular width of radiation main lobe. The total angle in the horizontal plane, in degrees, within which the power radiated in any direction does not fall more than 6 dB below the power radiated in the direction of maximum radiation, should be indicated.
<i>Column 9c</i>	Antenna gain (dB). The relative gain of the antenna in the direction of maximum radiation for the assigned frequency should be indicated.
<i>Column 9d</i>	Angle of elevation. The angle of the direction of maximum radiation in the vertical plane in degrees should be indicated.
<i>Column 9e</i>	Type of antenna. The nomenclature of the CCIR Book "Antenna Diagrams" should be used wherever it is applicable as shown in a list at the end of this instruction (see III of this Section).
<i>Column 10</i>	Hours of operation (UTC).
<i>Column 11</i>	Other frequencies simultaneously used for the same programme to the same area(s). 1. If the notified frequency is the only frequency used for the particular schedule, the indication "Nil" shall be inserted in this column. 2. In other cases, the other frequencies simultaneously used for the same programme to the same area shall be indicated.
<i>Column 12b</i>	Postal and telegraphic addresses of administration responsible for the station*.

* Where this information already appears in the Preface to the International Frequency List, the appropriate reference number or letter may be used.

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The addresses required are those to which communication should be sent on urgent matters regarding interference, quality of emissions, and questions referring to the technical operation (see Article 22).

Supplementary Information

Any other information supplied by the administration should be indicated in the space provided.

1. Indicate after the symbol COORD/ the name of any administration with which coordination has been effected for the use of the frequency; if no coordination has been effected, the indication "Nil" should be inserted.
2. Any other information which the administration considers to be relevant should be indicated, such as, for example, the maximum service range when this is less than 2 000 km; or information concerning the use of the notified frequency if such use is restricted; or if the frequency is not used during all the hours indicated in Column 10, or on certain days of the week only; or if synchronizing techniques are used.

III. Symbols for Type of Antenna

HOR	Horizontal non-directive antenna
VER	Vertical non-directive antenna

DP	Dipole
H	Horizontal
V	Vertical
R	With reflector

Example: DPHR means: Horizontal dipole with reflector.

H	Horizontal dipole curtain antenna
R	With reflector curtain
S	Slewed antenna
/..	Number of half-wave elements in each row
/..	Number of half-wave elements in each stack (one above the other)
/..	Height above ground in full wavelengths of the bottom row of elements
S..	Angle of slew, if any

Example: HRS/4/3/2S15 means: Horizontal array with reflector curtain, 4 half-wave elements in each row, 3 stacks of dipoles, bottom element 2 wavelengths above the ground, slewed with an angle of 15 degrees.

RHO	Rhombic antenna
/..	Length of one side of the rhombus, in wavelengths
/..	Height of rhombus above ground, in wavelengths
/..	One half of the interior side angle of rhombus

Example: RHO/2.5/0.4/65 means: Rhombic antenna, length of one side 2.5 wavelengths, height above ground 0.4 wavelengths, one half of the interior side angle 65 degrees.

TRO	Tropical broadcasting antenna
/..	Number of rows
/..	Height above the ground in wavelengths

Example: TRO/4/0.2 means: Tropical BC antenna with 4 rows (and 4 dipoles in each row) at a height of 0.2 wavelengths above the ground.

APPENDIX 3

**Notices Relating to Space Radiocommunications
and Radio Astronomy Stations**

(See Articles 11 and 13)

Section A. General Instructions

1. A separate notice shall be sent to the International Frequency Registration Board for notifying:

- each new frequency assignment to an earth station for transmitting or to be received or a space station for transmitting or to be received;
- any change in the characteristics of a frequency assignment recorded in the Master International Frequency Register (hereinafter called the *Master Register*);
- any total deletion of a frequency assignment recorded in the Master Register.

2. When submitting notices under Nos. 1488 to 1491 for frequency assignments to an earth or space station for transmitting or for frequency assignments to be used for reception by an earth or space station, separate notices shall be submitted to the Board for each assignment. In each of these cases where the basic characteristics are identical, with the exception of the frequency, a single notice may be submitted covering all basic characteristics and listing the assigned frequencies. In the case of a reflecting satellite system, only earth transmitting and receiving assignments shall be notified.

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3. In the case of a satellite system employing multiple space stations with the same general characteristics, a separate notice shall be submitted to the Board for each space station for transmitting or receiving assignments:

- when it is aboard a geostationary satellite;
- when it is aboard a non-geostationary satellite except when a number of satellites have the same radio frequency characteristics and orbital characteristics (excluding the ascending node position); in the latter case, one notice covering all such space stations may be submitted to the Board.

4. The following basic information shall be shown on the notice:

- a) the serial number of the notice and the date on which the notice is sent to the Board;
- b) the name of the notifying administration;
- c) sufficient data to identify the particular satellite network in which the earth or space station will operate, including in the case of a geostationary satellite its orbital position;
- d) whether the notice reflects:
 - 1) the first use of a frequency by a station;
 - 2) a change in the characteristics of a frequency assignment recorded in the Master Register (indicate whether the change is a replacement, addition or deletion of existing characteristics);
 - 3) a deletion of an assignment in all of its notified characteristics;
- e) reference to the IFRB weekly circular providing the advance publication information required in accordance with No. 1042;

- f)* basic characteristics as outlined in Section B, C, D, E, or F as appropriate;
- g)* any other information which the administration considers to be relevant, e.g., any factors taken into account when applying Appendix 28 for determination of the coordination area and also any indication that the assignment concerned would be operating in accordance with No. 342, information concerning the use of the notified frequency if such use is restricted, or, in the case of notices pertaining to space stations, if the transmissions of the station are to be permanently switched off after a certain period.

**Section B. Basic Characteristics to Be Furnished
in Notices Relating to Frequencies Used
by Earth Stations for Transmitting**

***Item 1* Assigned frequency (frequencies)**

Indicate the assigned frequency (frequencies), as defined in Article 1 (see No. 142), in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive and in GHz above 10 500 MHz.

***Item 2* Assigned frequency band**

Indicate the bandwidth of the assigned frequency band in kHz (see No. 141).

***Item 3* Date of bringing into use**

- a)* In the case of a new assignment, indicate the date (actual or foreseen, as appropriate) of bringing the frequency assignment into use.

b) Whenever the assignment is changed in any of its basic characteristics, as shown in this Section (except in the case of a change in *Item 4 a)*), the date to be given shall be that of the latest change (actual or foreseen, as appropriate).

Item 4 Identity and location of the transmitting earth station

a) Indicate the name by which the station is known or the name of the locality in which it is situated.

b) Indicate the country or geographical area in which the station is located. Symbols from the Preface to the International Frequency List should be used.

c) Indicate the geographical coordinates of the transmitter site (longitude and latitude in degrees and minutes). Indicate also the seconds ¹ with an accuracy of one-tenth of a minute.

Item 5 Station(s) with which communication is to be established

Identify the associated receiving space station(s) by reference to the notification thereof or in any other appropriate manner, or, in the case of a reflecting satellite, the identity of the satellite and the location of the associated receiving earth station(s). In the case of a geostationary satellite, indicate also its orbital position.

Item 6 Class of station and nature of service

Indicate the class of station and nature of service performed, using the symbols shown in Appendix 10.

¹ This information need only be furnished if the coordination area of the earth station overlaps the territory of another administration.

Item 7 Class of emission, necessary bandwidth and description of transmission

In accordance with Article 4 and Appendix 6:

- a) indicate the class of emission;
- b)¹ indicate the carrier frequency or frequencies of the emission(s);
- c)¹ indicate, for each carrier, the class of emission, necessary bandwidth and description of transmission;
- d)¹ indicate for the carrier having the smallest bandwidth of assignments in the system the class of emission, necessary bandwidth and a description of the transmission.

Item 8 Power characteristics of the transmission

- a)¹ Indicate for each carrier the peak envelope power (dBW) supplied to the input of the antenna.
- b) Indicate the total peak envelope power (dBW) and the maximum power density per Hz (dB(W/Hz))² supplied to the input of the antenna averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz.
- c)¹ Indicate for each carrier the minimum value of the peak envelope power supplied to the input of the antenna.

¹ This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

² The most recent version of CCIR Report 792 should be used to the extent applicable in calculating the maximum power density per Hz.

Item 9 Transmitting antenna characteristics

- a)* Indicate the isotropic or absolute gain (dB) of the antenna in the direction of maximum radiation (see No. 154).
- b)* Indicate the beamwidth in degrees between the half power points (describe in detail if not symmetrical).
- c)* Either attach the measured radiation diagram of the antenna (taking as a reference the direction of maximum radiation) or indicate the reference radiation diagram to be used for coordination.
- d)* Indicate graphically the horizon elevation angle for each azimuth around the earth station.
- e)* Indicate in degrees from the horizontal plane the planned minimum operating angle of elevation of the antenna in the direction of maximum radiation.
- f)* Indicate in degrees, clockwise from True North, the planned range of operating azimuthal angles for the direction of maximum radiation.
- g)*¹ Indicate the type of polarization of the transmitted wave in the direction of maximum radiation; also indicate the direction in the case of circular polarization and the plane in the case of linear polarization. (See Nos. 148 and 149.)
- h)* Indicate the altitude (metres) of the antenna above mean sea level.

¹ This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

Item 10¹ Modulation characteristics

For each carrier, according to the nature of the signal modulating the carrier and the type of modulation, indicate the following characteristics:

- a) carrier frequency modulated by a frequency-division multi-channel telephony baseband (FDM/FM) or by a signal that can be represented by a multi-channel telephony baseband: indicate the lowest and highest frequencies of the baseband and the r.m.s. frequency deviation of the test tone as a function of baseband frequency;
- b) carrier frequency modulated by a television signal: indicate the standard of the television signal (including, where appropriate, the standard used for colour), the frequency deviation for the reference frequency of the pre-emphasis characteristic and the pre-emphasis characteristic itself. Also indicate, where applicable, the characteristics of the multiplexing of the video signal with the sound signal(s) or other signals;
- c) carrier phase-shift modulated by a pulse code modulation signal (PCM/PSK): indicate the bit rate and the number of phases;
- d) amplitude modulated carrier (including single-sideband): indicate as precisely as possible the nature of the modulating signal and the kind of amplitude modulation used;

¹ This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

- e) for all other types of modulation, provide such particulars as may be useful for an interference study;
- f) for any type of modulation as applicable, indicate the characteristics of energy dispersal, such as the peak-to-peak frequency deviation (MHz) and the sweep frequency (kHz) of the energy dispersal wave form.

Item 11 **Regular hours of operation**

Indicate, in UTC, the regular hours of operation on the frequency of each carrier.

Item 12 **Coordination**

Give the name of any administration with which the use of this frequency has been successfully coordinated in accordance with Nos. **1060** and **1107** and, if appropriate, the name of any administration with which coordination has been sought but not effected.

Item 13 **Agreements**

Give, if appropriate, the name of any administration with which agreement has been effected to exceed the limits prescribed in these Regulations, and the contents of such agreement.

Item 14 **Operating administration or company**

Give the name of the operating administration or company and the postal and telegraphic addresses of the administration to which communications should be sent on urgent matters regarding interference, quality of emissions and questions referring to the technical operation of stations (see Article 22).

**Section C. Basic Characteristics to Be Furnished
in Notices Relating to Frequencies to Be Received
by Earth Stations**

Item 1 Assigned frequency (or frequencies)

Indicate the assigned frequency (frequencies), as defined in Article 1 (see No. 142), of the emission to be received, in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive and in GHz above 10 500 MHz.

Item 2 Assigned frequency band

Indicate the bandwidth of the assigned frequency band in kHz (see No. 141).

Item 3 Date of bringing into use

a) In the case of a new assignment, indicate the date (actual or foreseen, as appropriate) when reception of the assigned frequency begins.

b) Whenever the assignment is changed in any of its basic characteristics, as shown in this Section (except in the case of a change in *Item 4 a)*), the date to be given shall be that of the latest change (actual or foreseen, as appropriate).

Item 4 Identity and location of the receiving earth station

a) Indicate the name by which the receiving earth station is known or the name of the locality in which it is situated.

b) Indicate the country or geographical area in which the station is located. Symbols from the Preface to the International Frequency List should be used.

c) Indicate the geographical coordinates of the receiver site (longitude and latitude in degrees and minutes). Indicate also the seconds ¹ with an accuracy of one-tenth of a minute.

Item 5 Station(s) with which communication is to be established

Identify the associated transmitting space station(s) by reference to the notification thereof or in any other appropriate manner, or, in the case of a reflecting satellite, the identity of the satellite and the associated transmitting earth station(s). In the case of a geostationary satellite, indicate also its orbital position.

Item 6 Class of station and nature of service

Indicate the class of station and nature of service performed, using the symbols shown in Appendix 10.

Item 7 Class of emission, necessary bandwidth and description of the transmission to be received

In accordance with Article 4 and Appendix 6:

a) indicate the class of emission of the transmission to be received;

¹ This information need only be furnished if the coordination area of the earth station overlaps the territory of another administration.

- b)*¹ indicate the carrier frequency or frequencies of the transmission to be received;
- c)*¹ indicate, for each carrier to be received, the class of emission, necessary bandwidth and description of the transmission.

Item 8 Earth station receiving antenna characteristics

- a)* Indicate the isotropic or absolute gain (dB) of the antenna in the direction of maximum radiation (see No. 154).
- b)* Indicate the beamwidth in degrees between the half power points (describe in detail if not symmetrical).
- c)* Either attach the measured radiation diagram of the antenna (taking as a reference the direction of maximum radiation) or indicate the reference radiation diagram to be used for coordination.
- d)* Indicate graphically the horizon elevation angle for each azimuth around the earth station.
- e)* Indicate in degrees from the horizontal plane the planned minimum operating angle of elevation of the antenna in the direction of maximum radiation.
- f)* Indicate in degrees, clockwise from True North, the planned range of operating azimuthal angles for the direction of maximum radiation.
- g)* Indicate the altitude (metres) of the antenna above mean sea level.

¹ This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

*h)*¹ Indicate the type of polarization of the antenna. In the case of circular polarization, indicate the direction of polarization (see Nos. 148 and 149). In the case of linear polarization, indicate the plane of polarization. Indicate also if consent is given to the general use of this information in the determination of the need for coordination with other satellite networks according to Appendix 29.

Item 9 Noise temperature, link noise temperature and transmission gain

a) Indicate, in kelvins, the lowest total receiving system noise temperature referred to the output of the receiving antenna of the earth station under "quiet sky conditions". This value shall be indicated for the nominal value of the angle of elevation when the associated transmitting station is aboard a geostationary satellite and, in other cases, for the minimum value of angle of elevation.

b) When simple frequency-changing transponders are used on the associated space station, indicate the lowest equivalent satellite link noise temperatures under the conditions of *Item 9 a)* for each assignment (see No. 168).

c) Indicate the value of transmission gain associated with each equivalent satellite link noise temperature given in *Item 9 b)*. The transmission gain is evaluated from the output of the receiving antenna of the space station to the output of the receiving antenna of the earth station.

Item 10 Regular hours of reception

Indicate, in UTC, the regular hours of reception on the frequency of each carrier.

¹ This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

Item 11 **Coordination**

Give the name of any administration with which the use of this frequency has been successfully coordinated in accordance with Nos. 1060 and 1107 and, if appropriate, the name of any administration with which coordination has been sought but not effected.

Item 12 **Agreements**

Give also, if appropriate, the name of any administration with which agreement has been effected to exceed the limits prescribed in these Regulations, and the contents of such agreement.

Item 13 **Operating administration or company**

Give the name of the operating administration or company and the postal and telegraphic addresses of the administration to which communications should be sent on urgent matters regarding interference and questions referring to the technical operation of stations (see Article 22).

**Section D. Basic Characteristics to Be Furnished
in Notices Relating to Frequencies Used
by Space Stations for Transmitting**

Item 1 **Assigned frequency (frequencies)**

Indicate the assigned frequency (frequencies), as defined in Article 1 (see No. 142), in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive and in GHz above 10 500 MHz. At least one separate assignment notice should be made out for each antenna radiation beam.

Item 2 Assigned frequency band

Indicate the bandwidth of the assigned frequency band in kHz (see No. 141).

Item 3 Date of bringing into use ¹

a) In the case of a new assignment, indicate the date (actual or foreseen, as appropriate) of bringing the frequency assignment into use.

b) Whenever the assignment is changed in any of its basic characteristics as shown in this Section (except in the case of a change in *Item 4*), the date to be given shall be that of the latest change (actual or foreseen, as appropriate).

Item 4 Identity of the space station(s)

Indicate the identity of the space station(s).

Item 5 Orbital information

a) In the case of a space station aboard a geostationary satellite indicate the nominal geographical longitude on the geostationary-satellite orbit and the planned longitudinal tolerance and inclination excursion. Indicate also in the case where a geostationary satellite is intended to communicate with an earth station:

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

¹ See also Resolution 4.

- 2) the arc of the geostationary-satellite orbit within which the space station could provide the required service to its associated earth stations or service areas;
- 3) in the event that the arc defined in paragraph 2) above is less than the arc defined in paragraph 1) above, provide the reasons therefor.

Note: The arcs specified in 1) and 2) will be indicated by the geographical longitude of the extremes of these arcs on the geostationary-satellite orbit.

b) In the case of space station(s) aboard non-geostationary satellite(s), indicate the angle of inclination of the orbit, the period, the altitudes in kilometres of the apogee and perigee of the space station(s) and the number of satellites used.

Item 6 Service area or receiving station(s)

a) In the case where the associated receiving stations are earth stations, indicate the service area or areas on the Earth or the name of the locality and country or geographical area in which each receiving station is located.

b) In the case where the associated receiving stations are space stations, identify each station by reference to the notification thereof or in any other appropriate manner.

Item 7 Class of station and nature of service

Indicate the class of station and nature of service performed, using the symbols shown in Appendix 10.

Item 8 Class of emission, necessary bandwidth and description of transmission

In accordance with Article 4 and Appendix 6:

- a)* indicate the class of emission of the transmission;

- b)¹ indicate the carrier frequency or frequencies of the transmission;
- c)¹ indicate, for each carrier, the class of emission, necessary bandwidth and description of transmission;
- d)¹ indicate, for the carrier having the smallest bandwidth of assignments in the system, the class of emission, necessary bandwidth and a description of the transmission.

Item 9 Power characteristics of the transmission

- a)¹ Indicate for each carrier the peak envelope power (dBW) supplied to the input of the antenna.
- b) Indicate the total peak envelope power (dBW) and the maximum power density per Hz (dB(W/Hz))² at the input of the antenna, averaged over the worst 4 kHz band for carriers below 15 GHz or averaged over the worst 1 MHz band for carriers above 15 GHz.
- c)¹ Indicate for each carrier the minimum value of the peak envelope power supplied to the input of the antenna.

¹ This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

² The most recent version of CCIR Report 792 should be used to the extent applicable in calculating the maximum power density per Hz.

Item 10 Space station transmitting antenna characteristics

For each service area or antenna radiation beam:

- a) in the case of a space station aboard a geostationary satellite that is intended to communicate with an earth station, indicate the maximum gain of the space station transmitting antenna and the gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite on to a plane perpendicular to the axis from the centre of the Earth to the satellite. The isotropic or absolute gain at each contour which corresponds to a gain of 2, 4, 6, 10 and 20 dB and at 10 dB intervals thereafter, as necessary, below the maximum gain, shall be indicated. Whenever possible the gain contours of the space station transmitting antenna should also be provided in the form of a numerical equation or in tabular form;
- b) in the case of a space station aboard a geostationary satellite in which the antenna radiation beam is directed towards another satellite, or in the case of a space station aboard a non-geostationary satellite, indicate the isotropic or absolute gain of the space station transmitting antenna in the direction of maximum radiation and the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference;
- c)¹ indicate the type of polarization of the radiation emitted by the antenna. In the case of circular polarization, indicate the direction of polarization

¹ This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

(see Nos. 148 and 149). In the case of linear polarization, indicate the angle (in degrees) measured anticlockwise in a plane normal to the beam axis from the equatorial plane to the electric vector of the wave as seen from the satellite;

- d) for a geostationary satellite, indicate the pointing accuracy of the antenna;
- e) in the case of a space station aboard a geostationary satellite operating in a band allocated in the Earth-to-space direction and in the space-to-Earth direction, also indicate the gain of the space station transmitting antenna in the direction of those parts of the geostationary-satellite orbit which are not obstructed by the Earth, by means of a diagram showing estimated antenna gain versus orbit longitude.

Item 11¹ Modulation characteristics

For each carrier, according to the nature of the signal modulating the carrier and the type of modulation, indicate the following characteristics:

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

¹ This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

- b)* carrier frequency modulated by a television signal: indicate the standard of the television signal (including, where appropriate, the standard used for colour), the frequency deviation for the reference frequency of the pre-emphasis characteristic and the pre-emphasis characteristic itself. Also indicate, where applicable, the characteristics of the multiplexing of the video signal with the sound signal(s) or other signal(s);
- c)* carrier phase-shift modulated by a pulse code modulation signal (PCM/PSK): indicate the bit rate and the number of phases;
- d)* amplitude modulated carrier (including single-side-band): indicate as precisely as possible the nature of the modulating signal and the kind of amplitude modulation used;
- e)* for all other types of modulation, provide such particulars as may be useful for an interference study;
- f)* for any type of modulation as applicable, indicate the characteristics of energy dispersal.

***Item 12* Regular hours of operation**

Indicate in UTC the regular hours of operation on the frequency of each carrier.

***Item 13* Coordination**

Give the name of any administration or group of administrations with which the use of the satellite network to which the space station belongs has been successfully coordinated in accordance with No. 1060.

Item 14 **Agreements**

Give also, if appropriate, the name of any administration with which agreement has been effected to exceed the limits prescribed in these Regulations and the contents of such agreement.

Item 15 **Operating administration or company**

Give the name of the operating administration or company and the postal and telegraphic addresses of the administration to which communications should be sent on urgent matters regarding interference, quality of emissions and questions referring to the technical operation of stations (see Article 22).

**Section E. Basic Characteristics to Be Furnished
in Notices Relating to Frequencies to Be Received
by Space Stations**

Item 1 **Assigned frequency (or frequencies)**

Indicate the assigned frequency (frequencies), as defined in Article 1 (see No. 142), in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive and in GHz above 10 500 MHz. At least one separate assignment notice should be made out for each antenna radiation beam.

Item 2 **Assigned frequency band**

Indicate the bandwidth of the assigned frequency band in kHz (see No. 141).

Item 3 Date of bringing into use ¹

a) In the case of a new assignment, indicate the date (actual or foreseen, as appropriate) when reception of the assigned frequency begins.

b) Whenever the assignment is changed in any of its basic characteristics, as shown in this Section (except in the case of a change in *Item 4*), the date to be given shall be that of the latest change (actual or foreseen, as appropriate).

Item 4 Identity of the receiving space station(s)

Indicate the identity of the receiving space station(s).

Item 5 Orbital information

a) In the case of a space station aboard a geostationary satellite, indicate the planned nominal geographical longitude on the geostationary-satellite orbit and the planned longitudinal tolerance and inclination excursion. Indicate also in the case where a geostationary satellite is intended to communicate with an earth station:

- 1) the arc of the geostationary-satellite orbit over which the space station is visible, at a minimum angle of elevation of 10° at the Earth's surface, from its associated earth stations or service areas;
- 2) the arc of the geostationary-satellite orbit within which the space station could provide the required service to its associated earth stations or service areas;

¹ See also Resolution 4.

- 3) in the event that the arc defined in paragraph 2) above is less than the arc defined in paragraph 1) above, provide the reasons therefor.

Note: The arcs specified in 1) and 2) will be indicated by the geographical longitude of the extremes of these arcs on the geostationary-satellite orbit.

- b)* In the case of space station(s) aboard non-geostationary satellite(s), indicate the angle of inclination of the orbit, the period, the altitudes in kilometres of the apogee and perigee of the space station(s) and the number of satellites used.

Item 6 Associated transmitting earth station(s) or space station(s)

Identify the associated transmitting earth station(s) or space station(s) by reference to the notifications thereof or in any other appropriate manner.

Item 7 Class of station and nature of service

Indicate the class of station and nature of service performed, using the symbols shown in Appendix 10.

Item 8 Class of emission, necessary bandwidth and description of the transmission(s) to be received

In accordance with Article 4 and Appendix 6:

- a)* indicate the class of emission of the transmission(s) to be received;
- b)¹* indicate the carrier frequency or frequencies of the transmission(s) to be received;

¹ This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

- c)¹ indicate, for each carrier to be received, the class of emission, necessary bandwidth and description of the transmission(s) to be received.

Item 9 **Space station receiving antenna characteristics**

For each receiving beam:

- a) in the case of a space station aboard a geostationary satellite that is intended to communicate with an earth station, indicate the maximum gain of the space station receiving antenna and the gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite on to a plane perpendicular to the axis from the centre of the Earth to the satellite. The isotropic or absolute gain at each contour which corresponds to a gain of 2, 4, 6, 10 and 20 dB and at 10 dB intervals thereafter, as necessary, below the maximum gain, shall be indicated. Whenever possible the gain contours of the space station receiving antenna should also be provided in the form of a numerical equation or in tabular form;
- b) in the case of a space station aboard a geostationary satellite in which the antenna radiation beam is directed towards another satellite, or in the case of a space station aboard a non-geostationary satellite, indicate the isotropic or absolute gain of the space station receiving antenna in the direction of maximum radiation and indicate the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference;

¹ This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

- c)¹ indicate the type of polarization of the antenna. In the case of circular polarization, indicate the direction of polarization (see Nos. 148 and 149). In the case of linear polarization, indicate the angle (in degrees) measured anticlockwise in a plane normal to the beam axis from the equatorial plane to the electric vector of the wave as seen from the satellite. Indicate also if consent is given to the general use of this information in the determination of the need for coordination with other satellite networks according to Appendix 29;
- d) indicate, for a geostationary satellite, the pointing accuracy of the antenna;
- e) in the case of a space station aboard a geostationary satellite operating in a band allocated in the Earth-to-space direction and in the space-to-Earth direction, also indicate the gain of the space station receiving antenna in the direction of those parts of the geostationary-satellite orbit which are not obstructed by the Earth, by means of a diagram showing estimated antenna gain versus orbit longitude.

Item 10 Noise temperature

Indicate, in kelvins, the total receiving system noise temperature referred to the output of the receiving antenna of the space station.

¹ This information need only be furnished when such information has been used as a basis to effect coordination with another administration.

Item 11 Regular hours of reception

Indicate, in UTC, the regular hours of reception on the frequency of each carrier.

Item 12 Coordination

Give the name of any administration or group of administrations with which the use of the satellite network to which the space station belongs has been successfully coordinated in accordance with No. 1060.

Item 13 Agreements

Give also, if appropriate, the name of any administration with which agreement has been effected to exceed the limits prescribed in these Regulations and the contents of such agreement.

Item 14 Operating administration or company

Give the name of the operating administration or company and the postal and telegraphic addresses of the administration to which communications should be sent on urgent matters regarding interference and questions referring to the technical operation of stations (see Article 22).

**Section F. Basic Characteristics to Be Furnished
in Notices Relating to Frequencies to Be Received
by Radio Astronomy Stations**

Item 1 Observed frequency

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

Item 2 Date of bringing into use

a) Indicate the date (actual or foreseen, as appropriate) when reception of the frequency band begins.

b) Whenever there is a change in any of the basic characteristics, as shown in this Section (except in the case of a change in *Item 3 b)*), the date to be given shall be that of the latest change (actual or foreseen, as appropriate).

Item 3 Name and location of the station

a) Insert the letters "RA".

b) Indicate the name by which the station is known or the name of the locality in which it is situated or both.

c) Indicate the country or geographical area in which the station is located. Symbols from the Preface to the International Frequency List should be used.

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

Item 4 Bandwidth

 Indicate the width of the frequency band (in kHz) observed by the station.

Item 5 Antenna characteristics

 Indicate the antenna type and dimensions, effective area and angular coverage in azimuth and elevation.

Item 6 Regular hours of reception

 Indicate in UTC the regular hours of reception on the observed frequency.

Item 7 Noise temperature

Indicate, in kelvins, the overall receiving system noise temperature referred to the output of the receiving antenna.

Item 8 Class of observations

Indicate the class of observations to be taken on the frequency band shown in *Item 4*. Class A observations are those in which the sensitivity of the equipment is not a primary factor. Class B observations are those of such a nature that they can be made only with advanced low-noise receivers using the best techniques.

Item 9 Operating administration or company

Indicate the identity of the operating administration or company and the postal and telegraphic addresses of the administration to which communications should be sent on urgent matters regarding interference and questions referring to the technical operation of stations (see Article 22).

Section G. Forms of Notice (earth station)

The Board shall develop and keep up to date forms of notice to meet fully the statutory provisions of this Appendix and related decisions of future conferences.

Section H. Forms of Notice (space station)

The Board shall develop and keep up to date forms of notice to meet fully the statutory provisions of this Appendix and related decisions of future conferences.

ANNEX TO APPENDIX 3

Minimum Information Required for Coordination in Accordance with Nos. 1060 and 1107

General Information

- a)** For coordination in accordance with No. 1060:
- for the coordination of (an) assignment(s) to a space station, the information to be provided in Section B or C of Appendix 3 shall be either the characteristics of the actual cooperating earth station of the network, if known, or the characteristics of a typical earth station;
 - for the coordination of (an) assignment(s) to an earth station, supply *Items 4 c)* and *4 e)*, Section A of Appendix 3 if there is no change in the basic characteristics of the assignment(s) to the space station to accommodate the earth station(s). Otherwise, coordination of the frequency assignment(s) to the space station will be required.
- b)** For coordination in accordance with No. 1107, only the items indicated in Columns 9 and 10 of the table are required.
- c)** An “X” in a column of the table indicates that the information is required.

Appendix 3 information
Type of coordination required

Titles of the columns

1. Assignments to transmitting earth station with simple frequency-changing transponder on board the satellite in accordance with No. 1060.
2. Same as 1 in cases requiring independent treatment of the up-link and down-link (e.g. telemetry and telecommand).
3. Assignments to receiving earth station with simple frequency-changing transponder on board the satellite in accordance with No. 1060.
4. Same as 3 in cases requiring independent treatment of the up-link and down-link (e.g. telemetry and telecommand).
5. Assignments to transmitting space station with simple frequency-changing transponder on board the satellite in accordance with No. 1060.
6. Same as 5 in cases requiring independent treatment of the up-link and down-link (e.g. telemetry and telecommand).
7. Assignments to receiving space station with simple frequency-changing transponder on board the satellite in accordance with No. 1060.
8. Same as 7 in cases requiring independent treatment of the up-link and down-link (e.g. telemetry and telecommand).
9. Assignments to transmitting earth station in accordance with No. 1107.
10. Assignments to receiving earth station in accordance with No. 1107.

	1	2	3	4	5	6	7	8	9	10	
Section B Item No.											Section B Item No.
1 + 2	X	X			X				X		1 + 2
3a + 3b									X		3a + 3b
4a + 4b + 4c	X	X			X				X		4a + 4b + 4c
5	X	X			X						5
7a + 8b* + 9a + 9c	X	X			X				X		7a + 8b* + 9a + 9c
9d + 9e + 9f									X		9d + 9e + 9f
Section C Item No.											Section C Item No.
1 + 2			X	X			X			X	1 + 2
3a + 3b									X		3a + 3b
4a + 4b + 4c			X	X			X		X		4a + 4b + 4c
5			X	X			X				5
7a + 8a + 8c			X	X			X		X		7a + 8a + 8c
8d + 8e + 8f									X		8d + 8e + 8f
9a				X					X		9a
9b + 9c			X				X		X		9b + 9c
Section D Item No.											Section D Item No.
1 + 2 + 4 + 5a + 5a1 + 5a2 + 5a3 + 6a + 6b + 8a + 9b* + 10a + 10b** + 10d + 10e**	X				X	X					1 + 2 + 4 + 5a + 5a1 + 5a2 + 5a3 + 6a + 6b + 8a + 9b* + 10a + 10b** + 10d + 10e**
Section E Item No.											Section E Item No.
1 + 2 + 4 + 5a + 5a1 + 5a2 + 5a3 + 6 + 8a + 9a + 9b** + 9d + 9e**			X				X	X			1 + 2 + 4 + 5a + 5a1 + 5a2 + 5a3 + 6 + 8a + 9a + 9b** + 9d + 9e**
10			X					X			10

* Power density only.

** May not always pertain.

APPENDIX 4

Advance Publication Information to Be Furnished for a Satellite Network

(See Article 11)

Section A. General Instructions

- Item 1* Information shall be provided separately for each satellite network.
- Item 2* Information to be furnished for each satellite network shall include general characteristics (Section B), and, as applicable, characteristics in the Earth-to-space direction (Section C), characteristics in the space-to-Earth direction (Section D), and characteristics for space-to-space relay (Section E). In addition, the administration, or one acting on behalf of a group of named administrations submitting the advance information, may provide, as supplementary information, data for interference calculations for the purpose of inter-network coordination (Section F).

Section B. General Characteristics to Be Furnished for a Satellite Network

- Item 1* Identity of the satellite network

Clearly identify the satellite network and, if applicable, identify the satellite system of which it will form a part.

***Item 2* Date of bringing into use ¹**

Indicate the date by which the satellite network is expected to be brought initially into use.

***Item 3* Administration or group of administrations submitting the advance information**

Give the name of the administration or the names of the administrations in the group submitting the advance information on the satellite network and the postal and telegraphic addresses of the administration(s) to which any communication should be sent.

***Item 4* Orbital information relating to the space station(s)**

a) In the case of a space station aboard a geostationary satellite, give the planned nominal geographical longitude on the geostationary-satellite orbit and the planned longitudinal tolerance and inclination excursion. Indicate also:

- 1) the arc of the geostationary-satellite orbit over which the space station is visible, at a minimum angle of elevation of 10° at the Earth's surface, from its associated earth stations or service areas;
- 2) the arc of the geostationary-satellite orbit within which the space station could provide the required service to its associated earth stations or service areas;

¹ See also Resolution 4.

- 3) in the event that the arc defined in paragraph 2) above is less than the arc defined in paragraph 1) above, provide the reasons therefor.

Note: The arcs specified in 1) and 2) will be indicated by the geographical longitude of the extremes of these arcs on the geostationary-satellite orbit.

b) In the case of space station(s) aboard non-geostationary satellite(s), indicate the angle of inclination of the orbit, the period, the altitudes in kilometres of the apogee and perigee of the space station(s) and the number of satellites used having the same characteristics.

Section C. Characteristics of the Satellite Network in the Earth-to-Space Direction

***Item 1* Earth-to-space service area(s)**

Indicate the service area(s) on the Earth associated with each receiving antenna of the space station.

***Item 2* Class of stations and nature of service**

For each Earth-to-space service area, indicate the class of the stations in the satellite network and the nature of the service to be performed, using the symbols shown in Appendix 10.

***Item 3* Frequency range**

For each Earth-to-space service area, indicate the frequency range within which the carriers will be located.

Item 4 Power characteristics of the transmitted wave

- a) For each Earth-to-space service area indicate the maximum spectral power density (dB(W/Hz))¹ to be delivered to the antenna of the transmitting earth stations (the bandwidth over which this is averaged depends on the nature of the service concerned) for each size of transmitting earth station antenna and, if available, the total peak envelope power (dBW) and the necessary bandwidth of this emission.
- b) If available, indicate, for each Earth-to-space service area, the actual radiation pattern (relative to isotropic) of the transmitting earth station antenna having the highest off-beam equivalent isotropically radiated spectral power density for each size of transmitting earth station antenna.
- c) If available, for television carriers and for each Earth-to-space service area, indicate the peak envelope power to be delivered to the input of the earth station transmitting antenna.
- d) If available, indicate the minimum carrier power delivered to the antenna of the earth station for narrow-band carriers.

Item 5 Characteristics of space station receiving antennae

For each Earth-to-space service area:

- a) in the case of a space station aboard a geostationary satellite, indicate the maximum gain of the space station receiving antenna and the gain contours plotted on a map of the Earth's surface

¹ The most recent version of CCIR Report 792 should be used to the extent applicable in calculating the maximum power density per Hz.

preferably using a radial projection from the satellite in a plane perpendicular to the axis from the centre of the Earth to the satellite. The isotropic or absolute gain at each contour which corresponds to a gain of 2, 4, 6, 10 and 20 dB and at 10 dB intervals thereafter, as necessary, below the maximum gain, shall be indicated. Whenever possible the estimated gain contours of the space station receiving antenna should also be provided in the form of a numerical equation or in a tabular form;

- b)* in the case of a space station aboard a non-geostationary satellite, indicate the isotropic or absolute gain of the space station receiving antenna in the direction of maximum radiation and indicate the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference;
- c)* if available, for each space station receiving antenna, indicate the type of polarization of the antenna. In the case of circular polarization, indicate the direction of polarization (see Nos. 148 and 149);
- d)* in the case of a space station aboard a geostationary satellite operating in a band allocated in the Earth-to-space direction and in the space-to-Earth direction, also indicate the estimated gain of the space station receiving antenna in the direction of those parts of the geostationary-satellite orbit which are not obstructed by the Earth by means of a diagram showing estimated antenna gain versus orbit longitude.

Item 6 Noise temperature of the receiving space station

For each Earth-to-space service area, when other than a simple frequency-changing transponder is used aboard the

space station, indicate the lowest total receiving system noise temperature referred to the output of the receiving antenna.

***Item 7* Necessary bandwidth**

If available, in the case of narrow-band carriers, indicate the necessary bandwidth.

***Item 8* Modulation characteristics**

If available, in the case of television carriers, indicate the characteristics of energy dispersal such as the peak-to-peak frequency deviation (MHz) and the sweep frequency (kHz) of the energy dispersal waveform.

**Section D. Characteristics of the Satellite Network
in the Space-to-Earth Direction**

***Item 1* Space-to-Earth service area(s)**

Indicate the service area(s) on the Earth associated with each transmitting antenna of the space station.

***Item 2* Class of stations and nature of service**

For each space-to-Earth service area, indicate the class of the stations in the satellite network and the nature of the service to be performed, using the symbols shown in Appendix 10.

***Item 3* Frequency range**

For each space-to-Earth service area, indicate the frequency range within which the carriers will be located.

Item 4 Power characteristics of the transmission

- a) For each space-to-Earth service area, indicate the maximum spectral power density (dB(W/Hz))¹ to be delivered to the transmitting antenna of the space station (the bandwidth over which this is averaged depends on the nature of the service concerned) and, if available, the total peak envelope power (dBW) and the necessary bandwidth of this emission.
- b) If available, for narrow-band carriers and for television carriers, indicate the peak envelope power to be delivered to the input of the space station transmitting antenna.
- c) If available, indicate the minimum carrier power delivered to the antenna of the space station for narrow-band carriers.

Item 5 Characteristics of space station transmitting antennae

For each space-to-Earth service area:

- a) in the case of a space station aboard a geostationary satellite, indicate the maximum gain of the space station transmitting antenna and the gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite in a plane perpendicular to the axis from the centre of the Earth to the satellite. The isotropic or absolute gain at each contour which corresponds to a gain of 2, 4, 6, 10 and 20 dB and at 10 dB intervals thereafter as necessary, below the maximum gain,

¹ The most recent version of CCIR Report 792 should be used to the extent applicable in calculating the maximum power density per Hz.

shall be indicated. Whenever possible, the estimated gain contours of the space station transmitting antenna should also be provided in the form of a numerical equation or in tabular form;

- b) in the case of a space station aboard a non-geostationary satellite, indicate the isotropic or absolute gain of the space station transmitting antenna in the direction of maximum radiation and indicate the antenna radiation pattern, taking the gain in the direction of maximum radiation as a reference;
- c) if available, for each space station transmitting antenna, indicate the type of polarization of the antenna. In the case of circular polarization, indicate the direction of polarization (see Nos. 148 and 149);
- d) in the case of a space station aboard a geostationary satellite operating in a band allocated in the Earth-to-space direction and in the space-to-Earth direction, also indicate the estimated gain of the space station transmitting antenna in the direction of those parts of the geostationary-satellite orbit which are not obstructed by the Earth by means of a diagram showing estimated antenna gain versus orbit longitude.

Item 6 Characteristics of receiving earth stations

- a) For each space-to-Earth service area, when other than a simple frequency-changing transponder is used aboard the space station, indicate the lowest total receiving system noise temperature on the earth stations referred to the output of the receiving antenna.

For each space-to-Earth service area and for each projected usage¹ when simple frequency-changing transponders are used on the space station, indicate:

- 1) the lowest equivalent satellite link noise temperature and the associated value of transmission gain; *and*
- 2) the values of transmission gain and associated equivalent link noise temperature that correspond to the highest ratio of transmission gain to equivalent satellite link noise temperature. The transmission gain is evaluated from the output of the receiving antenna of the space station to the output of the receiving antenna of the earth station. For each projected usage, indicate also the receiving antenna(e) of the space station to which each simple frequency-changing transponder will be connected.

b) If available, indicate for each space-to-Earth service area the actual radiation pattern (relative to isotropic) of the receiving earth station for each size of receiving earth station antenna having the highest off-beam level. When simple frequency-changing transponders are used on the space station, indicate also, if available, the pattern associated with each equivalent satellite link noise temperature indicated above.

Item 7 Necessary bandwidth

If available, in the case of narrow-band carriers, indicate the necessary bandwidth.

¹ A different usage will be considered to take place when different types of carriers are employed (different by virtue of maximum power spectral density), or when different types of receiving earth stations are employed (different by virtue of receiving antenna gain).

Item 8 **Modulation characteristics**

If available, in the case of television carriers, indicate the characteristics of energy dispersal such as the peak-to-peak frequency deviation (MHz) and the sweep frequency (kHz) of the energy dispersal waveform.

**Section E. Characteristics to Be Furnished
for Space-to-Space Relays**

Where the satellite network is connected to one or more satellite networks by means of space-to-space relay, indicate the following:

- a) identity or identities of the other satellite network(s) to which the satellite network is connected;
- b) transmit and receive frequency bands;
- c) classes of emission;
- d) nominal equivalent isotropically radiated power(s) (e.i.r.p.) on the beam axis.

Section F. Supplementary Information (if available)

Item 1 **General**

Supplementary information may be provided by an administration or one acting on behalf of a group of named administrations who so desire. This information may be used for interference calculations associated with the advance publication process. The information may consist of part or all of the data contained in the following items which are not exhaustive but provide an indication of the type of information which may be supplied.

Item 2 Earth-to-space direction

For each Earth-to-space service area, the following information may be provided:

- a)* class of emission, necessary bandwidth and modulation characteristics (including energy dispersal if employed) for each type of carrier transmitted;
- b)* earth station e.i.r.p. for each type of carrier associated with each type and diameter of earth station antenna;
- c)* technical description and system parameters of telecommand (except for coding data).

Item 3 Space-to-Earth direction

For each space-to-Earth service area, the following information may be provided:

- a)* class of emission, necessary bandwidth and modulation characteristics (including energy dispersal if employed) for each type of carrier;
- b)* satellite transmitter power to be delivered to the satellite transmitting antenna for each type of carrier;
- c)* technical description and system parameters of beacon and space telemetry emissions (except for coding data).

Item 4 Any other information which may be useful

APPENDIX 5

**Information to Be Supplied in Accordance
with Nos. 1682 to 1684**

(See Article 16)



**Initial
allotment**



**Additional
allotment**



**Replacement
allotment
(No. 1721)**

1. Country or area of allotment

2. 2.1 Proposed frequency { Carrier kHz
 { Assigned kHz

- 2.2 Alternative proposed frequency { Carrier kHz
 { Assigned kHz

- 2.3 Frequency to be replaced (No. 1721) { Carrier kHz
 { Assigned kHz

3. 3.1 Main service area

- 3.2 Maximum length of circuit in kilometres

4. Nature of service (e.g. CP, CO, CV or OT)

5. Class of emission

6. Peak envelope power in kW

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7. Transmitting antenna characteristics (for details see Appendix 1):

7.1 In the case of a non-directional antenna, insert the symbol ND

7.2 In the case of a directional antenna, indicate:

a) the azimuth of maximum radiation

b) the angular width of main lobe

c) relative gain of the antenna in dB

8. Planned scheduled hours of operation of the proposed frequency to h (UTC)

9. Indicate, if possible:

a) the estimated peak hours of traffic to h (UTC)

b) the estimated daily volume of traffic in minutes

10. Planned date of first use of channel
(month) (year)

APPENDIX 6

**Additional Characteristics for the Classification of Emissions;
Determination of Necessary Bandwidths Including
Examples for their Calculation and Associated
Examples for the Designation of Emissions**

(See Article 4)

PART A

Additional Characteristics for the Classification of Emissions

Article 4 of these Regulations describes the basic characteristics, with three symbols, for the classification of emissions. For a more complete description of an emission, two optional additional characteristics should be added.

The optional additional characteristics (see also Recommendation 62) are:

Fourth symbol – Details of signal(s)

Fifth symbol – Nature of multiplexing

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

1. *Fourth symbol* – Details of signal(s)
 - 1.1 Two-condition code with elements of differing numbers and/or durations A
 - 1.2 Two-condition code with elements of the same number and duration without error-correction B
 - 1.3 Two-condition code with elements of the same number and duration with error-correction C

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1.4	Four-condition code in which each condition represents a signal element (of one or more bits)	D
1.5	Multi-condition code in which each condition represents a signal element (of one or more bits)	E
1.6	Multi-condition code in which each condition or combination of conditions represents a character	F
1.7	Sound of broadcasting quality (monophonic)	G
1.8	Sound of broadcasting quality (stereophonic or quadraphonic)	H
1.9	Sound of commercial quality (excluding categories given in sub-paragraphs 1.10 and 1.11)	J
1.10	Sound of commercial quality with the use of frequency inversion or band-splitting	K
1.11	Sound of commercial quality with separate frequency-modulated signals to control the level of demodulated signal	L
1.12	Monochrome	M
1.13	Colour	N
1.14	Combination of the above	W
1.15	Cases not otherwise covered	X
2.	<i>Fifth symbol</i> – Nature of multiplexing	
2.1	None	N
2.2	Code-division multiplex *	C
2.3	Frequency-division multiplex	F

* This includes bandwidth expansion techniques.

2.4	Time-division multiplex	T
2.5	Combination of frequency-division multiplex and time-division multiplex	W
2.6	Other types of multiplexing	X

PART B

Determination of Necessary Bandwidths Including Examples for their Calculation and Associated Examples for the Designation of Emissions

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

- 1) use of the formulae included in the following table which also gives examples of necessary bandwidths and designation of corresponding emissions;
- 2) computation in accordance with CCIR Recommendations¹;
- 3) measurement, in cases not covered by 1) or 2) above.

However, the necessary bandwidth so determined is not the only characteristic of an emission to be considered in evaluating the interference that may be caused by that emission.

¹ See also Recommendation 63.

In the formulation of the table, the following terms have been employed :

- B_n = Necessary bandwidth in hertz
- B = Modulation rate in bauds
- N = Maximum possible number of black plus white elements to be transmitted per second, in facsimile
- M = Maximum modulation frequency in hertz
- C = Sub-carrier frequency in hertz
- D = Peak deviation, i.e., half the difference between the maximum and minimum values of the instantaneous frequency. The instantaneous frequency in hertz is the time rate of change in phase in radians divided by 2π
- t = Pulse duration in seconds at half-amplitude
- t_r = Pulse rise time in seconds between 10% and 90% amplitude
- K = An overall numerical factor which varies according to the emission and which depends upon the allowable signal distortion
- N_c = Number of baseband channels in radio systems employing multi-channel multiplexing
- f_p = Continuity pilot sub-carrier frequency (Hz) (continuous signal utilized to verify performance of frequency-division multiplex systems).

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
I. NO MODULATING SIGNAL			
Continuous wave emission	—	—	NONE
II. AMPLITUDE MODULATION			
1. Signal with Quantized or Digital Information			
Continuous wave telegraphy, Morse code	$B_n = BK$ $K = 5$ for fading circuits $K = 3$ for non-fading circuits	25 words per minute; $B = 20, K = 5$ Bandwidth: 100 Hz	100HA1AAN
Telegraphy by on-off keying of a tone modulated carrier, Morse code	$B_n = BK + 2M$ $K = 5$ for fading circuits $K = 3$ for non-fading circuits	25 words per minute; $B = 20, M = 1\ 000$ $K = 5$ Bandwidth: 2 100 Hz = 2.1 kHz	2K10A2AAN
Selective calling signal using sequential single frequency code, single-sideband full carrier	$B_n = M$	Maximum code frequency is: 2 110 Hz $M = 2\ 110$ Bandwidth: 2 110 Hz = 2.11 kHz	2K11H2BFN
Direct-printing telegraphy using a frequency shifted modulating sub-carrier, with error-correction, single-sideband, suppressed carrier (single channel)	$B_n = 2M + 2DK$ $M = \frac{B}{2}$	$B = 50$ $D = 35$ Hz (70 Hz shift) $K = 1.2$ Bandwidth: 134 Hz	134HJ2BCN

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
Telegraphy, multi-channel with voice frequency, error-correction, some channels are time-division multiplexed, single-sideband, reduced carrier	$B_n = \text{highest central frequency} + M + DK$ $M = \frac{B}{2}$	15 channels; highest central frequency is: 2 805 Hz $B = 100$ $D = 42.5 \text{ Hz}$ (85 Hz shift) $K = 0.7$ Bandwidth: 2 885 Hz = 2.885 kHz	2K89R7BCW
2. Telephony (Commercial Quality)			
Telephony, double-sideband (single channel)	$B_n = 2M$	$M = 3\,000$ Bandwidth: 6 000 Hz = 6 kHz	6K00A3EJN
Telephony, single-sideband, full carrier (single channel)	$B_n = M$	$M = 3\,000$ Bandwidth: 3 000 Hz = 3 kHz	3K00H3EJN
Telephony, single-sideband, suppressed carrier (single channel)	$B_n = M - \text{lowest modulation frequency}$	$M = 3\,000$ lowest modulation frequency is 300 Hz Bandwidth: 2 700 Hz = 2.7 kHz	2K70J3EJN
Telephony with separate frequency modulated signal to control the level of demodulated speech signal, single-sideband, reduced carrier (Lincompex) (single channel)	$B_n = M$	Maximum control frequency is 2 990 Hz $M = 2\,990$ Bandwidth: 2 990 Hz = 2.99 kHz	2K99R3ELN
Telephony with privacy, single-sideband, suppressed carrier (two or more channels)	$B_n = N_c M - \text{lowest modulation frequency in the lowest channel}$	$N_c = 2$ $M = 3\,000$ lowest modulation frequency is 250 Hz Bandwidth: 5 750 Hz = 5.75 kHz	5K75J8EKF

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
Telephony, independent sideband (two or more channels)	$B_n = \text{sum of } M \text{ for each sideband}$	2 channels $M = 3\,000$ Bandwidth: 6 000 Hz = 6 kHz	6K00B8EJN
3. Sound Broadcasting			
Sound broadcasting, double-sideband	$B_n = 2M$ M may vary between 4 000 and 10 000 depending on the quality desired	Speech and music, $M = 4\,000$ Bandwidth: 8 000 Hz = 8 kHz	8K00A3EGN
Sound broadcasting, single-sideband, reduced carrier (single channel)	$B_n = M$ M may vary between 4 000 and 10 000 depending on the quality desired	Speech and music, $M = 4\,000$ Bandwidth: 4 000 Hz = 4 kHz	4K00R3EGN
Sound broadcasting, single-sideband, suppressed carrier	$B_n = M - \text{lowest modulation frequency}$	Speech and music, $M = 4\,500$ lowest modulation frequency = 50 Hz; Bandwidth: 4 450 Hz = 4.45 kHz	4K45J3EGN
4. Television			
Television, vision and sound	Refer to relevant CCIR documents for the bandwidths of the commonly used television systems	Number of lines = 625; Nominal video bandwidth: 5 MHz Sound carrier relative to video carrier = 5.5 MHz; Total vision bandwidth: 6.25 MHz; FM sound bandwidth including guardbands: 750 kHz RF channel bandwidth: 7 MHz	6M25C3F -- 750KF3EGN

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
5. Facsimile			
Analogue facsimile by sub-carrier frequency modulation of a single-sideband emission with reduced carrier, monochrome	$B_n = C + \frac{N}{2} + DK$ $K = 1.1$ (typically)	$N = 1\ 100$ corresponding to an index of cooperation of 352 and a cyler rotation speed of 60 rpm. Index of cooperation is the product of the drum diameter and number of lines per unit length. $C = 1\ 900$ $D = 400$ Hz Bandwidth: 2 890 Hz = 2.89 kHz	2K89R3CMN
Analogue facsimile; frequency modulation of an audio frequency sub-carrier which modulates the main carrier, single-sideband suppressed carrier	$B_n = 2M + 2DK$ $M = \frac{N}{2}$ $K = 1.1$ (typically)	$N = 1\ 100$ $D = 400$ Hz Bandwidth: 1 980 Hz = 1.98 kHz	1K98J3C --
6. Composite Emissions			
Double-sideband, television relay	$B_n = 2C + 2M + 2D$	Video limited to 5 MHz, audio on 6.5 MHz frequency modulated sub-carrier, sub-carrier deviation = 50 kHz: $C = 6.5 \times 10^6$ $D = 50 \times 10^3$ Hz $M = 15\ 000$ Bandwidth: 13.13×10^6 Hz = 13.13 MHz	13M1A8W --

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
Double-sideband radio-relay system, frequency division multiplex	$B_n = 2M$	10 voice channels occupying baseband between 1 kHz and 164 kHz; $M = 164\ 000$ Bandwidth: 328 000 Hz = 328 kHz	328KA8E --
Double-sideband emission of VOR with voice (VOR = VHF omnidirectional radio range)	$B_n = 2C_{max} + 2M + 2DK$ $K = 1$ (typically)	The main carrier is modulated by: – a 30 Hz sub-carrier – a carrier resulting from a 9 960 Hz tone frequency modulated by a 30 Hz tone – a telephone channel – a 1 020 Hz keyed tone for continual Morse identification. $C_{max} = 9\ 960$ $M = 30$ $D = 480$ Hz Bandwidth: 20 940 Hz = 20.94 kHz	20K9A9WWF
Independent sidebands; several telegraph channels with error-correction together with several telephone channels with privacy; frequency division multiplex	$B_n = \text{sum of } M \text{ for each sideband}$	Normally composite systems are operated in accordance with standardized channel arrangements (e.g. CCIR Rec. 348-2). 3 telephone channels and 15 telegraphy channels require the bandwidth 12 000 Hz = 12 kHz	12K0B9WWF

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
III-A. FREQUENCY MODULATION			
1. Signal with Quantized or Digital Information			
Telegraphy without error-correction (single channel)	$B_n = 2M + 2DK$ $M = \frac{B}{2}$ $K = 1.2$ (typically)	$B = 100$ $D = 85 \text{ Hz}$ (170 Hz shift) Bandwidth: 304 Hz	304HF1BBN
Telegraphy, narrow-band direct-printing with error-correction (single channel)	$B_n = 2M + 2DK$ $M = \frac{B}{2}$ $K = 1.2$ (typically)	$B = 100$ $D = 85 \text{ Hz}$ (170 Hz shift) Bandwidth: 304 Hz	304HF1BCN
Selective calling signal	$B_n = 2M + 2DK$ $M = \frac{B}{2}$ $K = 1.2$ (typically)	$B = 100$ $D = 85 \text{ Hz}$ (170 Hz shift) Bandwidth: 304 Hz	304HF1BCN
Four-frequency duplex telegraphy	$B_n = 2M + 2DK$ $B =$ Modulation rate in bauds of the faster channel. If the channels are synchronized: $M = \frac{B}{2}$ (otherwise $M = 2B$) $K = 1.1$ (typically)	Spacing between adjacent frequencies = 400 Hz; Synchronized channels $B = 100$ $M = 50$ $D = 600 \text{ Hz}$ Bandwidth: 1 420 Hz = 1.42 kHz	1K42F7BDX
2. Telephony (Commercial Quality)			
Commercial telephony	$B_n = 2M + 2DK$ $K = 1$ (typically, but under certain conditions a higher value may be necessary)	For an average case of commercial telephony, $D = 5\ 000 \text{ Hz}$ $M = 3\ 000$ Bandwidth: 16 000 Hz = 16 kHz	16K0F3EJN

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
3. Sound Broadcasting			
Sound broadcasting	$B_n = 2M + 2DK$ $K = 1$ (typically)	Monaural $D = 75\,000\text{ Hz}$ $M = 15\,000$ Bandwidth: $180\,000\text{ Hz}$ $= 180\text{ kHz}$	180KF3EGN
4. Facsimile			
Facsimile by direct frequency modulation of the carrier; black and white	$B_n = 2M + 2DK$ $M = \frac{N}{2}$ $K = 1.1$ (typically)	$N = 1\,100\text{ elements/sec;}$ $D = 400\text{ Hz}$ Bandwidth: $1\,980\text{ Hz}$ $= 1.98\text{ kHz}$	1K98F1C --
Analogue facsimile	$B_n = 2M + 2DK$ $M = \frac{N}{2}$ $K = 1.1$ (typically)	$N = 1\,100\text{ elements/sec;}$ $D = 400\text{ Hz}$ Bandwidth: $1\,980\text{ Hz}$ $= 1.98\text{ kHz}$	1K98F3C --
5. Composite Emissions (see Table III-B)			
Radio-relay system, frequency division multiplex	$B_n = 2f_p + 2DK$ $K = 1$ (typically)	60 telephone channels occupying baseband between 60 kHz and 300 kHz; rms per-channel deviation: 200 kHz; continuity pilot at 331 kHz produces 100 kHz rms deviation of main carrier. $D = 200 \times 10^3 \times 3.76 \times 2.02 = 1.52 \times 10^6\text{ Hz;}$ $f_p = 0.331 \times 10^6\text{ Hz;}$ Bandwidth: $3.702 \times 10^6\text{ Hz}$ $= 3.702\text{ MHz}$	3M70F8EJF

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
Radio-relay system, frequency division multiplex	$B_n = 2M + 2DK$ $K = 1$ (typically)	960 telephone channels occupying baseband between 60 kHz and 4 028 kHz; rms per-channel deviation: 200 kHz; continuity pilot at 4 715 kHz produces 140 kHz rms deviation of main carrier. $D = 200 \times 10^3 \times 3.76 \times 5.5 = 4.13 \times 10^6 \text{ Hz};$ $M = 4.028 \times 10^6;$ $f_p = 4.715 \times 10^6;$ $(2M + 2DK) > 2f_p$ Bandwidth: $16.32 \times 10^6 \text{ Hz}$ $= 16.32 \text{ MHz}$	16M3F8EJF
Radio-relay system, frequency division multiplex	$B_n = 2f_p$	600 telephone channels occupying baseband between 60 kHz and 2 540 kHz; rms per-channel deviation: 200 kHz; continuity pilot at 8 500 kHz produces 140 kHz rms deviation of main carrier. $D = 200 \times 10^3 \times 3.76 \times 4.36 = 3.28 \times 10^6 \text{ Hz};$ $M = 2.54 \times 10^6;$ $K = 1;$ $f_p = 8.5 \times 10^6;$ $(2M + 2DK) < 2f_p$ Bandwidth: $17 \times 10^6 \text{ Hz}$ $= 17 \text{ MHz}$	17M0F8EJF
Stereophonic sound broadcasting with multiplexed subsidiary telephony sub-carrier	$B_n = 2M + 2DK$ $K = 1$ (typically)	Pilot tone system; $M = 75\ 000$ $D = 75\ 000 \text{ Hz}$ Bandwidth: $300\ 000 \text{ Hz}$ $= 300 \text{ kHz}$	300KF8EHF

III-B. MULTIPLYING FACTORS FOR USE IN COMPUTING D , PEAK FREQUENCY DEVIATION, IN FM FREQUENCY DIVISION MULTIPLEX (FM/FDM) MULTI-CHANNEL EMISSIONS

For FM/FDM systems the necessary bandwidth is:

$$B_n = 2M + 2DK$$

The value of D , or peak frequency deviation, in these formulae for B_n is calculated by multiplying the rms value of per-channel deviation by the appropriate "Multiplying factor" shown below.

In the case where a continuity pilot of frequency f_p exists above the maximum modulation frequency M , the general formula becomes:

$$B_n = 2f_p + 2DK$$

In the case where the modulation index of the main carrier produced by the pilot is less than 0.25, and the rms frequency deviation of the main carrier produced by the pilot is less than or equal to 70% of the rms value of per-channel deviation, the general formula becomes either

$$B_n = 2f_p \quad \text{or} \quad B_n = 2M + 2DK$$

whichever is greater.

Number of telephone channels N_c	Multiplying factor ¹	
	(peak factor) x antilog	$\left[\frac{\text{value in dB above modulation reference level}}{20} \right]$
$3 < N_c < 12$	4.47 x antilog	$\left[\frac{\text{a value in dB specified by the equipment manufacturer or station licensee, subject to administration approval}}{20} \right]$
$12 \leq N_c < 60$	3.76 x antilog	$\left[\frac{2.6 + 2 \log N_c}{20} \right]$

¹ In the above chart, the multipliers 3.76 and 4.47 correspond to peak factors of 11.5 dB and 13.0 dB, respectively.

Number of telephone channels N_c	Multiplying factor ¹	
	(peak factor) x antilog	$\left[\frac{\text{value in dB above modulation reference level}}{20} \right]$
$60 \leq N_c < 240$	3.76 x antilog	$\left[\frac{-1 + 4 \log N_c}{20} \right]$
$N_c \geq 240$	3.76 x antilog	$\left[\frac{-15 + 10 \log N_c}{20} \right]$

¹ In the above chart, the multiplier 3.76 corresponds to a peak factor of 11.5 dB.

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
IV. PULSE MODULATION			
1. Radar			
Unmodulated pulse emission	$B_n = \frac{2K}{t}$ K depends upon the ratio of pulse duration to pulse rise time. Its value usually falls between 1 and 10 and in many cases it does not need to exceed 6	Primary Radar Range resolution: 150 m $K = 1.5$ (triangular pulse where $t \approx t_r$, only components down to 27 dB from the strongest are considered) $\text{Then } t = \frac{2 \times (\text{range resolution})}{\text{velocity of light}}$ $= \frac{2 \times 150}{3 \times 10^8}$ $= 1 \times 10^{-6} \text{ seconds}$ Bandwidth: $3 \times 10^6 \text{ Hz}$ $= 3 \text{ MHz}$	3M00P0NAN
2. Composite Emissions			
Radio-relay system	$B_n = \frac{2K}{t}$ $K = 1.6$	Pulse position modulated by 36 voice channel baseband; pulse width at half amplitude $= 0.4 \mu\text{s}$ Bandwidth: $8 \times 10^6 \text{ Hz}$ $= 8 \text{ MHz}$ (Bandwidth independent of the number of voice channels)	8M00M7EJT

APPENDIX 7

Table of Transmitter Frequency Tolerances

(See Article 5)

1. Frequency tolerance is defined in Article 1 and is expressed in parts in 10^6 , unless otherwise indicated.
2. The power shown for the various categories of stations is the peak envelope power for single-sideband transmitters and the mean power for all other transmitters, unless otherwise indicated. The term "power of a radio transmitter" is defined in Article 1.
3. For technical and operational reasons, certain categories of stations may need more stringent tolerances than those shown in the table.

Frequency Bands (lower limit exclusive, upper limit inclusive) and Categories of Stations	Tolerances applicable until 1 January 1990 to transmitters in use and to those to be installed before 2 January 1985	Tolerances applicable to new transmitters installed after 1 January 1985 and to all transmitters after 1 January 1990
1	2	3
Band: 9 kHz to 535 kHz		
1. Fixed Stations:		
— 9 kHz to 50 kHz	1 000	100
— 50 kHz to 535 kHz	200	50
2. Land Stations:		
a) Coast Stations:		100 1)
— power 200 W or less	500 2)	
— power above 200 W	200 2)	
b) Aeronautical Stations	100	100

1	2	3
3. Mobile Stations: a) Ship Stations b) Ship's Emergency Transmitters c) Survival Craft Stations d) Aircraft Stations 4. Radiodetermination Stations 5. Broadcasting Stations	1 000 3) 5 000 5 000 500 100 10 Hz	200 4) 500 5) 500 100 100 10 Hz
Band: 535 kHz to 1 606.5 kHz (1 605 kHz in Region 2) Broadcasting Stations	10 Hz 6)	10 Hz 6)
Band: 1 606.5 kHz (1 605 kHz in Region 2) to 4 000 kHz 1. Fixed Stations: — power 200 W or less — power above 200 W 2. Land Stations: — power 200 W or less — power above 200 W 3. Mobile Stations: a) Ship Stations b) Survival Craft Stations c) Emergency Position-Indicating Radiobeacons d) Aircraft Stations e) Land Mobile Stations 4. Radiodetermination Stations: — power 200 W or less — power above 200 W 5. Broadcasting Stations	100 50 100 2) 9) 10) 50 2) 9) 10) 200 3) 11) 300 300 100 10) 200 100 50 20	100 7) 8) 50 7) 8) 100 1) 7) 10) 50 1) 7) 10) 40 Hz 12) 100 100 100 10) 50 13) 20 14) 10 14) 10 Hz 15)

1	2	3
Band: 4 MHz to 29.7 MHz		
1. Fixed Stations:		
— power 500 W or less	50	
— power above 500 W	15	
a) Single-sideband and independent-sideband emissions:		
— power 500 W or less		50 Hz
— power above 500 W		20 Hz
b) Class F1B emissions		
		10 Hz
c) Other classes of emission:		
— power 500 W or less		20
— power above 500 W		10
2. Land Stations:		
a) Coast Stations:		
— power 500 W or less	50 2) 9)	20 Hz 1) 16)
— power above 500 W and less than or equal to 5 kW	30 2) 9)	
— power above 5 kW	15 2) 9)	
b) Aeronautical Stations:		
— power 500 W or less	100 10)	100 10)
— power above 500 W	50 10)	50 10)
c) Base Stations:		
— power 500 W or less	100	20 7)
— power above 500 W	50	
3. Mobile Stations:		
a) Ship Stations:		
1) Class A1A emissions	50 17) 18)	10
2) Emissions other than Class A1A	50 3) 11)	50 Hz 4) 19)

1	2	3
<i>b) Survival Craft Stations</i>	200	50
<i>c) Aircraft Stations</i>	100 10)	100 10)
<i>d) Land Mobile Stations</i>	200	40 20)
<i>4. Broadcasting Stations</i>	15	10 Hz 15) 21)
<i>5. Space Stations</i>		20
<i>6. Earth Stations</i>		20
Band: 29.7 MHz to 100 MHz		
<i>1. Fixed Stations:</i>		
— power 200 W or less	50	
— power above 200 W	30	
— power 50 W or less		30
— power above 50 W		20
<i>2. Land Stations:</i>		20
— power 15 W or less	50	
— power above 15 W	20	
<i>3. Mobile Stations:</i>		20 22)
— power 5 W or less	100	
— power above 5 W	50	
<i>4. Radiotermination Stations</i>	200	50
<i>5. Broadcasting Stations (other than television):</i>		2 000 Hz 23)
— power 50 W or less	50	
— power above 50 W	20	

1	2	3
6. Broadcasting Stations <i>(television sound and vision):</i> — power 50 W or less — power above 50 W 7. Space Stations 8. Earth Stations	 100 1 000 Hz	500 Hz 24) 25) 20 20
Band: 100 MHz to 470 MHz 1. Fixed Stations: — power 50 W or less — power above 50 W 2. Land Stations: a) Coast Stations b) Aeronautical Stations c) Base Stations: — power 5 W or less — power above 5 W — in the band 100 - 235 MHz — in the band 235 - 401 MHz — in the band 401 - 470 MHz 3. Mobile Stations: a) Ship Stations and Survival Craft Stations: — in the band 156 - 174 MHz — outside the band 156 - 174 MHz b) Aircraft Stations c) Land Mobile Stations: — power 5 W or less — power above 5 W	 50 20 20 27) 50 50 20 20 27) 50 30) 31) 50 50 20	 20 26) 10 10 20 28) 15 29) 7 29) 5 29) 10 50 31) 30 28)

1	2	3
— in the band 100 - 235 MHz — in the band 235 - 401 MHz — in the band 401 - 470 MHz		15 29) 7 29) 32) 5 29) 32)
4. <i>Radiodetermination Stations</i>	50 30) 33)	50 33)
5. <i>Broadcasting Stations (other than television)</i>	20	2 000 Hz 23)
6. <i>Broadcasting Stations (television sound and vision):</i>		500 Hz 24) 25)
— power 100 W or less — power above 100 W	100 1 000 Hz	
7. <i>Space Stations</i>		20
8. <i>Earth Stations</i>		20
Band: 470 MHz to 2 450 MHz		
1. <i>Fixed Stations:</i>		
— power 100 W or less — power above 100 W	300 34) 100 35)	100 50
2. <i>Land Stations</i>	300	20 36)
3. <i>Mobile Stations</i>	300	20 36)
4. <i>Radiodetermination Stations</i>	500 33)	500 33)
5. <i>Broadcasting Stations (other than television)</i>	100	100
6. <i>Broadcasting Stations (television sound and vision) in the band 470 MHz to 960 MHz:</i>		500 Hz 24) 25)
— power 100 W or less — power above 100 W	100 1 000 Hz	
7. <i>Space Stations</i>		20
8. <i>Earth Stations</i>		20

1	2	3
Band: 2 450 MHz to 10 500 MHz		
1. Fixed Stations:		
— power 100 W or less	300 34)	200
— power above 100 W	100 35)	50
2. Land Stations	300	100
3. Mobile Stations	300	100
4. Radiodetermination Stations	2 000 33)	1 250 33)
5. Space Stations		50
6. Earth Stations		50
Band: 10.5 GHz to 40 GHz		
1. Fixed Stations	500	300
2. Radiodetermination Stations	7 500 33)	5 000 33)
3. Broadcasting Stations		100
4. Space Stations		100
5. Earth Stations		100

Notes in the Table of Transmitter Frequency Tolerances

1) For coast station transmitters used for direct-printing telegraphy or for data transmission, the tolerance is 15 Hz.

2) For coast station transmitters used for direct-printing telegraphy and for data transmission the tolerance is 15 Hz. This tolerance is applicable to equipment installed after 1 January 1976 and to all equipment after 1 January 1985. For equipment installed before 2 January 1976 the tolerance is 40 Hz.

3) For ship station transmitters used for direct-printing telegraphy or for data transmission, the tolerance is 40 Hz. This tolerance is applicable to equipment installed after 1 January 1976 and to all equipment after 1 January 1985. For equipment installed before 2 January 1976 the tolerance is 100 Hz (with a maximum deviation of 40 Hz for short periods of the order of 15 minutes).

4) For ship station transmitters used for direct-printing telegraphy or for data transmission, the tolerance is 40 Hz.

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

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

7) For single-sideband radiotelephone transmitters the tolerance is:

- in the bands 1 606.5 (1 605 Region 2) - 4 000 kHz and 4 - 29.7 MHz for peak envelope powers of 200 W or less and 500 W or less, respectively, 50 Hz;
- in the bands 1 606.5 (1 605 Region 2) - 4 000 kHz and 4 - 29.7 MHz for peak envelope powers above 200 W and 500 W, respectively, 20 Hz.

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

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

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

- a) for all aeronautical stations, 10 Hz;
- b) for all aircraft stations operating on international services, 20 Hz;
- c) for aircraft stations operating exclusively on national services, 50 Hz*.

11) For ship station single-sideband radiotelephone transmitters the tolerance is:

- a) in the band 1 606.5 (1 605 Region 2) - 4 000 kHz:
 - 100 Hz for transmitters in use or to be installed before 2 January 1982;
 - 50 Hz for transmitters installed after 1 January 1982, but before 1 January 1985;
- b) in the band 4 000 - 23 000 kHz:
 - 100 Hz for transmitters in use before 2 January 1978;
 - 50 Hz for transmitters installed after 1 January 1978.

(See also Appendix 17.)

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

12) For A1A emissions the tolerance is 50 parts in 10^6 .

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

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

15) For A3E transmitters with carrier power of 10 kW or less the tolerance is 20 parts in 10^6 and 15 parts in 10^6 in the bands 1 606.5 (1 605 Region 2) - 4 000 kHz and 4 - 29.7 MHz respectively.

16) For A1A emissions the tolerance is 10 parts in 10^6 .

17) In the A1A Morse working frequency bands, a frequency tolerance of 200 parts in 10^6 may be applicable to existing transmitters, provided that the emissions are contained within the band in question.

18) In the A1A Morse calling frequency bands frequency tolerances of 40 parts in 10^6 in the bands between 4 MHz and 23 MHz and of 30 parts in 10^6 in the 25 MHz band are recommended as far as possible.

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

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

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

22) For non-vehicular mounted portable equipment with a transmitter mean power not exceeding 5 W, the tolerance is 40 parts in 10^6 .

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

24) In the case of television stations of:

- 50 W (vision peak envelope power) or less in the band 29.7 - 100 MHz;
- 100 W (vision peak envelope power) or less in the band 100 - 960 MHz

AP7-10

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

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

- 5 kHz in the band 100 - 470 MHz;
- 10 kHz in the band 470 - 960 MHz.

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

26) For multi-hop radio-relay systems employing direct frequency conversion the tolerance is 30 parts in 10^6 .

27) For coast and ship station transmitters in the band 156 - 174 MHz put into service after 1 January 1973 a tolerance of 10 parts in 10^6 shall apply. This tolerance is applicable to all transmitters, including survival craft stations, after 1 January 1983.

28) For a channel spacing of 50 kHz the tolerance is 50 parts in 10^6 .

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

30) This tolerance is not applicable to survival craft stations operating on the frequency 243 MHz.

31) For transmitters used by on-board communication stations a tolerance of 5 parts in 10^6 shall apply.

32) For non-vehicular mounted portable equipment with a transmitter mean power not exceeding 5 W the tolerance is 15 parts in 10^6 .

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

34) For transmitters using time-division multiplex the tolerance of 300 may be increased to 500.

35) This tolerance applies only to such emissions for which the necessary bandwidth does not exceed 3 000 kHz; for larger bandwidth emissions a tolerance of 300 applies.

36) In applying this tolerance administrations should be guided by the latest relevant CCIR Recommendations.

APPENDIX 8

**Table of Maximum Permitted Spurious
Emission Power Levels**

(See Article 5)

1. The following table indicates 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.
2. Spurious emission from any part of the installation other than the antenna and its transmission line shall not have an effect greater than would occur if this antenna system were supplied with the maximum permitted power at that spurious emission frequency.
3. These levels shall not, however, apply to emergency position-indicating radiobeacon (EPIRB) stations, emergency locator transmitters, ships' emergency transmitters, lifeboat transmitters, survival craft stations or maritime transmitters when used in emergency situations.
4. For technical or operational reasons, specific services may demand more stringent levels than those specified in the table. The levels applied to these services shall be those agreed upon by the appropriate world administrative radio conference. More stringent levels may also be fixed by specific agreement between the administrations concerned.
5. For radiodetermination stations, until acceptable methods of measurement exist, the lowest practicable power of spurious emission should be achieved.

Frequency Band Containing the Assignment (lower limit exclusive, upper limit inclusive)	For any spurious component the attenuation (mean power within the necessary bandwidth relative to the mean power of the spurious component concerned) shall be at least that specified in Columns A and B below and the absolute mean power levels given shall not be exceeded (Note 1)	
	A	B
	Levels applicable until 1 January 1994 to transmitters now in use and to those installed before 2 January 1985	Levels applicable to transmitters installed after 1 January 1985 and to all transmitters after 1 January 1994
9 kHz to 30 MHz	40 decibels 50 milliwatts (Notes 2, 3, 4)	40 decibels 50 milliwatts (Notes 4, 7, 8)
30 MHz to 235 MHz — mean power above 25 watts — mean power 25 watts or less	60 decibels 1 milliwatt (Note 5) 40 decibels 25 microwatts (Notes 5, 6)	60 decibels 1 milliwatt (Note 9) 40 decibels 25 microwatts

(continued)

(continued)

235 MHz to 960 MHz — mean power above 25 watts — mean power 25 watts or less	No level is specified for transmitters operating on assigned frequencies above 235 MHz. For these transmitters the power of spurious emissions shall be as low as practicable.	60 decibels 20 milliwatts (Notes 10, 11) 40 decibels 25 microwatts (Notes 10, 11)
960 MHz to 17.7 GHz — mean power above 10 watts — mean power 10 watts or less		50 decibels 100 milliwatts (Notes 10, 11, 12, 13) 100 microwatts (Notes 10, 11, 12, 13)
Above 17.7 GHz		Due to the diverse nature of technologies employed by services operating above 17.7 GHz, further study by the CCIR is required prior to the specification of levels. To the extent possible, the values to be observed should be those shown in appropriate CCIR Recommendations. Until suitable Recommendations have been adopted, the lowest possible values achievable shall be employed (see Recommendation 66).

**Notes in the Table of Maximum Permitted
Spurious Emission Power Levels**

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

2) For transmitters of mean power exceeding 50 kilowatts and which operate below 30 MHz over a frequency range approaching an octave or more, a reduction below 50 milliwatts is not mandatory, but a minimum attenuation of 60 decibels shall be provided and every effort should be made to comply with the level of 50 milliwatts.

3) For hand-portable equipment of mean power less than 5 watts which operates below 30 MHz, the attenuation shall be at least 30 decibels, but every effort should be made to attain 40 decibels attenuation.

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

5) For frequency modulated maritime mobile radiotelephone equipment which operates above 30 MHz, the mean power of any spurious emission falling in any other international maritime mobile channel, due to products of modulation, shall not exceed a level of 10 microwatts and the mean power of any other spurious emission on any discrete frequency within the international maritime mobile band shall not exceed a level of 2.5 microwatts. Where, exceptionally, transmitters of mean power above 20 watts are employed, these levels may be increased in proportion to the mean power of the transmitter.

6) For transmitters having a mean power of less than 100 milliwatts, it is not mandatory to comply with an attenuation of 40 decibels provided that the mean power level does not exceed 10 microwatts.

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

8) For hand-portable equipment of mean power less than 5 watts, the attenuation shall be 30 decibels, but every practicable effort should be made to attain 40 decibels attenuation.

9) Administrations may adopt a level of 10 milliwatts provided that harmful interference is not caused.

10) Where several transmitters feed a common antenna or closely spaced antennae on neighbouring frequencies, every practicable effort should be made to comply with the levels specified.

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

12) These levels are not applicable to systems using digital modulation techniques, but may be used as a guide. Values for these systems may be provided by the relevant CCIR Recommendations, when available (see Recommendation 66).

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

APPENDIX 9

Service Documents¹

(See Articles 10, 12, 13, 17 and 26)

List I. International Frequency List

The IFRB shall establish and keep up to date the column headings of the International Frequency List to meet fully the statutory provisions of Appendices 1 and 3 and related decisions of future conferences. Furthermore, the IFRB shall introduce the necessary improvements in the presentation of the list, without in any way altering the basic data specified in the Radio Regulations.

List II. List of Fixed Stations Operating International Circuits

Names of countries arranged in alphabetical order of abbreviations.
Names of stations in alphabetical order.

Name of the transmitting station	Call sign (identification)	Assigned frequency (kHz or MHz)	Locality(ies) or area(s) with which communication is established	Remarks
1	2	3	4	5

¹ The format of these documents may be modified as the situation requires.

List IV. List of Coast Stations*Part I. Tables of general or specific interest**Part II. Alphabetical index of coast stations*

Name of the station	See Part III page	Name of the station	See Part III page	Name of the station	See Part III page

Part III. Particulars of coast stations

Names of countries arranged in alphabetical order of abbreviations.
Names of stations in alphabetical order.

Name of the station ¹		Call sign ^{2, 3}		Emission			Service		Charges ^{9, 10}	Geographical coordinates of the transmitting antenna (longitude and latitude in degrees, minutes and seconds)	Remarks ^{11, 12}
Frequencies kHz or MHz	Class			Power (kW) ⁶	Nature ^{7, 8}	Hours of service (UTC)					
1	2	3a ⁴	3b ⁵	4	5	6	7	8	9	10	

- ¹ Indicate for each country the coast station or coast stations to which radiotelegrams intended for high-frequency transmission to ship stations should be sent.
- ² Indicate if maritime mobile service identity is provided.
- ³ The call sign of the station shall be followed, where appropriate, by the maritime mobile service identity or the identification number or the selective calling signal, in brackets, that the station uses.
- ⁴ Transmitting frequencies. The normal working frequency is printed in heavy type.
- ⁵ Watch and/or receiving frequencies or channels.
- ⁶ In the case of directive antennae, indicate under the power, the azimuth of the direction or directions of maximum gain, in degrees, beginning from True North clockwise.
- ⁷ Indicate if selective calling is provided and, if so, the system employed.
- ⁸ Indicate if narrow-band direct-printing telegraphy is provided.
- ⁹ The land-line telegraph charge of the country to which the coast station is subject and the charge applied by this country to telegrams destined for adjacent countries are given in Part IV of this List.
- ¹⁰ If the accounts for charges are settled by a private enterprise, the name and address of such private enterprise should, if necessary, be stated.
- ¹¹ Indicate if radar service is provided.
- ¹² The List should contain information concerning the times of transmission of traffic lists, and the hours of watchkeeping of the coast station on the various frequencies, etc. Coast or coast earth stations open to public correspondence and providing service for transmission and reception of radiotelegrams by radiotelephony shall be indicated in the List of Coast Stations.

Part IV. Inland telegraph rates, limitrophic rates, etc.

List V. List of Ship Stations*Particulars of ship stations*

The information concerning these stations shall be published as shown below:

Name of ship	Call sign	Country	Auxiliary installations	Class of ship	Nature of service	Hours of service	Telegraph transmission frequency bands	Telephone transmission frequency bands	Ship charge per word for radiotelegrams	Ship charge for a radiotelephone call of three minutes	Remarks
1	2	3	4	5	6	7	8	9	10	11	12

Column 1 The stations shall be arranged in alphabetical order of the names of the ships, irrespective of nationality. In the case of duplication of names, the name of the ship shall be followed by the call sign (separated from the name by a fraction bar).

Column 2 Call sign. This column also contains the maritime mobile service identity or the selective call number or signal, where appropriate.

Column 3 Country having jurisdiction over the station (indicated by the appropriate symbol).

Column 4 Auxiliary installations, including information concerning:

- a) number of lifeboats fitted with radio apparatus, and
- b) types and number of emergency position-indicating radiobeacons (optional), the operating frequency being indicated by one of the following letters:

A = 2 182 kHz

B = 121.5 MHz

C = 243 MHz

A figure following the letter indicates the number of radiobeacons. The letter "X" signifies that the number of radiobeacons has not been communicated.

Columns 5 to 7 In the form of service symbols (see Appendix 10). In addition, the list of the symbols used in Column 5 to designate the class of ship is given in the Preface to the List.

Columns 8 and 9 Indication of the frequency bands and classes of emission by means of the following symbols:

Radiotelegraphy

W = 110 - 150 kHz

X = 405 - 535 kHz

Y = 1 605 - 3 800 kHz

Z = 4 000 - 27 500 kHz

Radiotelephony

T = 1 605 - 4 000 kHz

U = 4 000 - 27 500 kHz

V = 156 - 174 MHz

These symbols should, if necessary, be followed by references to brief notes and indications of the frequencies for which the transmitters are adjusted, which shall appear at the end of the List.

Column 10 Basic ship charge per word for radiotelegrams ¹.

Column 11 Minimum charge for a radiotelephone call of three minutes ¹. The information in Columns 10 and 11 shall be followed by a note reference to indicate the administration or private enterprise to which the accounts should be sent. In case of a change of address of the operating authority, a second note reference after the charge should give the new address and the date from which the change will take effect.

Column 12 When two or more ship stations of the same nationality bear the same name, or if the accounts for charges should be sent direct to the owner of the ship, the name of the shipping line or the firm to which the ship belongs shall be given in this column.

In addition, if there is no room in the appropriate column, further information relating to Columns 1 to 11 may be given in Column 12 by means of a note reference. This column may comprise several lines.

Indicate if maritime mobile service identity is provided.

Indicate if selective calling is provided and, if so, the system employed.

Indicate if narrow-band direct-printing telegraphy is provided.

¹ These charges are fixed or approved by each administration.

List VI. List of Radiodetermination and Special Service Stations

(For navigational purposes, this List should be used with caution. See Article 35 of the Radio Regulations.)

Part A. Alphabetical index of stations.

Name of the station	Call sign	Nature of the service	See part B, page
1	2	3	4

Part B. Particulars of stations.

1. Direction-finding stations

Names of the countries arranged in alphabetical order of abbreviations.

Names of the stations in alphabetical order.

Name of the station	Geographical co-ordinates (longitude and latitude in degrees, minutes and seconds) of: a) the receiving antenna of the direction-finding station b) the transmitting antenna of the direction-finding station c) the transmitting antenna of the station mentioned in Column 8	Call sign	Frequencies (kHz or MHz) and classes of emission			Power (kW)	Name and call sign of the station with which communication should be established if the direction-finding station is not equipped with a transmitter	Charges	Remarks a) sectors in which bearings are normally accurate and references to national or international publications other than the present list; b) hours of service (UTC), etc.
			For calling the direction-finding station	For transmitting to the direction-finding station the signals necessary for taking bearings	For the transmission of the bearings by the direction-finding station				
1	2	3	4	5	6	7	8	9	10

2. Radiobeacon stations

**Names of the countries arranged in alphabetical order of abbreviations.
Names of the stations in alphabetical order.**

1	2	3	4	Emission			8	9	10	11
Name of the station	Geographical coordinates of the transmitting antenna of the radiobeacon (longitude and latitude in degrees, minutes and seconds)	Characteristic signal of the radiobeacon	Call sign of the radiobeacon (if any)	Frequency (kHz or MHz)	Class	Frequency of modulation (if any) (Hz)	Normal range in nautical miles	Name and call sign of the station to which requests for the emission of beacon signals may be addressed	Frequency to be used to call the station indicated in Column 9 (kHz or MHz)	Remarks
										a) sectors normally reliable and references to national or international publications other than this list; b) hours of service (UTC); c) description of the emission; d) charges, etc.

3. Ocean-station vessels

Ocean Regions in alphabetical order.
Names of stations in alphabetical order.

1	2	3	4	Radiobeacon					Direction-finding		Remarks	
Name of the station	Geographical position assigned to the station	Call sign of the station vessel	Frequency for calling the station (kHz or MHz)	Characteristic signal	Transmitting frequency (kHz or MHz)	Class of emission	Frequency of modulation (if any) (Hz)	Normal range in nautical miles	Frequency for transmitting to the station the signals necessary for taking bearings (kHz or MHz)	Frequency for the transmission by the station of the bearings (kHz or MHz)		Power of the transmitter (kW)
												a) references to national or international publications other than this list; b) hours of service (UTC); c) description of the radiobeacon emission.
												13

4. Direction-finder calibration stations

Names of the countries arranged in alphabetical order of abbreviations.
Names of the stations in alphabetical order.

Name of the station	Geographical coordinates of the transmitting antenna of the radiobeacon (longitude and latitude in degrees, minutes and seconds)	Characteristic signal	Call sign of the radiobeacon (if any)	Emission			Normal range in nautical miles	Name and call sign of the station to which requests may be addressed	Frequency to be used to call the station mentioned in Column 9 (kHz or MHz)	Remarks
				Frequency (kHz or MHz)	Class	Frequency of modulation (if any) (Hz)				
1	2	3	4	5	6	7	8	9	10	11

5. Stations transmitting standard frequency and time signals

Names of the countries arranged in alphabetical order of abbreviations.
Names of the stations in alphabetical order.

Name of the station	Call sign	Frequencies (kHz or MHz)	Class of emission	Times of emission (UTC)	Method ¹
1	2	3	4	5	6

¹ General instructions concerning time signals.

6. _____

7. Stations transmitting regular meteorological bulletins

Names of the countries arranged in alphabetical order of abbreviations.
Names of the stations in alphabetical order.

Name of the station	Call sign	Frequencies (kHz or MHz)	Class of emission	Times of emission (UTC)	Remarks ¹
1	2	3	4	5	6

¹ General instructions concerning meteorological bulletins including code used.

8. Stations transmitting notices to navigators

Names of the countries arranged in alphabetical order of abbreviations.
Names of the stations in alphabetical order.

Name of the station	Call sign	Frequencies (kHz or MHz)	Class of emission	Times of emission (UTC)	Remarks
1	2	3	4	5	6

9. Stations transmitting medical advice

Names of the countries arranged in alphabetical order of abbreviations.
Names of the stations in alphabetical order.

Name of the station	Call sign	Frequencies (kHz or MHz)	Class of emission	Hours of service (UTC)	Remarks
1	2	3	4	5	6

10. Stations transmitting epidemiological bulletins

Names of the countries arranged in alphabetical order of abbreviations.
Names of the stations in alphabetical order.

Name of the station	Call sign	Frequencies (kHz or MHz)	Class of emission	Times of emission (UTC)	Remarks
1	2	3	4	5	6

11. Stations transmitting Ursigrams

Names of the countries arranged in alphabetical order of abbreviations.
Names of the stations in alphabetical order.

Name of the station	Call sign	Frequencies (kHz or MHz)	Class of emission	Times of emission (UTC)	Remarks and nature of information
1	2	3	4	5	6

**12. Fixed earth stations in the maritime
radionavigation-satellite service**

Names of the countries notifying the stations in alphabetical order of country symbols.
Names of stations in alphabetical order.

1	2	Transmission of radio- navigation information			Reception of radio- navigation information		5	6	Remarks
		3a	3b	3c	4a	4b			Special methods of modulation, charges, etc.
	Geographical coordinates (in degrees and minutes) of the transmitter site	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (kW)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Identity of associated space station(s)	Operating administration or company	

**13. Space stations in the maritime
radionavigation-satellite service**

Names of the countries notifying the stations in alphabetical order of country symbols.
Names of stations by alphabetical and/or numerical order of designation of stations.

Identity of the station	Transmission of radionavigation information to ships			Reception of radio-navigation information from ships		Service area or areas on the Earth	Name of locality and country in which the associated fixed earth station(s) is (are) located	Operating administration or company	Remarks
	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (W)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission				Orbital information, special channelling arrangements, special modulation methods, charges, etc.
1	2a	2b	2c	3a	3b	4	5	6	7

Note: The Secretary-General, if he considers it necessary, may introduce in this list additional sections to cover new systems that may be developed and used.

List VIII. List of International Monitoring Stations

(See Article 20)

Note: Throughout this List those stations nominated by administrations, which may participate in the international monitoring system, are marked (IMS).

Part I. Centralizing offices

Names of countries arranged in alphabetical order of abbreviations.

- National centralizing office (postal and telegraphic address, telephone number, any other information)

Part II. Monitoring of emissions from stations of terrestrial radiocommunication services

A. Particulars of monitoring stations carrying out frequency measurements

Names of countries arranged in alphabetical order of abbreviations.

Names of stations in alphabetical order.

- Name and geographical coordinates of the station (longitude and latitude in degrees and minutes)
- Hours of service (UTC)
- Ranges of measurable frequencies (kHz, MHz or GHz)
- Accuracy of measurements ¹
- Remarks

¹ Indicate the maximum attainable accuracy for each frequency range.

B. Particulars of monitoring stations carrying out field strength or power flux-density measurements

Names of countries arranged in alphabetical order of abbreviations.

Names of stations in alphabetical order.

- Name and geographical coordinates of the station (longitude and latitude in degrees and minutes)
- Hours of service (UTC)
- Ranges of frequencies (kHz, MHz or GHz)
- Maximum and minimum values of measurable field strengths or power flux-densities
- Accuracy of measurements in dB ¹
- Remarks

C. Particulars of monitoring stations carrying out direction-finding measurements

Names of countries arranged in alphabetical order of abbreviations.

Names of stations in alphabetical order.

- Name and geographical coordinates of the station (longitude and latitude in degrees, minutes and seconds)
- Hours of service (UTC)
- Ranges of frequencies (kHz, MHz or GHz)
- Type of antennae in use
- Remarks

¹ Indicate the maximum attainable accuracy for each frequency range.

D. Particulars of monitoring stations carrying out bandwidth measurements

Names of countries arranged in alphabetical order of abbreviations.

Names of stations in alphabetical order.

- Name and geographical coordinates of the station (longitude and latitude in degrees and minutes)
- Hours of service (UTC)
- Ranges of frequencies (kHz, MHz or GHz)
- Method(s) of measurement ¹
- Resolution at –60 dB (if appropriate)
- Remarks

E. Particulars of monitoring stations carrying out automatic spectrum occupancy surveys

Names of countries arranged in alphabetical order of abbreviation.

Names of stations in alphabetical order.

- Name and geographical coordinates of the station (longitude and latitude in degrees and minutes)
- Hours of service (UTC)
- Ranges of frequencies (kHz, MHz or GHz)
- Method(s) employed
- Remarks

¹ See the relevant CCIR Recommendations and Reports.

*Part III. Monitoring of emissions from stations of space
radiocommunication services*

Particulars of monitoring stations carrying out measurements related to stations in the space radiocommunication services.

Names of countries arranged in alphabetical order of symbols.

Names of stations in alphabetical order.

- Name and geographical coordinates of the station (longitude and latitude in degrees, minutes and seconds)
- Hours of service (UTC)
- Information on antennae in use (e.g. diameter or gain as a function of frequency; slew rate, if applicable; etc.)
- Range of azimuth and elevation angles
- Maximum attainable accuracy in determining orbital positions of space stations
- Information on system polarization
- System noise temperature
- Ranges of frequencies with the maximum attainable accuracy of frequency measurement for each frequency range
- Ranges of frequencies in which field strength or power flux-density measurements can be performed
- Minimum value of measurable field strength or power flux-density with indication of attainable accuracy of measurement

- Information available for bandwidth measurements ¹
- Information available for spectrum occupancy measurements
- Information available for orbit occupancy measurements
- Remarks

**List VIII A. List of Space Radiocommunication Stations and
Radio Astronomy Stations**

The Board shall prepare and keep up to date the contents of this List grouped in such a way as to permit administrations to more easily identify all stations pertaining to a given satellite network. Furthermore, the Board shall introduce the necessary improvements in the presentation of the List without in any way altering the basic data specified in the Radio Regulations.

¹ See the relevant CCIR Recommendations and Reports.

APPENDIX 10

Service Document Symbols

(See Article 26 and Appendix 9)

- Station classified as situated in a region of heavy traffic (see Article 60)
("TI")¹
- By day ("HJ")¹
By night ("HN")¹
- [] A ship which carries lifeboats fitted with radio apparatus; a number inside
the square brackets shows the number of such lifeboats ("S")¹
- AL Aeronautical radionavigation land station
- AM Aeronautical radionavigation mobile station
- AT Amateur station
- AX Aeronautical fixed station
- BC Broadcasting station, sound
- BT Broadcasting station, television
- C Continuous operation during hours shown
- CA Cargo ship
- CO Station open to official correspondence exclusively
- CP Station open to public correspondence
- CR Station open to limited public correspondence
- CV Station open exclusively to correspondence of a private agency
- D30° Directive antenna having maximum radiation in the direction of 30°
(expressed in degrees from True North, from 0 to 360 clockwise)

¹ The symbol shown in parentheses may be used in notifications and service documents.

AP10-2

DR	Directive antenna provided with a reflector
EA	Space station in the amateur-satellite service
EB	Space station in the broadcasting-satellite service (sound broadcasting)
EC	Space station in the fixed-satellite service
ED	Space telecommand space station
EG	Space station in the maritime mobile-satellite service
EH	Space research space station
EK	Space tracking space station
EM	Meteorological-satellite space station
EN	Radionavigation-satellite space station
ER	Space telemetering space station
EV	Space station in the broadcasting-satellite service (television)
EX	Experimental station
FA	Aeronautical station
FB	Base station
FC	Coast station
FL	Land station
FP	Port station
FR	Receiving station only, connected with the general network of telecommunication channels
FS	Land station established solely for the safety of life
FX	Fixed station
GMT	Greenwich Mean Time
GS	Station on board a warship or a military or naval aircraft
H	Schedule operation
H8	8-hour service provided by a ship station of the third category
H16	16-hour service provided by a ship station of the second category

H24	Continuous service throughout the twenty-four hours
HJ	Day service
HN	Night service
HT	Transition period service
HX	Intermittent service throughout the twenty-four hours, or station having no specific working hours
I	Intermittent operation during the time indicated
LR	Radiolocation land station
MA	Aircraft station
ME	Space station
ML	Land mobile station
MO	Mobile station
MR	Radiolocation mobile station
MS	Ship station
ND	Non-directional antenna
NL	Maritime radionavigation land station
OD	Oceanographic data station
OE	Oceanographic data interrogating station
OT	Station open exclusively to operational traffic of the service concerned
PA	Passenger ship
RA	Radio astronomy station
RC	Non-directional radiobeacon
RD	Directional radiobeacon
RG	Radio direction-finding station
RM	Maritime radionavigation mobile station
RT	Revolving radiobeacon
SM	Meteorological aids station

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SS	Standard frequency and time signal station
TA	Space operation earth station in the amateur-satellite service
TC	Earth station in the fixed-satellite service
TD	Space telecommand earth station
TE	Transmitting earth station
TF	Fixed earth station in the radiodetermination-satellite service
TG	Mobile earth station in the maritime mobile-satellite service
TH	Earth station in the space research service
TI	Earth station in the maritime mobile-satellite service at a specified fixed point
TK	Space tracking earth station
TL	Mobile earth station in the radiodetermination-satellite service
TM	Earth station in the meteorological-satellite service
TN	Earth station in the radionavigation-satellite service
TP	Receiving earth station
TR	Space telemetring earth station
TS	Television, sound channel
TT	Earth station in the space operation service
TV	Television, vision channel
UTC	Coordinated Universal Time

(The symbols may be modified as the situation requires.)

APPENDIX 11

Documents with Which Ship and Aircraft Stations Shall Be Provided

(See Articles 24, 26, 44, 46, 49, 55, 57, 59 and Appendix 9)

Section I. Ship Stations for Which a Radiotelegraph Installation Is Required by International Agreement

These stations shall be provided with:

1. the licence prescribed by Article 24;
2. certificates of the operator or operators;
3. the log (diary of the radio service) in which the following are recorded as they occur, together with the time of their occurrence;
 - a)* all communications relating to distress traffic in full;
 - b)* urgency and safety communications;
 - c)* observance of watch on the international distress frequency during silence periods;
 - d)* communications exchanged between the ship station and land or mobile stations;
 - e)* service incidents of all kinds;
 - f)* if the ship's rules permit, the position of the ship at least once a day;
 - g)* the opening and closing of each period of service;
4. the Alphabetical List of Call Signs of Stations used in the Maritime Mobile Service;
5. the List of Coast Stations;

6. the List of Ship Stations (the carriage of the supplement is optional);
7. the List of Radiodetermination and Special Service Stations;
8. the Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services;
9. telegraph tariffs of the countries for which the station most frequently accepts radiotelegrams.

Section II. Other Ship Radiotelegraph Stations

These stations shall be provided with the documents mentioned in items 1 to 6, 8 and 9 of Section I.

Section III. Ship Stations for Which a Radiotelephone Installation Is Required by International Agreement

These stations shall be provided with:

1. the licence prescribed by Article 24;
2. certificates of the operator or operators;
3. the log (diary of the radio service) in which the following are recorded as they occur, together with the time of their occurrence:
 - a) a summary of all communications relating to distress, urgency and safety traffic;
 - b) a summary of communications exchanged between the ship station and land or mobile stations;

- c) a reference to important service incidents;
 - d) if the ship's rules permit, the position of the ship at least once a day;
4. a list of coast stations with which communications are likely to be conducted, showing watchkeeping hours, frequencies and charges;
 5. the provisions of the Radio Regulations and of the CCITT Resolutions and Recommendations applicable to the maritime mobile radiotelephone service, or the Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services.

Section IV. Other Ship Radiotelephone Stations

These stations shall be provided with:

1. the documents mentioned in items 1 and 2 of Section III;
2. the documents mentioned in items 3, 4 and 5 of Section III, in accordance with the requirements of the administrations concerned.

Section V. Ship Stations Equipped with Multiple Installations

These stations shall be provided with:

1. for each installation, if necessary, the documents mentioned in items 1 to 3 of Section I, or in items 1, 2 and 3 of Section III;
2. for only one installation, the other documents mentioned in Sections I or III, as appropriate.

Section VI. Aircraft Stations

These stations shall be provided with:

1. the documents mentioned in items 1 and 2 of Section I;
 2. the log (diary of the radio service) as defined in item 3 of Section I, unless administrations have adopted other arrangements for recording all information which the log should contain;
 3. the documents containing official information relating to stations which the aircraft station may use for the execution of its service.
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APPENDIX 12

Hours of Service for Ship Stations of the Second and Third Categories

(See Articles 26 and 58)

Section I. Table

Hours of Service Ship's Time or Zone Time (See No. 4058 and 4059)	
16 hours (H16)	8 hours (H8)
from to 0000 - 0400 h 0800 - 1200 h 1600 - 1800 h 2000 - 2200 h plus 4 hours (see No. 4058)	from to 0800 - 1200 h 1800 - 2200 h ^{a)} plus 2 hours (see No. 4059)

- a) Two continuous hours of service between 1800 and 2200 hours, ship's time or zone time, at times decided by the administration, master or responsible person.

Section II. Diagram and Map

Note a: This diagram indicates the *fixed* and *elected* hours of service maintained by ships of the second and third categories in terms of zone time. (The hours of service shown exclude those which are determined by the administration, master, or responsible person.)

The *fixed* hours of watch are shown thus:

I) for ships of the second category:



II) for ships of the second and third categories:



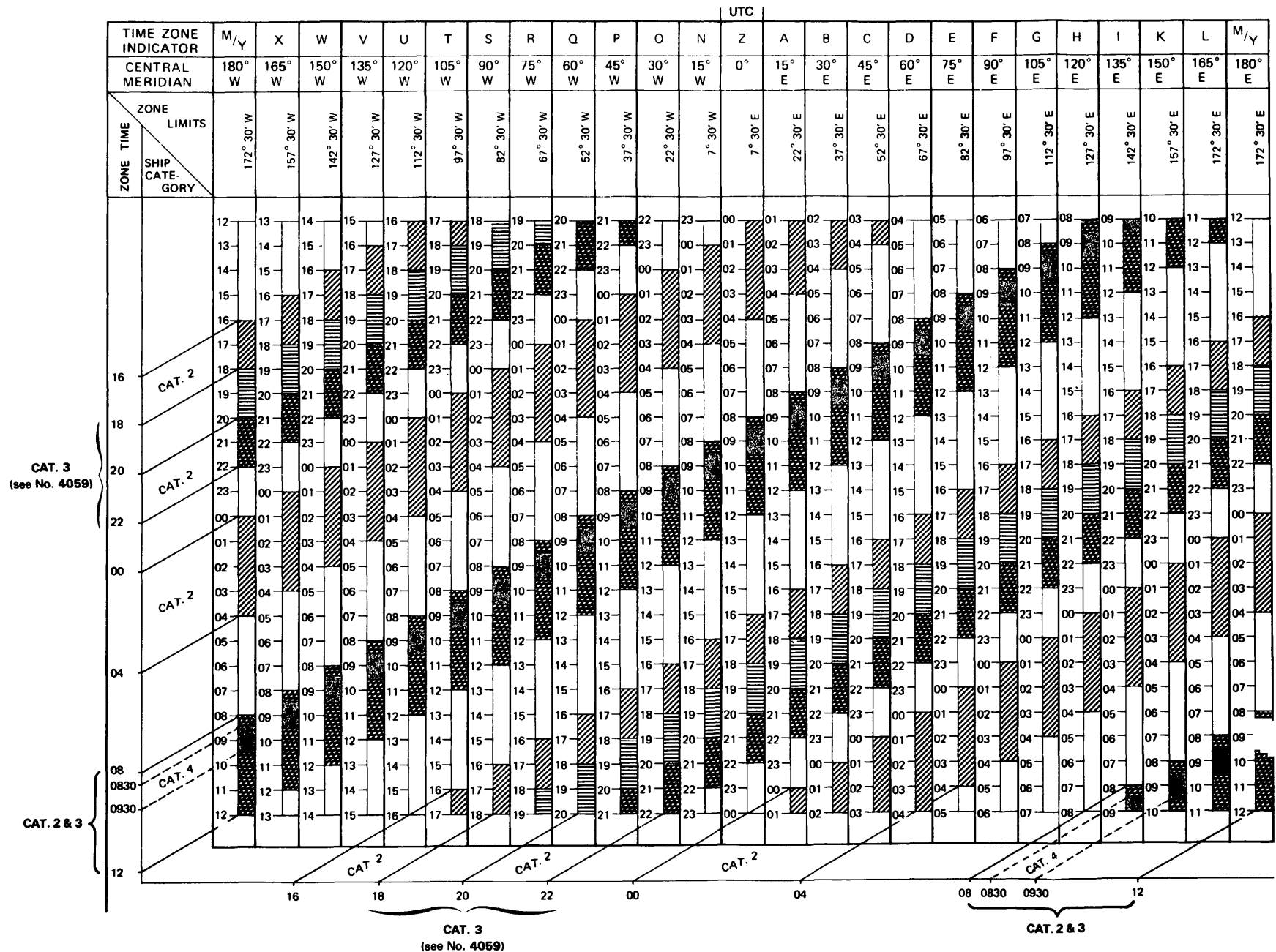
III) for ships of the third category, period over which two continuous hours of service may be elected:



Note b: Also shown (in black) is the specific service 0830-0930 that ships of the fourth category are encouraged to provide (see No. 4062).

DIAGRAM TIME ZONES AND HOURS OF SERVICE OF SHIP STATIONS

AP12-3

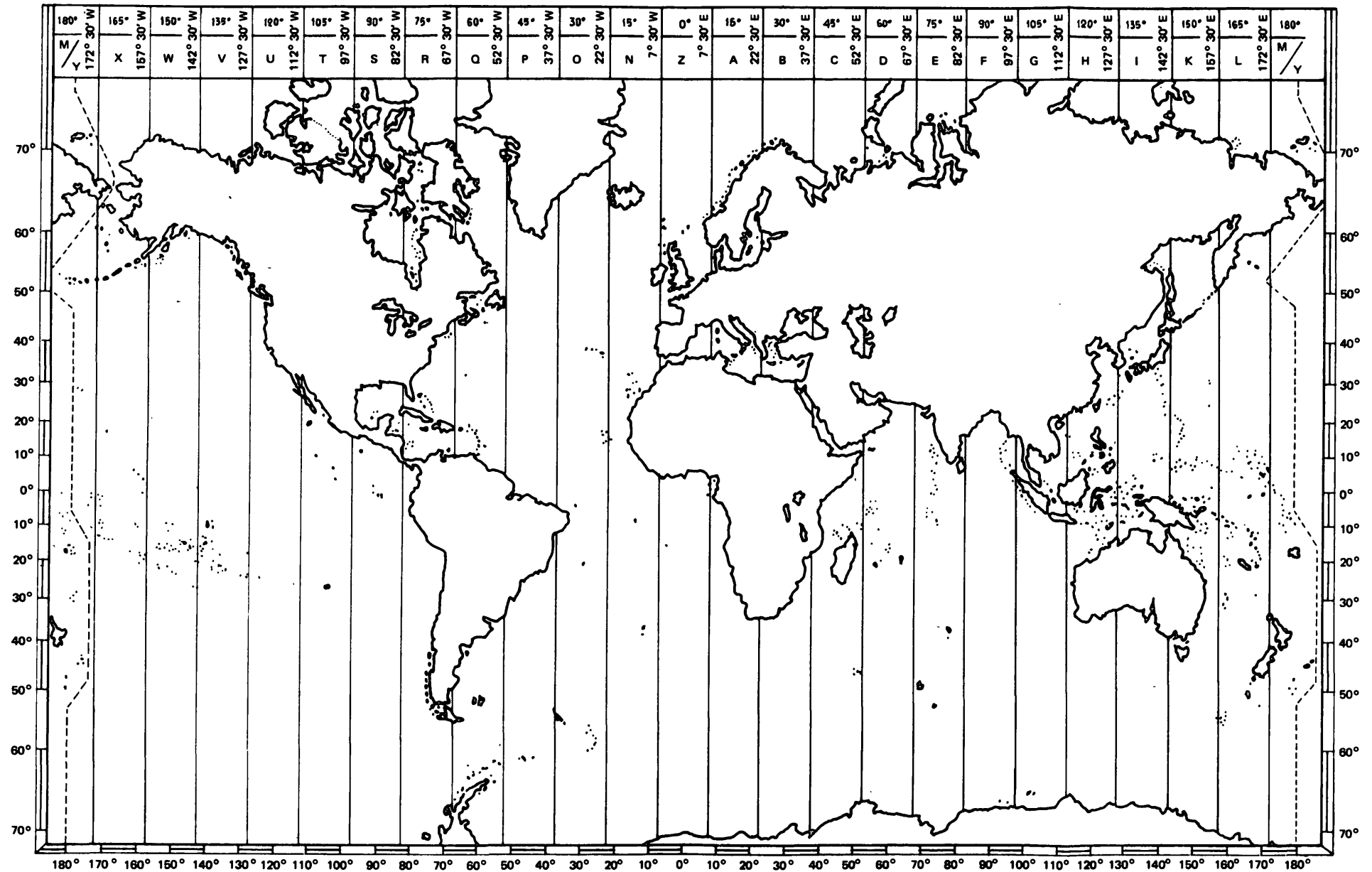


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MAP TIME ZONES

AP12-5



APPENDIX 13

Miscellaneous Abbreviations and Signals to Be Used in Radiotelegraphy Communications Except in the Maritime Mobile Service

(See Article 52)

Section I. Q Code

Introduction

1. The series of groups QRA to QUZ, listed in this Appendix, are for use by all services.
2. The QAA to QNZ series are reserved for the aeronautical service and the QOA to QQZ series are reserved for the maritime services. These series are not listed in these Regulations*.
3. Certain Q code abbreviations may be given an affirmative or negative sense by sending YES or NO respectively, immediately following the abbreviation.
4. The meanings assigned to Q code abbreviations may be amplified or completed by the addition of appropriate other groups, call signs, place names, figures, numbers, etc. It is optional to fill in the blanks shown in parentheses. Any data which are filled in where blanks appear shall be sent in the same order as shown in the text of the following tables.
5. Q code abbreviations are given the form of a question when followed by a question mark. When an abbreviation is used as a question and is followed by additional or complementary information, the question mark should follow this information.
6. Q code abbreviations with numbered alternative significations shall be followed by the appropriate figure to indicate the exact meaning intended. This figure shall be sent immediately following the abbreviation.
7. All times shall be given in Coordinated Universal Time (UTC) unless otherwise indicated in the question or reply.

* Note by the General Secretariat: Series QOA to QQZ are now shown in Appendix 14.

Abbreviations Available for All Services

A. List of Abbreviations in Alphabetical Order

Abbreviation	Question	Answer or Advice
QRA	What is the name of your station?	The name of my station is ...
QRB	How far approximately are you from my station?	The approximate distance between our stations is ... nautical miles (or kilometres).
QRC	By what private enterprise (or state administration) are the accounts for charges for your station settled?	The accounts for charges of my station are settled by the private enterprise ... (or state administration).
QRD	Where are you bound for and where are you from?	I am bound for ... from ...
QRE	What is your estimated time of arrival at ... (or over ...) (place)?	My estimated time of arrival at ... (or over ...) (place) is ... hours.
QRF	Are you returning to ... (place)?	I am returning to ... (place). or Return to ... (place).
QRG	Will you tell me my exact frequency (or that of ...)?	Your exact frequency (or that of ...) is ... kHz (or MHz).
QRH	Does my frequency vary?	Your frequency varies.
QRI	How is the tone of my transmission?	The tone of your transmission is ... 1. good 2. variable 3. bad.
QRJ	How many radiotelephone calls have you to book?	I have ... radiotelephone calls to book.

Abbreviation	Question	Answer or Advice
QRK	What is the intelligibility of my signals (<i>or</i> those of ...)?	The intelligibility of your signals (<i>or</i> those of ...) is ... 1. bad 2. poor 3. fair 4. good 5. excellent.
QRL	Are you busy?	I am busy (<i>or</i> I am busy with ...). Please do not interfere.
QRM	Are you being interfered with?	I am being interfered with (1. nil 2. slightly 3. moderately 4. severely 5. extremely).
QRN	Are you troubled by static?	I am troubled by static (1. nil 2. slightly 3. moderately 4. severely 5. extremely).
QRO	Shall I increase transmitter power?	Increase transmitter power.
QRP	Shall I decrease transmitter power?	Decrease transmitter power.
QRQ	Shall I send faster?	Send faster (... words per minute).
QRR	Are you ready for automatic operation?	I am ready for automatic operation. Send at ... words per minute.
QRS	Shall I send more slowly?	Send more slowly (... words per minute).

Abbreviation	Question	Answer or Advice
QRT	Shall I stop sending?	Stop sending.
QRU	Have you anything for me?	I have nothing for you.
QRV	Are you ready?	I am ready.
QRW	Shall I inform ... that you are calling him on ... kHz (or MHz)?	Please inform ... that I am calling him on ... kHz (or MHz).
QRX	When will you call me again?	I will call you again at ... hours (on ... kHz (or MHz)).
QRY	What is my turn? (Relates to communication.)	Your turn is Number ... (or according to any other indication). (Relates to communication.)
QRZ	Who is calling me?	You are being called by ... (on ... kHz (or MHz)).
QSA	What is the strength of my signals (or those of ...)?	The strength of your signals (or those of ...) is ... 1. scarcely perceptible 2. weak 3. fairly good 4. good 5. very good.
QSB	Are my signals fading?	Your signals are fading.
QSC	Are you a cargo vessel?	I am a cargo vessel.
QSD	Is my keying defective?	Your keying is defective.
QSE	What is the estimated drift of the survival craft?	The estimated drift of the survival craft is ... (figures and units).

Abbreviation	Question	Answer or Advice
QSF	Have you effected rescue?	I have effected rescue and am proceeding to ... base (with ... persons injured requiring ambulance).
QSG	Shall I send ... telegrams at a time?	Send ... telegrams at a time.
QSH	Are you able to home on your D/F equipment?	I am able to home on my D/F equipment (on station ...).
QSI		I have been unable to break in on your transmission. or Will you inform ... (<i>call sign</i>) that I have been unable to break in on his transmission (on ... kHz (<i>or</i> MHz)).
QSJ	What is the charge to be collected to ... including your internal charge?	The charge to be collected to ... including my internal charge is ... francs.
QSK	Can you hear me between your signals and if so can I break in on your transmission?	I can hear you between my signals; break in on my transmission.
QSL	Can you acknowledge receipt?	I am acknowledging receipt.
QSM	Shall I repeat the last telegram which I sent you (<i>or</i> some previous telegram)?	Repeat the last telegram which you sent me (<i>or</i> telegram(s) number(s) ...).
QSN	Did you hear me (<i>or</i> ... (<i>call sign</i>)) on ... kHz (<i>or</i> MHz)?	I did hear you (<i>or</i> ... (<i>call sign</i>)) on ... kHz (<i>or</i> MHz).
QSO	Can you communicate with ... direct (<i>or</i> by relay)?	I can communicate with ... direct (<i>or</i> by relay through ...).

Abbreviation	Question	Answer or Advice
QSP	Will you relay to ... free of charge?	I will relay to ... free of charge.
QSQ	Have you a doctor on board (<i>or is ... (name of person) on board</i>)?	I have a doctor on board (<i>or ... (name of person) is on board</i>).
QSR	Shall I repeat the call on the calling frequency?	Repeat your call on the calling frequency; did not hear you (<i>or have interference</i>).
QSS	What working frequency will you use?	I will use the working frequency ... kHz (<i>normally only the last three figures of the frequency need be given</i>).
QSU	Shall I send or reply on this frequency (<i>or on ... kHz (or MHz)</i>) (with emissions of class ...)?	Send or reply on this frequency (<i>or on ... kHz (or MHz)</i>) (with emissions of class ...).
QSV	Shall I send a series of Vs on this frequency (<i>or ... kHz (or MHz)</i>)?	Send a series of Vs on this frequency (<i>or ... kHz (or MHz)</i>).
QSW	Will you send on this frequency (<i>or on ... kHz (or MHz)</i>) (with emissions of class ...)?	I am going to send on this frequency (<i>or on ... kHz (or MHz)</i>) (with emissions of class ...).
QSX	Will you listen to ... (<i>call sign(s)</i>) on ... kHz (<i>or MHz</i>)?	I am listening to ... (<i>call sign(s)</i>) on ... kHz (<i>or MHz</i>).
QSY	Shall I change to transmission on another frequency?	Change to transmission on another frequency (<i>or on ... kHz (or MHz)</i>).
QSZ	Shall I send each word or group more than once?	Send each word or group twice (<i>or ... times</i>).
QTA	Shall I cancel telegram number ...?	Cancel telegram number ...
QTB	Do you agree with my counting of words?	I do not agree with your counting of words; I will repeat the first letter or digit of each word or group.

Abbreviation	Question	Answer or Advice
QTC	How many telegrams have you to send?	I have ... telegrams for you (<i>or for</i> ...).
QTD	What has the rescue vessel or rescue aircraft recovered?	... (<i>identification</i>) has recovered ... 1. ... (<i>number</i>) survivors 2. wreckage 3. ... (<i>number</i>) bodies.
QTE	What is my TRUE bearing from you?	Your TRUE bearing from me is ... degrees at ... hours.
	<i>or</i>	<i>or</i>
	What is my TRUE bearing from ... (<i>call sign</i>)?	Your TRUE bearing from ... (<i>call sign</i>) was ... degrees at ... hours.
QTF	<i>or</i>	<i>or</i>
	What is the TRUE bearing of ... (<i>call sign</i>) from ... (<i>call sign</i>)?	The TRUE bearing of ... (<i>call sign</i>) from ... (<i>call sign</i>) was ... degrees at ... hours.
	<i>or</i>	<i>or</i>
QTF	Will you give me the position of my station according to the bearings taken by the D/F stations which you control?	The position of your station according to the bearings taken by the D/F stations which I control was ... latitude, ... longitude (<i>or other indication of position</i>), class ... at ... hours.
QTG	Will you send two dashes of ten seconds each followed by your call sign (repeated ... times) (on ... kHz (<i>or</i> MHz))?	I am going to send two dashes of ten seconds each followed by my call sign (repeated ... times) (on ... kHz (<i>or</i> MHz)).
	<i>or</i>	<i>or</i>
	Will you request ... to send two dashes of ten seconds followed by his call sign (repeated ... times) on ... kHz (<i>or</i> MHz)?	I have requested ... to send two dashes of ten seconds followed by his call sign (repeated ... times) on ... kHz (<i>or</i> MHz).

Abbreviation	Question	Answer or Advice
QTH	What is your position in latitude and longitude (<i>or according to any other indication</i>)?	My position is ... latitude, ... longitude (<i>or according to any other indication</i>).
QTI	What is your TRUE track?	My TRUE track is ... degrees.
QTJ	What is your speed? (<i>Requests the speed of a ship or aircraft through the water or air respectively.</i>)	My speed is ... knots (<i>or ... kilometres per hour or ... statute miles per hour</i>). (<i>Indicates the speed of a ship or aircraft through the water or air respectively.</i>)
QTK	What is the speed of your aircraft in relation to the surface of the Earth?	The speed of my aircraft in relation to the surface of the Earth is ... knots (<i>or ... kilometres per hour or ... statute miles per hour</i>).
QTL	What is your TRUE heading?	My TRUE heading is ... degrees.
QTM	What is your MAGNETIC heading?	My MAGNETIC heading is ... degrees.
QTN	At what time did you depart from ... (<i>place</i>)?	I departed from ... (<i>place</i>) at ... hours.
QTO	Have you left dock (<i>or port</i>)? <i>or</i> Are you airborne?	I have left dock (<i>or port</i>). <i>or</i> I am airborne.
QTP	Are you going to enter dock (<i>or port</i>)? <i>or</i> Are you going to alight (<i>or land</i>)?	I am going to enter dock (<i>or port</i>). <i>or</i> I am going to alight (<i>or land</i>).
QTQ	Can you communicate with my station by means of the International Code of Signals?	I am going to communicate with your station by means of the International Code of Signals.
QTR	What is the correct time?	The correct time is ... hours.

Abbreviation	Question	Answer or Advice
QTS	Will you send your call sign for tuning purposes or so that your frequency can be measured now (<i>or at ... hours</i>) on ... kHz (<i>or MHz</i>)?	I will send my call sign for tuning purposes or so that my frequency may be measured now (<i>or at ... hours</i>) on ... kHz (<i>or MHz</i>).
QTT		The identification signal which follows is superimposed on another transmission.
QTU	What are the hours during which your station is open?	My station is open from ... to ... hours.
QTV	Shall I stand guard for you on the frequency of ... kHz (<i>or MHz</i>) (from ... to ... hours)?	Stand guard for me on the frequency of ... kHz (<i>or MHz</i>) (from ... to ... hours).
QTW	What is the condition of survivors?	Survivors are in ... condition and urgently need ...
QTX	Will you keep your station open for further communication with me until further notice (<i>or until ... hours</i>)?	I will keep my station open for further communication with you until further notice (<i>or until ... hours</i>).
QTY	Are you proceeding to the position of incident and if so when do you expect to arrive?	I am proceeding to the position of incident and expect to arrive at ... hours (on ... (<i>date</i>)).
QTZ	Are you continuing the search?	I am continuing the search for ... (aircraft, ship, survival craft, survivors or wreckage).
QUA	Have you news of ... (<i>call sign</i>)?	Here is news of ... (<i>call sign</i>).
QUB	Can you give me in the following order information concerning: the direction in degrees TRUE and speed of the surface wind; visibility; present weather; and amount, type and height of base of cloud above surface elevation at ... (<i>place of observation</i>)?	Here is the information requested: ... (<i>The units used for speed and distances should be indicated.</i>)

Abbreviation	Question	Answer or Advice
QUC	What is the number (<i>or other indication</i>) of the last message you received from me (<i>or from ... (call sign)</i>)?	The number (<i>or other indication</i>) of the last message I received from you (<i>or from ... (call sign)</i>) is ...
QUD	Have you received the urgency signal sent by ... (<i>call sign of mobile station</i>)?	I have received the urgency signal sent by ... (<i>call sign of mobile station</i>) at ... hours.
QUE	Can you use telephony in ... (<i>language</i>), with interpreter if necessary; if so, on what frequencies?	I can use telephony in ... (<i>language</i>) on ... kHz (<i>or</i> MHz).
QUF	Have you received the distress signal sent by ... (<i>call sign of mobile station</i>)?	I have received the distress signal sent by ... (<i>call sign of mobile station</i>) at ... hours.
QUG	Will you be forced to alight (<i>or land</i>)?	I am forced to alight (<i>or land</i>) immediately. <i>or</i> I shall be forced to alight (<i>or land</i>) at ... (<i>position or place</i>) at ... hours.
QUH	Will you give me the present barometric pressure at sea level?	The present barometric pressure at sea level is ... (<i>units</i>).
QUI	Are your navigation lights working?	My navigation lights are working.
QUJ	Will you indicate the TRUE track to reach you (<i>or ...</i>)?	The TRUE track to reach me (<i>or ...</i>) is ... degrees at ... hours.
QUK	Can you tell me the condition of the sea observed at ... (<i>place or coordinates</i>)?	The sea at ... (<i>place or coordinates</i>) is ...

Abbreviation	Question	Answer or Advice
QUL	Can you tell me the swell observed at ... (<i>place or coordinates</i>)?	The swell at ... (<i>place or coordinates</i>) is ...
QUM	May I resume normal working?	Normal working may be resumed.
QUN	Will vessels in my immediate vicinity ... <i>or</i> (in the vicinity of ... latitude, ... longitude) <i>or</i> (in the vicinity of ...) please indicate their position, TRUE course and speed?	My position, TRUE course and speed are ...
QUO	Shall I search for ... 1. aircraft 2. ship 3. survival craft in the vicinity of ... latitude, ... longitude (<i>or according to any other indication</i>)?	Please search for ... 1. aircraft 2. ship 3. survival craft in the vicinity of ... latitude, ... longitude (<i>or according to any other indication</i>).
QUP	Will you indicate your position by ... 1. searchlight 2. black smoke trail 3. pyrotechnic lights?	My position is indicated by ... 1. searchlight 2. black smoke trail 3. pyrotechnic lights.
QUQ	Shall I train my searchlight nearly vertical on a cloud, occulting if possible and, if your aircraft is seen, deflect the beam up wind and on the water (<i>or land</i>) to facilitate your landing?	Please train your searchlight on a cloud, occulting if possible and, if my aircraft is seen or heard, deflect the beam up wind and on the water (<i>or land</i>) to facilitate my landing.

Abbreviation	Question	Answer or Advice
QUR	Have survivors ... 1. received survival equipment 2. been picked up by rescue vessel 3. been reached by ground rescue party?	Survivors ... 1. are in possession of survival equipment dropped by ... 2. have been picked up by rescue vessel 3. have been reached by ground rescue party.
QUS	Have you sighted survivors or wreckage? If so, in what position?	Have sighted ... 1. survivors in water 2. survivors on rafts 3. wreckage in position ... latitude, ... longitude (<i>or according to any other indication</i>).
QUT	Is position of incident marked?	Position of incident is marked by ... 1. flame or smoke float 2. sea marker 3. sea marker dye 4. ... (<i>specify other marking</i>).
QUU	Shall I home ship or aircraft to my position?	Home ship or aircraft ... (<i>call sign</i>) ... 1. to your position by transmitting your call sign and long dashes on ... kHz (<i>or</i> MHz) 2. by transmitting on ... kHz (<i>or</i> MHz) TRUE track to reach you.
QUW	Are you in the search area designated as ... (<i>designator or latitude and longitude</i>)?	I am in the ... (<i>designation</i>) search area.
QUY	Is position of survival craft marked?	Position of survival craft was marked at ... hours by ... 1. flame or smoke float 2. sea marker 3. sea marker dye 4. ... (<i>specify other marking</i>).

B. Lists of Signals According to the Nature of Questions, Answer or Advice

Abbreviation	Question	Answer or Advice
	Name	
QRA	What is the name of your station?	The name of my station is ...
	Route	
QRD	Where are you bound for and where are you from?	I am bound for ... from ...
	Position	
QRB	How far approximately are you from my station?	The approximate distance between our stations is ... nautical miles (or kilometres).
QTH	What is your position in latitude and longitude (or according to any other indication)?	My position is ... latitude, ... longitude (or according to any other indication).
QTN	At what time did you depart from ... (place)?	I departed from ... (place) at ... hours.
	Quality of Signals	
QRI	How is the tone of my transmission?	The tone of your transmission is ... 1. good 2. variable 3. bad.
QRK	What is the intelligibility of my signals (or those of ...)?	The intelligibility of your signals (or those of ...) is ... 1. bad 2. poor 3. fair 4. good 5. excellent.

Abbreviation	Question	Answer or Advice
	Strength of Signals	
QRO	Shall I increase transmitter power?	Increase transmitter power.
QRP	Shall I decrease transmitter power?	Decrease transmitter power.
QSA	What is the strength of my signals (or those of ...)?	The strength of your signals (or those of ...) is ... 1. scarcely perceptible 2. weak 3. fairly good 4. good 5. very good.
QSB	Are my signals fading?	Your signals are fading.
	Keying	
QRQ	Shall I send faster?	Send faster (... words per minute).
QRR	Are you ready for automatic operation?	I am ready for automatic operation. Send at ... words per minute.
QRS	Shall I send more slowly?	Send more slowly (... words per minute).
QSD	Is my keying defective?	Your keying is defective.
	Interference	
QRM	Are you being interfered with?	I am being interfered with (1. nil 2. slightly 3. moderately 4. severely 5. extremely).

Abbreviation	Question	Answer or Advice
	Interference (cont.)	
QRN	Are you troubled by static?	I am troubled by static (1. nil 2. slightly 3. moderately 4. severely 5. extremely).
	Adjustment of Frequency	
QRG	Will you tell me my exact frequency (<i>or</i> that of ...)?	Your exact frequency (<i>or</i> that of ...) is ... kHz (<i>or</i> MHz).
QRH	Does my frequency vary?	Your frequency varies.
QTS	Will you send your call sign for tuning purposes or so that your frequency can be measured now (<i>or</i> at ... hours) on ... kHz (<i>or</i> MHz)?	I will send my call sign for tuning purposes or so that my frequency may be measured now (<i>or</i> at ... hours) on ... kHz (<i>or</i> MHz).
	Choice of Frequency and/or Class of Emission	
QSN	Did you hear me (<i>or</i> ... (<i>call sign</i>)) on ... kHz (<i>or</i> MHz)?	I did hear you (<i>or</i> ... (<i>call sign</i>)) on ... kHz (<i>or</i> MHz).
QSS	What working frequency will you use?	I will use the working frequency ... kHz (<i>normally only the last three figures of the frequency need be given</i>).
QSU	Shall I send or reply on this frequency (<i>or</i> on ... kHz (<i>or</i> MHz)) (with emissions of class ...)?	Send or reply on this frequency (<i>or</i> on ... kHz (<i>or</i> MHz)) (with emissions of class ...).
QSV	Shall I send a series of Vs on this frequency (<i>or</i> ... kHz (<i>or</i> MHz))?	Send a series of Vs on this frequency (<i>or</i> ... kHz (<i>or</i> MHz)).

Abbreviation	Question	Answer or Advice
	Choice of Frequency and/or Class of Emission (cont.)	
QSW	Will you send on this frequency (<i>or on ... kHz (or MHz)</i>) (with emissions of class ...)?	I am going to send on this frequency (<i>or on ... kHz (or MHz)</i>) (with emissions of class ...).
QSX	Will you listen to ... (<i>call sign(s)</i>) on ... kHz (<i>or MHz</i>)?	I am listening to ... (<i>call sign(s)</i>) on ... kHz (<i>or MHz</i>).
	Change of Frequency	
QSY	Shall I change to transmission on another frequency?	Change to transmission on another frequency (<i>or on ... kHz (or MHz)</i>).
	Establishing Communication	
QRL	Are you busy?	I am busy (<i>or I am busy with ...</i>). Please do not interfere.
QRV	Are you ready?	I am ready.
QRX	When will you call me again?	I will call you again at ... hours (on ... kHz (<i>or MHz</i>)).
QRY	What is my turn? (<i>Relates to communication.</i>)	Your turn is Number ... (<i>or according to any other indication</i>). (<i>Relates to communication.</i>)
QRZ	Who is calling me?	You are being called by ... (on ... kHz (<i>or MHz</i>)).
QSC	Are you a cargo vessel?	I am a cargo vessel.
QSR	Shall I repeat the call on the calling frequency?	Repeat your call on the calling frequency; did not hear you (<i>or have interference</i>).
QTQ	Can you communicate with my station by means of the International Code of Signals?	I am going to communicate with your station by means of the International Code of Signals.

Abbreviation	Question	Answer or Advice
	Establishing Communication (cont.)	
QUE	Can you use telephony in ... (<i>language</i>), with interpreter if necessary; if so, on what frequencies?	I can use telephony in ... (<i>language</i>) on ... kHz (<i>or</i> MHz).
	Time	
QTR	What is the correct time?	The correct time is ... hours.
QTU	What are the hours during which your station is open?	My station is open from ... to ... hours.
	Charges	
QRC	By what private enterprise (<i>or</i> state administration) are the accounts for charges for your station settled?	The accounts for charges of my station are settled by the private enterprise ... (<i>or</i> state administration).
QSJ	What is the charge to be collected to ... including your internal charge?	The charge to be collected to ... including my internal charge is ... francs.
	Transit	
QRW	Shall I inform ... that you are calling him on ... kHz (<i>or</i> MHz)?	Please inform ... that I am calling him on ... kHz (<i>or</i> MHz).
QSO	Can you communicate with ... direct (<i>or</i> by relay)?	I can communicate with ... direct (<i>or</i> by relay through ...).
QSP	Will you relay to ... free of charge?	I will relay to ... free of charge.
QSQ	Have you a doctor on board (<i>or</i> is ... (<i>name of person</i>) on board)?	I have a doctor on board (<i>or</i> ... (<i>name of person</i>) is on board).
QUA	Have you news of ... (<i>call sign</i>)?	Here is news of ... (<i>call sign</i>).

Abbreviation	Question	Answer or Advice
	Transit (cont.)	
QUC	What is the number (<i>or other indication</i>) of the last message you received from me (<i>or from ... (call sign)</i>)?	The number (<i>or other indication</i>) of the last message I received from you (<i>or from ... (call sign)</i>) is ...
	Exchange of Correspondence	
QRJ	How many radiotelephone calls have you to book?	I have ... radiotelephone calls to book.
QRU	Have you anything for me?	I have nothing for you.
QSG	Shall I send ... telegrams at a time?	Send ... telegrams at a time.
QSI		I have been unable to break in on your transmission. <i>or</i> Will you inform ... (<i>call sign</i>) that I have been unable to break in on his transmission (on ... kHz (<i>or</i> MHz)).
QSK	Can you hear me between your signals and if so can I break in on your transmission?	I can hear you between my signals; break in on my transmission.
QSL	Can you acknowledge receipt?	I am acknowledging receipt.
QSM	Shall I repeat the last telegram which I sent you (<i>or some previous telegram</i>)?	Repeat the last telegram which you sent me (<i>or telegram(s) number(s) ...</i>).
QSZ	Shall I send each word or group more than once?	Send each word or group twice (<i>or ... times</i>).
QTA	Shall I cancel telegram number ...?	Cancel telegram number ...

Abbreviation	Question	Answer or Advice
	Exchange of Correspondence (cont.)	
QTB	Do you agree with my counting of words?	I do not agree with your counting of words; I will repeat the first letter or digit of each word or group.
QTC	How many telegrams have you to send?	I have ... telegrams for you (<i>or for ...</i>).
QTV	Shall I stand guard for you on the frequency of ... kHz (<i>or MHz</i>) (from ... to ... hours)?	Stand guard for me on the frequency of ... kHz (<i>or MHz</i>) (from ... to ... hours).
QTX	Will you keep your station open for further communication with me until further notice (<i>or until ... hours</i>)?	I will keep my station open for further communication with you until further notice (<i>or until ... hours</i>).
	Movement	
QRE	What is your estimated time of arrival at ... (<i>or over ...</i>) (<i>place</i>)?	My estimated time of arrival at ... (<i>or over ...</i>) (<i>place</i>) is ... hours.
QRF	Are you returning to ... (<i>place</i>)?	I am returning to ... (<i>place</i>). <i>or</i> Return to ... (<i>place</i>).
QSH	Are you able to home on your D/F equipment?	I am able to home on my D/F equipment (on station ...).
QTI	What is your TRUE track?	My TRUE track is ... degrees.
Q TJ	What is your speed? (<i>Requests the speed of a ship or aircraft through the water or air respectively.</i>)	My speed is ... knots (<i>or ... kilometres per hour or ... statute miles per hour</i>). (<i>Indicates the speed of a ship or aircraft through the water or air respectively.</i>)

Abbreviation	Question	Answer or Advice
	Movement (cont.)	
QTK	What is the speed of your aircraft in relation to the surface of the Earth?	The speed of my aircraft in relation to the surface of the Earth is ... knots (<i>or</i> ... kilometres per hour <i>or</i> ... statute miles per hour).
QTL	What is your TRUE heading?	My TRUE heading is ... degrees.
QTM	What is your MAGNETIC heading?	My MAGNETIC heading is ... degrees.
QTN	At what time did you depart from ... (<i>place</i>)?	I departed from ... (<i>place</i>) at ... hours.
QTO	Have you left dock (<i>or</i> port)?	I have left dock (<i>or</i> port).
	<i>or</i>	<i>or</i>
	Are you airborne?	I am airborne.
QTP	Are you going to enter dock (<i>or</i> port)?	I am going to enter dock (<i>or</i> port).
	<i>or</i>	<i>or</i>
	Are you going to alight (<i>or</i> land)?	I am going to alight (<i>or</i> land).
QUG	Will you be forced to alight (<i>or</i> land)?	I am forced to alight (<i>or</i> land) immediately.
		<i>or</i>
		I shall be forced to alight (<i>or</i> land) at ... (<i>position or place</i>) at ... hours.
QUJ	Will you indicate the TRUE track to reach you (<i>or</i> ...)?	The TRUE track to reach me (<i>or</i> ...) is ... degrees at ... hours.
QUN	Will vessels in my immediate vicinity ...	My position, TRUE course and speed are ...
	<i>or</i>	
	(in the vicinity of ... latitude, ... longitude)	
	<i>or</i>	
	(in the vicinity of ...) please indicate their position, TRUE course and speed?	

Abbreviation	Question	Answer or Advice
	Meteorology	
QUB	Can you give me in the following order information concerning: the direction in degrees TRUE and speed of the surface wind; visibility; present weather; and amount, type and height of base of cloud above surface elevation at ... (<i>place of observation</i>)?	Here is the information requested: ... (<i>The units used for speed and distances should be indicated.</i>)
QUH	Will you give me the present barometric pressure at sea level?	The present barometric pressure at sea level is ... (<i>units</i>).
QUK	Can you tell me the condition of the sea observed at ... (<i>place or coordinates</i>)?	The sea at ... (<i>place or coordinates</i>) is ...
QUL	Can you tell me the swell observed at ... (<i>place or coordinates</i>)?	The swell at ... (<i>place or coordinates</i>) is ...
	Radio Direction-Finding	
QTE	What is my TRUE bearing from you? or What is my TRUE bearing from ... (<i>call sign</i>)? or What is the TRUE bearing of ... (<i>call sign</i>) from ... (<i>call sign</i>)?	Your TRUE bearing from me is ... degrees at ... hours. or Your TRUE bearing from ... (<i>call sign</i>) was ... degrees at ... hours. or The TRUE bearing of ... (<i>call sign</i>) from ... (<i>call sign</i>) was ... degrees at ... hours.
QTF	Will you give me the position of my station according to the bearings taken by the D/F stations which you control?	The position of your station according to the bearings taken by the D/F stations which I control was ... latitude, ... longitude (<i>or other indication of position</i>), class ... at ... hours.

Abbreviation	Question	Answer or Advice
	Radio Direction-Finding (cont.)	
QTG	Will you send two dashes of ten seconds each followed by your call sign (repeated ... times) (on ... kHz (<i>or</i> MHz))? <i>or</i> Will you request ... to send two dashes of ten seconds followed by his call sign (repeated ... times) on ... kHz (<i>or</i> MHz)?	I am going to send two dashes of ten seconds each followed by my call sign (repeated ... times) (on ... kHz (<i>or</i> MHz)). <i>or</i> I have requested ... to send two dashes of ten seconds followed by his call sign (repeated ... times) on ... kHz (<i>or</i> MHz).
	Suspension of Work	
QRT	Shall I stop sending?	Stop sending.
QUM	May I resume normal working?	Normal working may be resumed.
	Urgency	
QUD	Have you received the urgency signal sent by ... (<i>call sign of mobile station</i>)?	I have received the urgency signal sent by ... (<i>call sign of mobile station</i>) at ... hours.
QUG	Will you be forced to alight (<i>or</i> land)?	I am forced to alight (<i>or</i> land) immediately. <i>or</i> I shall be forced to alight (<i>or</i> land) at ... (<i>position or place</i>) at ... hours.
	Distress	
QUF	Have you received the distress signal sent by ... (<i>call sign of mobile station</i>)?	I have received the distress signal sent by ... (<i>call sign of mobile station</i>) at ... hours.
QUM	May I resume normal working?	Normal working may be resumed.
	Search and Rescue	
QSE	What is the estimated drift of the survival craft?	The estimated drift of the survival craft is ... (<i>figures and units</i>).

Abbreviation	Question	Answer or Advice
	Search and Rescue (cont.)	
QSF	Have you effected rescue?	I have effected rescue and am proceeding to ... base (with ... persons injured requiring ambulance).
QTD	What has the rescue vessel or rescue aircraft recovered?	... (<i>identification</i>) has recovered ... 1. ... (<i>number</i>) survivors 2. wreckage 3. ... (<i>number</i>) bodies.
QTW	What is the condition of survivors?	Survivors are in ... condition and urgently need ...
QTY	Are you proceeding to the position of incident and if so when do you expect to arrive?	I am proceeding to the position of incident and expect to arrive at ... hours (on ... (<i>date</i>)).
QTZ	Are you continuing the search?	I am continuing the search for ... (aircraft, ship, survival craft, survivors or wreckage).
QUI	Are your navigation lights working?	My navigation lights are working.
QUN	Will vessels in my immediate vicinity ... <i>or</i> (in the vicinity of ... latitude, ... longitude) <i>or</i> (in the vicinity of ...) please indicate their position, TRUE course and speed?	My position, TRUE course and speed are ...
QUO	Shall I search for ... 1. aircraft 2. ship 3. survival craft in the vicinity of ... latitude, ... longitude (<i>or according to any other indication</i>)?	Please search for ... 1. aircraft 2. ship 3. survival craft in the vicinity of ... latitude, ... longitude (<i>or according to any other indication</i>).

Abbreviation	Question	Answer or Advice
	Search and Rescue (cont.)	
QUP	Will you indicate your position by ... 1. searchlight 2. black smoke trail 3. pyrotechnic lights?	My position is indicated by ... 1. searchlight 2. black smoke trail 3. pyrotechnic lights.
QUQ	Shall I train my searchlight nearly vertical on a cloud, occulting if possible and, if your aircraft is seen, deflect the beam up wind and on the water (<i>or land</i>) to facilitate your landing?	Please train your searchlight on a cloud, occulting if possible and, if my aircraft is seen or heard, deflect the beam up wind and on the water (<i>or land</i>) to facilitate my landing.
QUR	Have survivors ... 1. received survival equipment 2. been picked up by rescue vessel 3. been reached by ground rescue party?	Survivors ... 1. are in possession of survival equipment dropped by ... 2. have been picked up by rescue vessel 3. have been reached by ground rescue party.
QUS	Have you sighted survivors or wreckage? If so, in what position?	Have sighted ... 1. survivors in water 2. survivors on rafts 3. wreckage in position ... latitude, ... longitude (<i>or according to any other indication</i>).
QUT	Is position of incident marked?	Position of incident is marked by ... 1. flame or smoke float 2. sea marker 3. sea marker dye 4. ... (<i>specify other marking</i>).

Abbreviation	Question	Answer or Advice
	Search and Rescue (cont.)	
QUU	Shall I home ship or aircraft to my position?	Home ship or aircraft ... (<i>call sign</i>) ... 1. to your position by transmitting your call sign and long dashes on ... kHz (<i>or</i> MHz) 2. by transmitting on ... kHz (<i>or</i> MHz) TRUE track to reach you.
QUW	Are you in the search area designated as ... (<i>designator or latitude and longitude</i>)?	I am in the ... (<i>designation</i>) search area.
QUY	Is position of survival craft marked?	Position of survival craft was marked at ... hours by ... 1. flame or smoke float 2. sea marker 3. sea marker dye 4. ... (<i>specify other marking</i>). .
	Identification	
QTT		The identification signal which follows is superimposed on another transmission.

Section II. Miscellaneous Abbreviations and Signals

Abbreviation or Signal	Definition
AA	All after ... (<i>used after a question mark to request a repetition</i>).
AB	All before ... (<i>used after a question mark to request a repetition</i>).
ADS	Address (<i>used after a question mark to request a repetition</i>).
$\overline{AR}$	End of transmission (· - - - · <i>to be sent as one signal</i>).
$\overline{AS}$	Waiting period (· - - - · <i>to be sent as one signal</i>).
BK	Signal used to interrupt a transmission in progress.
BN	All between ... and ... (<i>used after a question mark to request a repetition</i>).
BQ	A reply to an RQ.
CFM	Confirm (<i>or I confirm</i>).
CL	I am closing my station.
COL	Collate (<i>or I collate</i>).
CP	General call to two or more specified stations (<i>see Article 52</i>).
CQ	General call to all stations (<i>see Article 52</i>).
CS	Call sign (<i>used to request a call sign</i>).
$\overline{DDD}$	Used to identify the transmission of the distress message by a station not itself in distress (<i>see No. 3164</i>).
DE	"From ..." (<i>used to precede the call sign of the calling station</i>).
DF	Your bearing at ... hours was ... degrees, in the doubtful sector of this station, with a possible error of ... degrees.
DO	Bearing doubtful. Ask for another bearing later (<i>or at ... hours</i>).
E	East (cardinal point).
ER	Here ...
ETA	Estimated time of arrival.
ITP	The punctuation counts.
K	Invitation to transmit.
KMH	Kilometres per hour.
KTS	Nautical miles per hour (<i>knots</i>).
MIN	Minute (<i>or Minutes</i>).

Abbreviation or Signal	Definition
MPH	Statute miles per hour.
MSG	Prefix indicating a message to or from the master of a ship concerning its operation or navigation.
N	North (cardinal point).
NIL	I have nothing to send to you.
NO	No (<i>negative</i>).
NW	Now.
OK	We agree (<i>or</i> It is correct).
OL	Ocean Letter.
P	Prefix indicating a private radiotelegram.
PBL	Preamble (<i>used after a question mark to request a repetition</i>).
R	Received.
REF	Reference to ... (<i>or</i> Refer to ...).
RPT	Repeat (<i>or</i> I repeat) (<i>or</i> Repeat ...).
RQ	Indication of a request.
S	South (cardinal point).
SIG	Signature (<i>used after a question mark to request a repetition</i>).
SLT	Radiomaritime Letter.
<u>SOS</u>	Distress Signal (<i>... — — ... to be sent as one signal</i>).
SS	Indicator preceding the name of a ship station.
SVC	Prefix indicating a service telegram.
SYS	Refer to your service telegram.
TFC	Traffic.
TR	Used by a land station to request the position and next port of call of a mobile station (<i>see No. 3691</i>); used also as a prefix to the reply.
TTT	This group when sent three times constitutes the safety signal (<i>see No. 3221</i>).
TU	Thank you.
TXT	Text (<i>used after a question mark to request a repetition</i>).
<u>VA</u>	End of work (<i>... — — ... to be sent as one signal</i>).
W	West (cardinal point).

Abbreviation or Signal	Definition
WA	Word after ... (<i>used after a question mark to request a repetition</i>).
WB	Word before ... (<i>used after a question mark to request a repetition</i>).
WD	Word(s) <i>or</i> Group(s).
XQ	Prefix used to indicate an operating communication in the fixed service.
XXX	This group when sent three times constitutes the urgency signal (<i>see No. 3196</i>).
YES	Yes (<i>affirmative</i>).

APPENDIX 14

**Miscellaneous Abbreviations and Signals to Be Used
for Radiocommunications in the Maritime Mobile Service**

(See Articles 37, 63 and 65)

Section I. Q Code**Introduction**

1. The series of groups listed in this Appendix range from QOA to QUZ.
2. The QOA to QQZ series are reserved for the maritime mobile service.
3. Certain Q code abbreviations may be given an affirmative or negative sense by sending, immediately following the abbreviation, the letter C or the letters NO (in radiotelephony spoken as: CHARLIE or NO).
4. The meanings assigned to Q code abbreviations may be amplified or completed by the appropriate addition of other groups, call signs, place names, figures, numbers, etc. It is optional to fill in the blanks shown in parentheses. Any data which are filled in where blanks appear shall be sent in the same order as shown in the text of the following tables.
5. Q code abbreviations are given the form of a question when followed by a question mark in radiotelegraphy and RQ (ROMEO QUEBEC) in radiotelephony. When an abbreviation is used as a question and is followed by additional or complementary information, the question mark (or RQ) should follow this information.
6. Q code abbreviations with numbered alternative significations shall be followed by the appropriate figure to indicate the exact meaning intended. This figure shall be sent immediately following the abbreviation.
7. All times shall be given in Coordinated Universal Time (UTC) unless otherwise indicated in the question or reply.
8. An asterisk * following a Q code abbreviation means that this signal has a meaning similar to a signal appearing in the International Code of Signals.

Abbreviations Available for the Maritime Mobile Service

A. List of Abbreviations in Alphabetical Order

Abbreviation	Question	Answer or Advice
QOA	Can you communicate by radio-telegraphy (500 kHz)?	I can communicate by radio-telegraphy (500 kHz).
QOB	Can you communicate by radio-telephony (2 182 kHz)?	I can communicate by radio-telephony (2 182 kHz).
QOC	Can you communicate by radio-telephony (channel 16 — frequency 156.80 MHz)?	I can communicate by radio-telephony (channel 16 — frequency 156.80 MHz).
QOD	Can you communicate with me in ... 0. Dutch 5. Italian 1. English 6. Japanese 2. French 7. Norwegian 3. German 8. Russian 4. Greek 9. Spanish?	I can communicate with you in ... 0. Dutch 5. Italian 1. English 6. Japanese 2. French 7. Norwegian 3. German 8. Russian 4. Greek 9. Spanish.
QOE	Have you received the safety signal sent by ... (<i>name and/or call sign</i>)?	I have received the safety signal sent by ... (<i>name and/or call sign</i>).
QOF	What is the commercial quality of my signals?	The quality of your signals is ... 1. not commercial 2. marginally commercial 3. commercial.
QOG	How many tapes have you to send?	I have ... tapes to send.
QOH	Shall I send a phasing signal for ... seconds?	Send a phasing signal for ... seconds.
QOI	Shall I send my tape?	Send your tape.
QOJ	Will you listen on ... kHz (<i>or</i> MHz) for signals of emergency position-indicating radiobeacons?	I am listening on ... kHz (<i>or</i> MHz) for signals of emergency position-indicating radiobeacons.

Abbreviation	Question	Answer or Advice
QOK	Have you received the signals of an emergency position-indicating radiobeacon on ... kHz (<i>or</i> MHz)?	I have received the signals of an emergency position-indicating radiobeacon on ... kHz (<i>or</i> MHz).
QOL	Is your vessel fitted for reception of selective calls? If so, what is your selective call number or signal?	My vessel is fitted for the reception of selective calls. My selective call number or signal is ...
QOM	On what frequencies can your vessel be reached by a selective call?	My vessel can be reached by a selective call on the following frequency/ies ... (periods of time to be added if necessary).
QOT	Do you hear my call; what is the approximate delay in minutes before we may exchange traffic?	I hear your call; the approximate delay is ... minutes.
QRA	What is the name of your vessel (<i>or</i> station)?	The name of my vessel (<i>or</i> station) is ...
QRB	How far approximately are you from my station?	The approximate distance between our stations is ... nautical miles (<i>or</i> kilometres).
QRC	By what private enterprise (<i>or</i> state administration) are the accounts for charges for your station settled?	The accounts for charges of my station are settled by the private enterprise ... (<i>or</i> state administration).
QRD	Where are you bound for and where are you from?	I am bound for ... from ...
QRE	What is your estimated time of arrival at ... (<i>or</i> over ...) (<i>place</i>)?	My estimated time of arrival at ... (<i>or</i> over ...) (<i>place</i>) is ... hours.
QRF	Are you returning to ... (<i>place</i>)?	I am returning to ... (<i>place</i>). <i>or</i> Return to ... (<i>place</i>).

Abbreviation	Question	Answer or Advice
QRG	Will you tell me my exact frequency (<i>or</i> that of ...)?	Your exact frequency (<i>or</i> that of ...) is ... kHz (<i>or</i> MHz).
QRH	Does my frequency vary?	Your frequency varies.
QRI	How is the tone of my transmission?	The tone of your transmission is ... 1. good 2. variable 3. bad.
QRJ	How many radiotelephone calls have you to book?	I have ... radiotelephone calls to book.
QRK	What is the intelligibility of my signals (<i>or</i> those of ... (<i>name and/or call sign</i>))?	The intelligibility of your signals (<i>or</i> those of ... (<i>name and/or call sign</i>)) is ... 1. bad 2. poor 3. fair 4. good 5. excellent.
QRL	Are you busy?	I am busy (<i>or</i> I am busy with ... (<i>name and/or call sign</i>)). Please do not interfere.
QRM	Is my transmission being interfered with?	Your transmission is being interfered with ... 1. nil 2. slightly 3. moderately 4. severely 5. extremely.

Abbreviation	Question	Answer or Advice
QRN	Are you troubled by static?	I am troubled by static ... 1. nil 2. slightly 3. moderately 4. severely 5. extremely.
QRO	Shall I increase transmitter power?	Increase transmitter power.
QRP	Shall I decrease transmitter power?	Decrease transmitter power.
QRQ	Shall I send faster?	Send faster (... words per minute).
QRR	Are you ready for automatic operation?	I am ready for automatic operation. Send at ... words per minute.
QRS	Shall I send more slowly?	Send more slowly (... words per minute).
QRT	Shall I stop sending?	Stop sending.
QRU	Have you anything for me?	I have nothing for you.
QRV	Are you ready?	I am ready.
QRW	Shall I inform ... that you are calling him on ... kHz (or MHz)?	Please inform ... that I am calling him on ... kHz (or MHz).
QRX	When will you call me again?	I will call you again at ... hours on ... kHz (or MHz).
QRY	What is my turn? (Relates to communication.)	Your turn is Number ... (or according to any other indication). (Relates to communication.)
QRZ	Who is calling me?	You are being called by ... (on ... kHz (or MHz)).

Abbreviation	Question	Answer or Advice
QSA	What is the strength of my signals (or those of ... <i>(name and/or call sign)</i>)?	The strength of your signals (or those of ... <i>(name and/or call sign)</i>) is ... 1. scarcely perceptible 2. weak 3. fairly good 4. good 5. very good.
QSB	Are my signals fading?	Your signals are fading.
QSC	Are you a low traffic ship station?	I am a low traffic ship station.
QSD	Are my signals mutilated?	Your signals are mutilated.
QSE*	What is the estimated drift of the survival craft?	The estimated drift of the survival craft is ... <i>(figures and units)</i> .
QSF*	Have you effected rescue?	I have effected rescue and am proceeding to ... base (with ... persons injured requiring ambulance).
QSG	Shall I send ... telegrams at a time?	Send ... telegrams at a time.
QSH	Are you able to home with your direction-finding equipment?	I am able to home with my direction-finding equipment (on ... <i>(name and/or call sign)</i>).
QSI		I have been unable to break in on your transmission. or Will you inform ... <i>(name and/or call sign)</i> that I have been unable to break in on his transmission (on ... kHz (or MHz)).

Abbreviation	Question	Answer or Advice
QSI	What is the charge to be collected to ... including your internal charge?	The charge to be collected to ... including my internal charge is ... francs.
QSK	Can you hear me between your signals and if so may I break in on your transmission?	I can hear you between my signals; break in on my transmission.
QSL	Can you acknowledge receipt?	I am acknowledging receipt.
QSM	Shall I repeat the last telegram which I sent you (<i>or</i> some previous telegram)?	Repeat the last telegram which you sent me (<i>or</i> telegram(s) number(s) ...).
QSN	Did you hear me (<i>or</i> ... (<i>name and/or call sign</i>)) on ... kHz (<i>or</i> MHz)?	I did hear you (<i>or</i> ... (<i>name and/or call sign</i>)) on ... kHz (<i>or</i> MHz).
QSO	Can you communicate with ... (<i>name and/or call sign</i>) direct (<i>or</i> by relay)?	I can communicate with ... (<i>name and/or call sign</i>) direct (<i>or</i> by relay through ...).
QSP	Will you relay to ... (<i>name and/or call sign</i>) free of charge?	I will relay to ... (<i>name and/or call sign</i>) free of charge.
QSQ	Have you a doctor on board (<i>or</i> is ... (<i>name of person</i>) on board)?	I have a doctor on board (<i>or</i> ... (<i>name of person</i>) is on board).
QSR	Shall I repeat the call on the calling frequency?	Repeat your call on the calling frequency; did not hear you (<i>or</i> have interference).
QSS	What working frequency will you use?	I will use the working frequency ... kHz (<i>or</i> MHz) (<i>in the high frequency bands normally only the last three figures of the frequency need be given</i>).
QSU	Shall I send or reply on this frequency (<i>or</i> on ... kHz (<i>or</i> MHz)) (with emissions of class ...)?	Send or reply on this frequency (<i>or</i> on ... kHz (<i>or</i> MHz)) (with emissions of class ...).

Abbreviation	Question	Answer or Advice
QSV	Shall I send a series of Vs (<i>or signs</i>) for adjustment on this frequency (<i>or on ... kHz (or MHz)</i>)?	Send a series of Vs (<i>or signs</i>) for adjustment on this frequency (<i>or on ... kHz (or MHz)</i>).
QSW	Will you send on this frequency (<i>or on ... kHz (or MHz)</i>) (with emissions of class ...)?	I am going to send on this frequency (<i>or on ... kHz (or MHz)</i>) (with emissions of class ...).
QSX	Will you listen to ... (<i>name and/or call sign(s)</i>) on ... kHz (<i>or MHz</i>), or in the bands .../channels ...?	I am listening to ... (<i>name and/or call sign(s)</i>) on ... kHz (<i>or MHz</i>), or in the bands .../channels ...
QSY	Shall I change to transmission on another frequency?	Change to transmission on another frequency (<i>or on ... kHz (or MHz)</i>).
QSZ	Shall I send each word or group more than once?	Send each word or group twice (<i>or ... times</i>).
QTA	Shall I cancel telegram (<i>or message</i>) number ...?	Cancel telegram (<i>or message</i>) number ...
QTB	Do you agree with my counting of words?	I do not agree with your counting of words; I will repeat the first letter or digit of each word or group.
QTC	How many telegrams have you to send?	I have ... telegrams for you (<i>or for ... (name and/or call sign)</i>).
QTD*	What has the rescue vessel or rescue aircraft recovered?	... (<i>identification</i>) has recovered ... 1. ... (<i>number</i>) survivors 2. wreckage 3. ... (<i>number</i>) bodies.

Abbreviation	Question	Answer or Advice
QTE	What is my TRUE bearing from you?	Your TRUE bearing from me is ... degrees at ... hours.
	<i>or</i>	<i>or</i>
	What is my TRUE bearing from ... (<i>name and/or call sign</i>)?	Your TRUE bearing from ... (<i>name and/or call sign</i>) was ... degrees at ... hours.
QTF	What is the TRUE bearing of ... (<i>name and/or call sign</i>) from ... (<i>name and/or call sign</i>)?	The TRUE bearing of ... (<i>name and/or call sign</i>) from ... (<i>name and/or call sign</i>) was ... degrees at ... hours.
	Will you give me my position according to the bearings taken by the direction-finding stations which you control?	Your position according to the bearings taken by the direction-finding stations which I control was ... latitude, ... longitude (<i>or other indication of position</i>), class ... at ... hours.
QTG	Will you send two dashes of ten seconds each (<i>or carrier</i>) followed by your call sign (<i>or name</i>) (repeated ... times) on ... kHz (<i>or MHz</i>)?	I am going to send two dashes of ten seconds each (<i>or carrier</i>) followed by my call sign (<i>or name</i>) (repeated ... times) on ... kHz (<i>or MHz</i>).
	Will you request ... (<i>name and/or call sign</i>) to send two dashes of ten seconds each (<i>or carrier</i>) followed by his call sign (<i>and/or name</i>) (repeated ... times) on ... kHz (<i>or MHz</i>)?	I have requested ... (<i>name and/or call sign</i>) to send two dashes of ten seconds each (<i>or carrier</i>) followed by his call sign (<i>and/or name</i>) (repeated ... times) on ... kHz (<i>or MHz</i>).

Abbreviation	Question	Answer or Advice
QTH	What is your position in latitude and longitude (<i>or according to any other indication</i>)?	My position is ... latitude, ... longitude (<i>or according to any other indication</i>).
QTI*	What is your TRUE course?	My TRUE course is ... degrees.
QJT*	What is your speed? (<i>Requests the speed of a ship or aircraft through the water or air respectively.</i>)	My speed is ... knots (<i>or kilometres per hour or ... statute miles per hour</i>). (<i>Indicates the speed of a ship or aircraft through the water or air respectively.</i>)
QTK*	What is the speed of your aircraft in relation to the surface of the Earth?	The speed of my aircraft in relation to the surface of the Earth is ... knots (<i>or ... kilometres per hour or ... statute miles per hour</i>).
QTL*	What is your TRUE heading?	My TRUE heading is ... degrees.
QTM*	What is your MAGNETIC heading?	My MAGNETIC heading is ... degrees.
QTN	At what time did you depart from ... (<i>place</i>)?	I departed from ... (<i>place</i>) at ... hours.
QTO	Have you left dock (<i>or port</i>)? <i>or</i> Are you airborne?	I have left dock (<i>or port</i>). <i>or</i> I am airborne.
QTP	Are you going to enter dock (<i>or port</i>)? <i>or</i> Are you going to alight (<i>or land</i>)?	I am going to enter dock (<i>or port</i>). <i>or</i> I am going to alight (<i>or land</i>).
QTD	Can you communicate with my station by means of the International Code of Signals (INTERCO)?	I am going to communicate with your station by means of the International Code of Signals (INTERCO).

Abbreviation	Question	Answer or Advice
QTR	What is the correct time?	The correct time is ... hours.
QTS	Will you send your call sign (<i>and/or</i> name) for ... seconds?	I will send my call sign (<i>and/or</i> name) for ... seconds.
QTT		The identification signal which follows is superimposed on another transmission.
QTU	What are the hours during which your station is open?	My station is open from ... to ... hours.
QTV	Shall I stand guard for you on the frequency of ... kHz (<i>or</i> MHz) (from ... to ... hours)?	Stand guard for me on the frequency of ... kHz (<i>or</i> MHz) (from ... to ... hours).
QTW*	What is the condition of survivors?	Survivors are in ... condition and urgently need ...
QTX	Will you keep your station open for further communication with me until further notice (<i>or</i> until ... hours)?	I will keep my station open for further communication with you until further notice (<i>or</i> until ... hours).
QTY*	Are you proceeding to the position of incident and if so when do you expect to arrive?	I am proceeding to the position of incident and expect to arrive at ... hours (on ... (<i>date</i>)).
QTZ*	Are you continuing the search?	I am continuing the search for ... (aircraft, ship, survival craft, survivors or wreckage).
QUA	Have you news of ... (<i>name and/or call sign</i>)?	Here is news of ... (<i>name and/or call sign</i>).
QUB*	Can you give me in the following order information concerning: the direction in degrees TRUE and speed of the surface wind; visibility; present weather; and amount, type and height of base of cloud above surface elevation at ... (<i>place of observation</i>)?	Here is the information requested: ... (<i>The units used for speed and distances should be indicated.</i>)

Abbreviation	Question	Answer or Advice
QUC	What is the number <i>(or other indication)</i> of the last message you received from me <i>(or from ... (name and/or call sign))</i> ?	The number <i>(or other indication)</i> of the last message I received from you <i>(or from ... (name and/or call sign))</i> is ...
QUD	Have you received the urgency signal sent by ... <i>(name and/or call sign)</i> ?	I have received the urgency signal sent by ... <i>(name and/or call sign)</i> at ... hours.
QUE	Can you speak in ... <i>(language)</i> , with interpreter if necessary; if so, on what frequencies?	I can speak in ... <i>(language)</i> on ... kHz <i>(or MHz)</i> .
QUF	Have you received the distress signal sent by ... <i>(name and/or call sign)</i> ?	I have received the distress signal sent by ... <i>(name and/or call sign)</i> at ... hours.
QUH*	Will you give me the present barometric pressure at sea level?	The present barometric pressure at sea level is ... <i>(units)</i> .
QUM	May I resume normal working?	Normal working may be resumed.
QUN	1. <i>When directed to all stations:</i> Will vessels in my immediate vicinity ... or (in the vicinity of ... latitude, ... longitude) or (in the vicinity of ...) please indicate their position, TRUE course and speed? 2. <i>When directed to a single station:</i> Please indicate your position, TRUE course and speed.	My position, TRUE course and speed are ...
QUO*	Shall I search for ... 1. aircraft 2. ship 3. survival craft in the vicinity of ... latitude, ... longitude <i>(or according to any other indication)</i> ?	Please search for ... 1. aircraft 2. ship 3. survival craft in the vicinity of ... latitude, ... longitude <i>(or according to any other indication)</i> .

Abbreviation	Question	Answer or Advice
QUP*	Will you indicate your position by ... 1. searchlight 2. black smoke trail 3. pyrotechnic lights?	My position is indicated by ... 1. searchlight 2. black smoke trail 3. pyrotechnic lights.
QUR*	Have survivors ... 1. received survival equipment 2. been picked up by rescue vessel 3. been reached by ground rescue party?	Survivors ... 1. are in possession of survival equipment dropped by ... 2. have been picked up by rescue vessel 3. have been reached by ground rescue party.
QUS*	Have you sighted survivors or wreckage? If so, in what position?	Have sighted ... 1. survivors in water 2. survivors on rafts 3. wreckage in position ... latitude, ... longitude (or according to any other indication).
QUT*	Is position of incident marked?	Position of incident is marked by ... 1. flame or smoke float 2. sea marker 3. sea marker dye 4. ... (specify other marking).
QUU*	Shall I home ship or aircraft to my position?	Home ship or aircraft ... (name and/or call sign) ... 1. to your position by sending your call sign and long dashes on ... kHz (or MHz) 2. by sending on ... kHz (or MHz) TRUE track to reach you.
QUW*	Are you in the search area designated as ... (designator or latitude and longitude)?	I am in the ... (designation) search area.
QUX	Do you have any navigational warnings or gale warnings in force?	I have the following navigational warning(s) or gale warning(s) in force: ...

Abbreviation	Question	Answer or Advice
QUY*	Is position of survival craft marked?	Position of survival craft was marked at ... hours by ... 1. flame or smoke float 2. sea marker 3. sea marker dye 4. ... (<i>specify other marking</i>).
QUZ	May I resume restricted working?	Distress phase still in force; restricted working may be resumed.

B. Lists of Signals According to the Nature of Questions, Answer or Advice

Abbreviation	Question	Answer or Advice
	Name	
QRA	What is the name of your vessel (<i>or station</i>)?	The name of my vessel (<i>or station</i>) is ...
	Route	
QRD	Where are you bound for and where are you from?	I am bound for ... from ...
	Position	
QRB	How far approximately are you from my station?	The approximate distance between our stations is ... nautical miles (<i>or kilometres</i>).
QTH	What is your position in latitude and longitude (<i>or according to any other indication</i>)?	My position is ... latitude, ... longitude (<i>or according to any other indication</i>).
QTN	At what time did you depart from ... (<i>place</i>)?	I departed from ... (<i>place</i>) at ... hours.
	Quality of Signals	
QOF	What is the commercial quality of my signals?	The quality of your signals is ... 1. not commercial 2. marginally commercial 3. commercial.
QRI	How is the tone of my transmission?	The tone of your transmission is ... 1. good 2. variable 3. bad.
QRK	What is the intelligibility of my signals (<i>or those of ... (name and/or call sign)</i>)?	The intelligibility of your signals (<i>or those of ... (name and/or call sign)</i>) is ... 1. bad 2. poor 3. fair 4. good 5. excellent.

Abbreviation	Question	Answer or Advice
	Strength of Signals	
QRO	Shall I increase transmitter power?	Increase transmitter power.
QRP	Shall I decrease transmitter power?	Decrease transmitter power.
QSA	What is the strength of my signals (or those of ... <i>(name and/or call sign)</i>)?	The strength of your signals (or those of ... <i>(name and/or call sign)</i>) is ... 1. scarcely perceptible 2. weak 3. fairly good 4. good 5. very good.
QSB	Are my signals fading?	Your signals are fading.
	Keying	
QRQ	Shall I send faster?	Send faster (... words per minute).
QRR	Are you ready for automatic operation?	I am ready for automatic operation. Send at ... words per minute.
QRS	Shall I send more slowly?	Send more slowly (... words per minute).
QSD	Are my signals mutilated?	Your signals are mutilated.
	Interference	
QRM	Is my transmission being interfered with?	Your transmission is being interfered with ... 1. nil 2. slightly 3. moderately 4. severely 5. extremely.

Abbreviation	Question	Answer or Advice
	Interference (cont.)	
QRN	Are you troubled by static?	I am troubled by static ... 1. nil 2. slightly 3. moderately 4. severely 5. extremely.
	Adjustment of Frequency	
QRG	Will you tell me my exact frequency (<i>or</i> that of ...)?	Your exact frequency (<i>or</i> that of ...) is ... kHz (<i>or</i> MHz).
QRH	Does my frequency vary?	Your frequency varies.
QTS	Will you send your call sign (<i>and/or</i> name) for ... seconds?	I will send my call sign (<i>and/or</i> name) for ... seconds.
	Choice of Frequency and/or Class of Emission	
QSN	Did you hear me (<i>or</i> ... (<i>name and/or call sign</i>)) on ... kHz (<i>or</i> MHz)?	I did hear you (<i>or</i> ... (<i>name and/or call sign</i>)) on ... kHz (<i>or</i> MHz).
QSS	What working frequency will you use?	I will use the working frequency ... kHz (<i>or</i> MHz) (<i>in the high frequency bands normally only the last three figures of the frequency need be given</i>).
QSU	Shall I send or reply on this frequency (<i>or</i> on ... kHz (<i>or</i> MHz)) (with emissions of class ...)?	Send or reply on this frequency (<i>or</i> on ... kHz (<i>or</i> MHz)) (with emissions of class ...).
QSV	Shall I send a series of Vs (<i>or</i> signs) for adjustment on this frequency (<i>or</i> on ... kHz (<i>or</i> MHz))?	Send a series of Vs (<i>or</i> signs) for adjustment on this frequency (<i>or</i> on ... kHz (<i>or</i> MHz)).

Abbreviation	Question	Answer or Advice
	Choice of Frequency and/or Class of Emission (cont.)	
QSW	Will you send on this frequency (<i>or</i> on ... kHz (<i>or</i> MHz)) (with emissions of class ...)?	I am going to send on this frequency (<i>or</i> on ... kHz (<i>or</i> MHz)) (with emissions of class ...).
QSX	Will you listen to ... (<i>name and/or call sign(s)</i>) on ... kHz (<i>or</i> MHz), or in the bands .../channels ...?	I am listening to ... (<i>name and/or call sign(s)</i>) on ... kHz (<i>or</i> MHz), or in the bands .../channels ...
	Change of Frequency	
QSY	Shall I change to transmission on another frequency?	Change to transmission on another frequency (<i>or</i> on ... kHz (<i>or</i> MHz)).
	Establishing Communication	
QOA	Can you communicate by radiotelegraphy (500 kHz)?	I can communicate by radiotelegraphy (500 kHz).
QOB	Can you communicate by radiotelephony (2 182 kHz)?	I can communicate by radiotelephony (2 182 kHz).
QOC	Can you communicate by radiotelephony (channel 16 — frequency 156.80 MHz)?	I can communicate by radiotelephony (channel 16 — frequency 156.80 MHz).
QOD	Can you communicate with me in ... 0. Dutch 5. Italian 1. English 6. Japanese 2. French 7. Norwegian 3. German 8. Russian 4. Greek 9. Spanish?	I can communicate with you in ... 0. Dutch 5. Italian 1. English 6. Japanese 2. French 7. Norwegian 3. German 8. Russian 4. Greek 9. Spanish.
QOT	Do you hear my call; what is the approximate delay in minutes before we may exchange traffic?	I hear your call; the approximate delay is ... minutes.

Abbreviation	Question	Answer or Advice
	Establishing Communication (cont.)	
QRL	Are you busy?	I am busy (<i>or</i> I am busy with ... (<i>name and/or call sign</i>)). Please do not interfere.
QRV	Are you ready?	I am ready.
QRX	When will you call me again?	I will call you again at ... hours on ... kHz (<i>or</i> MHz).
QRY	What is my turn? (<i>Relates to communication.</i>)	Your turn is Number ... (<i>or according to any other indication.</i>) (<i>Relates to communication.</i>)
QRZ	Who is calling me?	You are being called by ... (on ... kHz (<i>or</i> MHz)).
QSC	Are you a low traffic ship station?	I am a low traffic ship station.
QSR	Shall I repeat the call on the calling frequency?	Repeat your call on the calling frequency; did not hear you (<i>or</i> have interference).
QTQ	Can you communicate with my station by means of the International Code of Signals (INTERCO)?	I am going to communicate with your station by means of the International Code of Signals (INTERCO).
QUE	Can you speak in ... (<i>language</i>), with interpreter if necessary; if so, on what frequencies?	I can speak in ... (<i>language</i>) on ... kHz (<i>or</i> MHz).
	Selective Calls	
QOL	Is your vessel fitted for reception of selective calls? If so, what is your selective call number or signal?	My vessel is fitted for the reception of selective calls. My selective call number or signal is ...

Abbreviation	Question	Answer or Advice
	Selective Calls (cont.)	
QOM	On what frequencies can your vessel be reached by a selective call?	My vessel can be reached by a selective call on the following frequency/ies ... (periods of time to be added if necessary).
	Time	
QTR	What is the correct time?	The correct time is ... hours.
QTU	What are the hours during which your station is open?	My station is open from ... to ... hours.
	Charges	
QRC	By what private enterprise (<i>or</i> state administration) are the accounts for charges for your station settled?	The accounts for charges of my station are settled by the private enterprise ... (<i>or</i> state administration).
QSJ	What is the charge to be collected to ... including your internal charge?	The charge to be collected to ... including my internal charge is ... francs.
	Transit	
QRW	Shall I inform ... that you are calling him on ... kHz (<i>or</i> MHz)?	Please inform ... that I am calling him on ... kHz (<i>or</i> MHz).
QSO	Can you communicate with ... (<i>name and/or call sign</i>) direct (<i>or</i> by relay)?	I can communicate with ... (<i>name and/or call sign</i>) direct (<i>or</i> by relay through ...).
QSP	Will you relay to ... (<i>name and/or call sign</i>) free of charge?	I will relay to ... (<i>name and/or call sign</i>) free of charge.
QSQ	Have you a doctor on board (<i>or</i> is ... (<i>name of person</i>) on board)?	I have a doctor on board (<i>or</i> ... (<i>name of person</i>) is on board).
QUA	Have you news of ... (<i>name and/or call sign</i>)?	Here is news of ... (<i>name and/or call sign</i>).

Abbreviation	Question	Answer or Advice
	Transit (cont.)	
QUC	What is the number (<i>or other indication</i>) of the last message you received from me (<i>or from ... (name and/or call sign)</i>)?	The number (<i>or other indication</i>) of the last message I received from you (<i>or from ... (name and/or call sign)</i>) is ...
	Exchange of Correspondence	
QOG	How many tapes have you to send?	I have ... tapes to send.
QOH	Shall I send a phasing signal for ... seconds?	Send a phasing signal for ... seconds.
QOI	Shall I send my tape?	Send your tape.
QRJ	How many radiotelephone calls have you to book?	I have ... radiotelephone calls to book.
QRU	Have you anything for me?	I have nothing for you.
QSG	Shall I send ... telegrams at a time?	Send ... telegrams at a time.
QSI		I have been unable to break in on your transmission.
		<i>or</i>
		Will you inform ... (<i>name and/or call sign</i>) that I have been unable to break in on his transmission (on ... kHz (<i>or</i> MHz)).
QSK	Can you hear me between your signals and if so may I break in on your transmission?	I can hear you between my signals; break in on my transmission.
QSL	Can you acknowledge receipt?	I am acknowledging receipt.
QSM	Shall I repeat the last telegram which I sent you (<i>or some previous telegram</i>)?	Repeat the last telegram which you sent me (<i>or telegram(s) number(s) ...</i>).

Abbreviation	Question	Answer or Advice
	Exchange of Correspondence (cont.)	
QSZ	Shall I send each word or group more than once?	Send each word or group twice (<i>or</i> ... times).
QTA	Shall I cancel telegram (<i>or</i> message) number ...?	Cancel telegram (<i>or</i> message) number ...
QTB	Do you agree with my counting of words?	I do not agree with your counting of words; I will repeat the first letter or digit of each word or group.
QTC	How many telegrams have you to send?	I have ... telegrams for you (<i>or</i> for ... (<i>name and/or call sign</i>)).
QTV	Shall I stand guard for you on the frequency of ... kHz (<i>or</i> MHz) (from ... to ... hours)?	Stand guard for me on the frequency of ... kHz (<i>or</i> MHz) (from ... to ... hours).
QTX	Will you keep your station open for further communication with me until further notice (<i>or</i> until ... hours)?	I will keep my station open for further communication with you until further notice (<i>or</i> until ... hours).
	Movement	
QRE	What is your estimated time of arrival at ... (<i>or</i> over ...) (<i>place</i>)?	My estimated time of arrival at ... (<i>or</i> over ...) (<i>place</i>) is ... hours.
QRF	Are you returning to ... (<i>place</i>)?	I am returning to ... (<i>place</i>). <i>or</i> Return to ... (<i>place</i>).
QSH	Are you able to home with your direction-finding equipment?	I am able to home with my direction-finding equipment (on ... (<i>name and/or call sign</i>)).
QTI*	What is your TRUE course?	My TRUE course is ... degrees.

Abbreviation	Question	Answer or Advice
	Movement (cont.)	
QTJ*	What is your speed? <i>(Requests the speed of a ship or aircraft through the water or air respectively.)</i>	My speed is ... knots <i>(or kilometres per hour or ... statute miles per hour).</i> <i>(Indicates the speed of a ship or aircraft through the water or air respectively.)</i>
QTK*	What is the speed of your aircraft in relation to the surface of the Earth?	The speed of my aircraft in relation to the surface of the Earth is ... knots <i>(or ... kilometres per hour or ... statute miles per hour).</i>
QTL*	What is your TRUE heading?	My TRUE heading is ... degrees.
QTM*	What is your MAGNETIC heading?	My MAGNETIC heading is ... degrees.
QTN	At what time did you depart from ... <i>(place)</i> ?	I departed from ... <i>(place)</i> at ... hours.
QTO	Have you left dock <i>(or port)</i> ?	I have left dock <i>(or port)</i> .
	<i>or</i>	<i>or</i>
	Are you airborne?	I am airborne.
QTP	Are you going to enter dock <i>(or port)</i> ?	I am going to enter dock <i>(or port)</i> .
	<i>or</i>	<i>or</i>
	Are you going to alight <i>(or land)</i> ?	I am going to alight <i>(or land)</i> .
QUN	1. <i>When directed to all stations:</i> Will vessels in my immediate vicinity ... <i>or</i> (in the vicinity of ... latitude, ... longitude) <i>or</i> (in the vicinity of ...) please indicate their position, TRUE course and speed? 2. <i>When directed to a single station:</i> Please indicate your position, TRUE course and speed.	My position, TRUE course and speed are ...

Abbreviation	Question	Answer or Advice
	Meteorology	
QUB*	Can you give me in the following order information concerning: the direction in degrees TRUE and speed of the surface wind; visibility; present weather; and amount, type and height of base of cloud above surface elevation at ... <i>(place of observation)</i> ?	Here is the information requested: ... <i>(The units used for speed and distances should be indicated.)</i>
QUH*	Will you give me the present barometric pressure at sea level?	The present barometric pressure at sea level is ... <i>(units)</i> .
QUX	Do you have any navigational warnings or gale warnings in force?	I have the following navigational warning(s) or gale warning(s) in force: ...
	Radio Direction-Finding	
QTE	What is my TRUE bearing from you?	Your TRUE bearing from me is ... degrees at ... hours.
	<i>or</i>	<i>or</i>
	What is my TRUE bearing from ... <i>(name and/or call sign)</i> ?	Your TRUE bearing from ... <i>(name and/or call sign)</i> was ... degrees at ... hours.
	<i>or</i>	<i>or</i>
	What is the TRUE bearing of ... <i>(name and/or call sign)</i> from ... <i>(name and/or call sign)</i> ?	The TRUE bearing of ... <i>(name and/or call sign)</i> from ... <i>(name and/or call sign)</i> was ... degrees at ... hours.
QTF	Will you give me my position according to the bearings taken by the direction-finding stations which you control?	Your position according to the bearings taken by the direction-finding stations which I control was ... latitude, ... longitude <i>(or other indication of position)</i> , class ... at ... hours.

Abbreviation	Question	Answer or Advice
QTG	Radio Direction-Finding (cont.)	
	Will you send two dashes of ten seconds each (<i>or carrier</i>) followed by your call sign (<i>or name</i>) (repeated ... times) on ... kHz (<i>or MHz</i>)? <i>or</i>	I am going to send two dashes of ten seconds each (<i>or carrier</i>) followed by my call sign (<i>or name</i>) (repeated ... times) on ... kHz (<i>or MHz</i>). <i>or</i>
	Will you request ... (<i>name and/or call sign</i>) to send two dashes of ten seconds each (<i>or carrier</i>) followed by his call sign (<i>and/or name</i>) (repeated ... times) on ... kHz (<i>or MHz</i>)?	I have requested ... (<i>name and/or call sign</i>) to send two dashes of ten seconds each (<i>or carrier</i>) followed by his call sign (<i>and/or name</i>) (repeated ... times) on ... kHz (<i>or MHz</i>).
	Suspension of Work	
QRT	Shall I stop sending?	Stop sending.
QUM	May I resume normal working?	Normal working may be resumed.
QUZ	May I resume restricted working?	Distress phase still in force; restricted working may be resumed.
	Safety	
QOE	Have you received the safety signal sent by ... (<i>name and/or call sign</i>)?	I have received the safety signal sent by ... (<i>name and/or call sign</i>).
QUX	Do you have any navigational warnings or gale warnings in force?	I have the following navigational warning(s) or gale warning(s) in force: ...
	Urgency	
QUD	Have you received the urgency signal sent by ... (<i>name and/or call sign</i>)?	I have received the urgency signal sent by ... (<i>name and/or call sign</i>) at ... hours.

Abbreviation	Question	Answer or Advice
Distress		
QOJ	Will you listen on ... kHz (or MHz) for signals of emergency position-indicating radiobeacons?	I am listening on ... kHz (or MHz) for signals of emergency position-indicating radiobeacons.
QOK	Have you received the signals of an emergency position-indicating radiobeacon on ... kHz (or MHz)?	I have received the signals of an emergency position-indicating radiobeacon on ... kHz (or MHz).
QUF	Have you received the distress signal sent by ... (name and/or call sign)?	I have received the distress signal sent by ... (name and/or call sign) at ... hours.
QUM	May I resume normal working?	Normal working may be resumed.
QUZ	May I resume restricted working?	Distress phase still in force; restricted working may be resumed.
Search and Rescue		
QSE*	What is the estimated drift of the survival craft?	The estimated drift of the survival craft is ... (figures and units).
QSF*	Have you effected rescue?	I have effected rescue and am proceeding to ... base (with ... persons injured requiring ambulance).
QTD*	What has the rescue vessel or rescue aircraft recovered?	... (identification) has recovered ... 1. ... (number) survivors 2. wreckage 3. ... (number) bodies.
QTW*	What is the condition of survivors?	Survivors are in ... condition and urgently need ...
QTY*	Are you proceeding to the position of incident and if so when do you expect to arrive?	I am proceeding to the position of incident and expect to arrive at ... hours (on ... (date)).

Abbreviation	Question	Answer or Advice
	Search and Rescue (cont.)	
QTZ*	Are you continuing the search?	I am continuing the search for ... (aircraft, ship, survival craft, survivors or wreckage).
QUN	1. <i>When directed to all stations:</i> Will vessels in my immediate vicinity ... or (in the vicinity of ... latitude, ... longitude) or (in the vicinity of ...) please indicate their position, TRUE course and speed? 2. <i>When directed to a single station:</i> Please indicate your position, TRUE course and speed.	My position, TRUE course and speed are ...
QUO*	Shall I search for ... 1. aircraft 2. ship 3. survival craft in the vicinity of ... latitude, ... longitude (<i>or according to any other indication</i>)?	Please search for ... 1. aircraft 2. ship 3. survival craft in the vicinity of ... latitude, ... longitude (<i>or according to any other indication</i>).
QUP*	Will you indicate your position by ... 1. searchlight 2. black smoke trail 3. pyrotechnic lights?	My position is indicated by ... 1. searchlight 2. black smoke trail 3. pyrotechnic lights.
QUR*	Have survivors ... 1. received survival equipment 2. been picked up by rescue vessel 3. been reached by ground rescue party?	Survivors ... 1. are in possession of survival equipment dropped by ... 2. have been picked up by rescue vessel 3. have been reached by ground rescue party.

Abbreviation	Question	Answer or Advice
QUS* QUT* QUU* QUW* QUY* QUZ QTT	Search and Rescue (cont.) Have you sighted survivors or wreckage? If so, in what position? Is position of incident marked? Shall I home ship or aircraft to my position? Are you in the search area designated as ... (<i>designator or latitude and longitude</i>)? Is position of survival craft marked? May I resume restricted working? Identification	Have sighted ... 1. survivors in water 2. survivors on rafts 3. wreckage in position ... latitude, ... longitude (<i>or according to any other indication</i>). Position of incident is marked by ... 1. flame or smoke float 2. sea marker 3. sea marker dye 4. ... (<i>specify other marking</i>). Home ship or aircraft ... (<i>name and/or call sign</i>) ... 1. to your position by sending your call sign and long dashes on ... kHz (<i>or</i> MHz) 2. by sending on ... kHz (<i>or</i> MHz) TRUE track to reach you. I am in the ... (<i>designation</i>) search area. Position of survival craft was marked at ... hours by ... 1. flame or smoke float 2. sea marker 3. sea marker dye 4. ... (<i>specify other marking</i>). Distress phase still in force; restricted working may be resumed. The identification signal which follows is superimposed on another transmission.

Section II. Miscellaneous Abbreviations and Signals

Abbreviation or Signal	Definition
AA	All after ... <i>(used after a question mark in radiotelegraphy or after RQ in radiotelephony (in case of language difficulties) or after RPT, to request a repetition).</i>
AB	All before ... <i>(used after a question mark in radiotelegraphy or after RQ in radiotelephony (in case of language difficulties) or after RPT, to request a repetition).</i>
ADS	Address <i>(used after a question mark in radiotelegraphy or after RQ in radiotelephony (in case of language difficulties) or after RPT, to request a repetition).</i>
$\overline{AR}$	End of transmission.
$\overline{AS}$	Waiting period.
BK	Signal used to interrupt a transmission in progress.
BN	All between ... and ... <i>(used after a question mark in radiotelegraphy or after RQ in radiotelephony (in case of language difficulties) or after RPT, to request a repetition).</i>
BQ	A reply to an RQ.
$\overline{BT}$	Signal to mark the separation between different parts of the same transmission.
C	Yes <i>or</i> "The significance of the previous group should be read in the affirmative".
ÇFM	Confirm <i>(or I confirm).</i>
CL	I am closing my station.
COL	Collate <i>(or I collate).</i>
CORREC-TION	Cancel my last word <i>or</i> group. The correct word <i>or</i> group follows <i>(used in radiotelephony, spoken as KOR-REK-SHUN).</i>

Note: When used in radiotelegraphy, a bar over the letters composing a signal denotes that the letters are to be sent as one signal.

Abbreviation or Signal	Definition
CP	General call to two or more specified stations (<i>see Article 63</i>).
CQ	General call to all stations.
CS	Call sign (<i>used to request a call sign</i>).
DE	"From . . ." (<i>used to precede the name or other identification of the calling station</i>).
DF	Your bearing at . . . hours was . . . degrees, in the doubtful sector of this station, with a possible error of . . . degrees.
DO	Bearing doubtful. Ask for another bearing later (<i>or at . . . hours</i>).
E	East (cardinal point) (<i>see No. 3098</i>).
ETA	Estimated time of arrival.
INTERCO	International Code of Signals groups follow (<i>used in radiotelephony, spoken as IN-TER-CO</i>).
K	Invitation to transmit.
KA	Starting signal.
KTS	Nautical miles per hour (<i>knots</i>).
MIN	Minute (<i>or Minutes</i>).
MSG	Prefix indicating a message to or from the master of a ship concerning its operation or navigation.
N	North (cardinal point) (<i>see No. 3098</i>).
NIL	I have nothing to send to you.
NO	No (<i>negative</i>).
NW	Now.
NX	Notice to Mariners (<i>or Notice to Mariners follows</i>).
OK	We agree (<i>or It is correct</i>).
OL	Ocean Letter.
P	Prefix indicating a private radiotelegram.
PBL	Preamble (<i>used after a question mark in radiotelegraphy or after RQ in radiotelephony (in case of language difficulties) or after RPT, to request a repetition</i>).
PSE	Please.
R	Received.
REF	Reference to . . . (<i>or Refer to . . .</i>).
RPT	Repeat (<i>or I repeat</i>) (<i>or Repeat . . .</i>).

Abbreviation or Signal	Definition
RQ	Indication of a request.
S	South (cardinal point) (<i>see No. 3098</i>).
SIG	Signature (<i>used after a question mark in radiotelegraphy or after RQ in radiotelephony (in case of language difficulties) or after RPT, to request a repetition</i>).
SLT	Radiomaritime Letter.
SVC	Prefix indicating a service telegram.
SYS	Refer to your service telegram.
TFC	Traffic.
TR	Used by a land station to request the position and next port of call of a mobile station (<i>see Nos. 4741 and 4942</i>); used also as a prefix to the reply.
TU	Thank you.
TXT	Text (<i>used after a question mark in radiotelegraphy or after RQ in radiotelephony (in case of language difficulties) or after RPT, to request a repetition</i>).
$\overline{VA}$	End of work.
W	West (cardinal point) (<i>see No. 3098</i>).
WA	Word after . . . (<i>used after a question mark in radiotelegraphy or after RQ in radiotelephony (in case of language difficulties) or after RPT, to request a repetition</i>).
WB	Word before . . . (<i>used after a question mark in radiotelegraphy or after RQ in radiotelephony (in case of language difficulties) or after RPT, to request a repetition</i>).
WD	Word(s) or Group(s).
WX	Weather report (or Weather report follows).
XQ	Prefix used to indicate the transmission of a service note.
YZ	The words which follow are in plain language.

APPENDIX 15

SINPO and SINPFEMO Codes

(See CCIR Recommendation 251)

SINPO signal reporting code

	S	I	N	P	O
Rating scale	Signal strength	Degrading effect of			Overall rating
		Interference	Noise	Propagation disturbance	
5	Excellent	Nil	Nil	Nil	Excellent
4	Good	Slight	Slight	Slight	Good
3	Fair	Moderate	Moderate	Moderate	Fair
2	Poor	Severe	Severe	Severe	Poor
1	Barely audible	Extreme	Extreme	Extreme	Unusable

SINPFEMO signal reporting code

	S	I	N	P	F	E	M	O
Rating scale	Signal strength	Degrading effect of			Frequency of fading	Modulation		Overall rating
		Interference	Noise	Propagation disturbance		Quality	Depth	
5	Excellent	Nil	Nil	Nil	Nil	Excellent	Maximum	Excellent
4	Good	Slight	Slight	Slight	Slow	Good	Good	Good
3	Fair	Moderate	Moderate	Moderate	Moderate	Fair	Fair	Fair
2	Poor	Severe	Severe	Severe	Fast	Poor	Poor or Nil	Poor
1	Barely audible	Extreme	Extreme	Extreme	Very fast	Very poor	Continuously over-modulated	Unusable

Special remarks:

- a) A signal report shall consist of the code word SINPO or SINPFEMO followed by a group of five or eight numerals, rating, respectively, the five or eight characteristics of the particular signal code.
- b) The letter X shall be used instead of a numeral for characteristics not rated.
- c) Although the code word SINPFEMO is intended for radiotelephony, it may be used for radiotelegraphy.
- d) The overall rating for radiotelegraphy shall be as indicated in Tables I and II.

TABLE I

Overall rating	Mechanized Operations
5. Excellent 4. Good 3. Fair 2. Poor 1. Unusable	4-channel time-division multiplex 2-channel time-division multiplex Marginal single start-stop printer BKs, XQs and call signs readable Unreadable

TABLE II

Overall rating	Morse Operation
5. Excellent 4. Good 3. Fair 2. Poor 1. Unusable	High speed 100 wpm 50 wpm BKs, XQs and call signs readable Unreadable

e) The overall rating for telephony shall be as indicated in Table III.

TABLE III

Overall rating	Operating Condition	Quality
5. Excellent 4. Good 3. Fair	Signal quality unaffected Signal quality slightly affected Signal quality seriously affected; channel usable by operators or by experienced subscribers	} Commercial } Marginally commercial
2. Poor 1. Unusable	Channel just usable by operators Channel unusable by operators	} Not commercial

APPENDIX 16

**Channelling of the Maritime Mobile Radiotelephone Bands
Between 4 000 kHz and 23 000 kHz**

(See Article 60, Section IV)

1. Radiotelephone channelling arrangements for the frequencies to be used by coast and ship stations in the bands allocated to the maritime mobile service are indicated in two sections as follows:

Section A — Table of single-sideband transmitting frequencies for duplex (two-frequency) operation (in kHz);

Section B — Table of single-sideband transmitting frequencies for simplex (single-frequency) operation and for intership cross-band (two-frequency) operation (in kHz).

2. The technical characteristics for single-sideband transmitters are specified in Appendix 17.

3. One or more series of frequencies from Section A (with the exception of those frequencies mentioned in paragraph 5 below) may be assigned to each coast station, which uses these frequencies associated in pairs (see No. **4381**); each pair consists of a transmitting and a receiving frequency. The series shall be selected with due regard to the areas served and so as to avoid, as far as possible, harmful interference between the services of different coast stations.

4. The frequencies in Section B are provided for worldwide common use by ships of all categories, according to traffic requirements, for ship transmissions to coast stations and for intership communication. They are

also authorized for worldwide common use for transmissions by coast stations (simplex operation) provided the peak envelope power does not exceed 1 kW. (See Recommendation 304.)

5. The following frequencies in Section A are allocated for calling purposes:

- Channel No. 421 in the 4 MHz band;
- Channel No. 606 in the 6 MHz band;
- Channel No. 821 in the 8 MHz band;
- Channel No. 1221 in the 12 MHz band;
- Channel No. 1621 in the 16 MHz band;
- Channel No. 2221 in the 22 MHz band.

The remaining frequencies in Sections A and B are working frequencies.

6. a) Stations using single-sideband emissions shall operate only on the carrier frequencies shown in Sections A and B in conformity with the technical characteristics specified in Appendix 17. The upper sideband mode shall always be employed.
- b) Stations employing the single-sideband mode shall use only class R3E and J3E emissions. However, administrations should endeavour, as far as possible, to restrict to class J3E emissions the use of the Channels Nos. 401, 601, 801, 1201, 1601 and 2201.

7. If an administration authorizes the use of frequencies other than those indicated in Sections A and B, its radiotelephone service shall not cause harmful interference to radiotelephone stations of the maritime mobile service which use frequencies in accordance with the following Tables.

SECTION A

Table of Single-Sideband Transmitting Frequencies
for Duplex (Two-Frequency) Operation (in kHz)

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Channel No.	4 MHz Band				Channel No.	6 MHz Band				Channel No.	8 MHz Band				Channel No.	12 MHz Band				Channel No.	16 MHz Band				Channel No.	22 MHz Band			
	Coast stations		Ship stations			Coast stations		Ship stations			Coast stations		Ship stations			Coast stations		Ship stations			Coast stations		Ship stations			Coast stations		Ship stations	
	Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency		Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency		Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency		Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency		Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency		Carrier frequency	Assigned frequency	Carrier frequency	Assigned frequency
401	4 357.4	4 358.8	4 063	4 064.4	601	6 506.4	6 507.8	6 200	6 201.4	801	8 718.9	8 720.3	8 195	8 196.4	1201	13 100.8	13 102.2	12 330	12 331.4	1601	17 232.9	17 234.3	16 460	16 461.4	2201	22 596	22 597.4	22 000	22 001.4
402	4 360.5	4 361.9	4 066.1	4 067.5	602	6 509.5	6 510.9	6 203.1	6 204.5	802	8 722	8 723.4	8 198.1	8 199.5	1202	13 103.9	13 105.3	12 333.1	12 334.5	1602	17 236	17 237.4	16 463.1	16 464.5	2202	22 599.1	22 600.5	22 003.1	22 004.5
403	4 363.6	4 365	4 069.2	4 070.6	603	6 512.6	6 514	6 206.2	6 207.6	803	8 725.1	8 726.5	8 201.2	8 202.6	1203	13 107	13 108.4	12 336.2	12 337.6	1603	17 239.1	17 240.5	16 466.2	16 467.6	2203	22 602.2	22 603.6	22 006.2	22 007.6
404	4 366.7	4 368.1	4 072.3	4 073.7	604	6 515.7	6 517.1	6 209.3	6 210.7	804	8 728.2	8 729.6	8 204.3	8 205.7	1204	13 110.1	13 111.5	12 339.3	12 340.7	1604	17 242.2	17 243.6	16 469.3	16 470.7	2204	22 605.3	22 606.7	22 009.3	22 010.7
405	4 369.8	4 371.2	4 075.4	4 076.8	605	6 518.8	6 520.2	6 212.4	6 213.8	805	8 731.3	8 732.7	8 207.4	8 208.8	1205	13 113.2	13 114.6	12 342.4	12 343.8	1605	17 245.3	17 246.7	16 472.4	16 473.8	2205	22 608.4	22 609.8	22 012.4	22 013.8
406	4 372.9	4 374.3	4 078.5	4 079.9	606	6 521.9*	6 523.3*	6 215.5**2	6 216.9*	806	8 734.4	8 735.8	8 210.5	8 211.9	1206	13 116.3	13 117.7	12 345.5	12 346.9	1606	17 248.4	17 249.8	16 475.5	16 476.9	2206	22 611.5	22 612.9	22 015.5	22 016.9
407	4 376	4 377.4	4 081.6	4 083						807	8 737.5	8 738.9	8 213.6	8 215	1207	13 119.4	13 120.8	12 348.6	12 350	1607	17 251.5	17 252.9	16 478.6	16 480	2207	22 614.6	22 616	22 018.6	22 020
408	4 379.1	4 380.5	4 084.7	4 086.1						808	8 740.6	8 742	8 216.7	8 218.1	1208	13 122.5	13 123.9	12 351.7	12 353.1	1608	17 254.6	17 256	16 481.7	16 483.1	2208	22 617.7	22 619.1	22 021.7	22 023.1
409	4 382.2	4 383.6	4 087.8	4 089.2						809	8 743.7	8 745.1	8 219.8	8 221.2	1209	13 125.6	13 127	12 354.8	12 356.2	1609	17 257.7	17 259.1	16 484.8	16 486.2	2209	22 620.8	22 622.2	22 024.8	22 026.2
410	4 385.3	4 386.7	4 090.9	4 092.3						810	8 746.8	8 748.2	8 222.9	8 224.3	1210	13 128.7	13 130.1	12 357.9	12 359.3	1610	17 260.8	17 262.2	16 487.9	16 489.3	2210	22 623.9	22 625.3	22 027.9	22 029.3
411	4 388.4	4 389.8	4 094	4 095.4						811	8 749.9	8 751.3	8 226	8 227.4	1211	13 131.8	13 133.2	12 361	12 362.4	1611	17 263.9	17 265.3	16 491	16 492.4	2211	22 627	22 628.4	22 031	22 032.4
412	4 391.5	4 392.9	4 097.1	4 098.5						812	8 753	8 754.4	8 229.1	8 230.5	1212	13 134.9	13 136.3	12 364.1	12 365.5	1612	17 267	17 268.4	16 494.1	16 495.5	2212	22 630.1	22 631.5	22 034.1	22 035.5
413	4 394.6	4 396	4 100.2	4 101.6						813	8 756.1	8 757.5	8 232.2	8 233.6	1213	13 138	13 139.4	12 367.2	12 368.6	1613	17 270.1	17 271.5	16 497.2	16 498.6	2213	22 633.2	22 634.6	22 037.2	22 038.6
414	4 397.7	4 399.1	4 103.3	4 104.7						814	8 759.2	8 760.6	8 235.3	8 236.7	1214	13 141.1	13 142.5	12 370.3	12 371.7	1614	17 273.2	17 274.6	16 500.3	16 501.7	2214	22 636.3	22 637.7	22 040.3	22 041.7
415	4 400.8	4 402.2	4 106.4	4 107.8						815	8 762.3	8 763.7	8 238.4	8 239.8	1215	13 144.2	13 145.6	12 373.4	12 374.8	1615	17 276.3	17 277.7	16 503.4	16 504.8	2215	22 639.4	22 640.8	22 043.4	22 044.8
416	4 403.9	4 405.3	4 109.5	4 110.9	816	8 765.4	8 766.8	8 241.5	8 242.9	1216	13 147.3	13 148.7	12 376.5	12 377.9	1616	17 279.4	17 280.8	16 506.5	16 507.9	2216	22 642.5	22 643.9	22 046.5	22 047.9					
417	4 407	4 408.4	4 112.6	4 114	817	8 768.5	8 769.9	8 244.6	8 246	1217	13 150.4	13 151.8	12 379.6	12 381	1617	17 282.5	17 283.9	16 509.6	16 511	2217	22 645.6	22 647	22 049.6	22 051					
418	4 410.1	4 411.5	4 115.7	4 117.1	818	8 771.6	8 773	8 247.7	8 249.1	1218	13 153.5	13 154.9	12 382.7	12 384.1	1618	17 285.6	17 287	16 512.7	16 514.1	2218	22 648.7	22 650.1	22 052.7	22 054.1					
419	4 413.2	4 414.6	4 118.8	4 120.2	819	8 774.7	8 776.1	8 250.8	8 252.2	1219	13 156.6	13 158	12 385.8	12 387.2	1619	17 288.7	17 290.1	16 515.8	16 517.2	2219	22 651.8	22 653.2	22 055.8	22 057.2					
420	4 416.3	4 417.7	4 121.9	4 123.3	820	8 777.8	8 779.2	8 253.9	8 255.3	1220	13 159.7	13 161.1	12 388.9	12 390.3	1620	17 291.8	17 293.2	16 518.9	16 520.3	2220	22 654.9	22 656.3	22 058.9	22 060.3					
421	4 419.4*	4 420.8*	4 125 *	4 126.4*	821	8 780.9*	8 782.3*	8 257 *	8 258.4*	1221	13 162.8*	13 164.2*	12 392 *	12 393.4*	1621	17 294.9*	17 296.3*	16 522 *	16 523.4*	2221	22 658 *	22 659.4*	22 062 *	22 063.4*					
422	4 422.5	4 423.9	4 128.1	4 129.5	822	8 784	8 785.4	8 260.1	8 261.5	1222	13 165.9	13 167.3	12 395.1	12 396.5	1622	17 298	17 299.4	16 525.1	16 526.5	2222	22 661.1	22 662.5	22 065.1	22 066.5					
423	4 425.6	4 427	4 131.2	4 132.6	823	8 787.1	8 788.5	8 263.2	8 264.6	1223	13 169	13 170.4	12 398.2	12 399.6	1623	17 301.1	17 302.5	16 528.2	16 529.6	2223	22 664.2	22 665.6	22 068.2	22 069.6					
424	4 428.7	4 430.1	4 134.3	4 135.7	824	8 790.2	8 791.6	8 266.3	8 267.7	1224	13 172.1	13 173.5	12 401.3	12 402.7	1624	17 304.2	17 305.6	16 531.3	16 532.7	2224	22 667.3	22 668.7	22 071.3	22 072.7					
425	4 431.8	4 433.2	4 137.4	4 138.8	825	8 793.3	8 794.7	8 269.4	8 270.8	1225	13 175.2	13 176.6	12 404.4	12 405.8	1625	17 307.3	17 308.7	16 534.4	16 535.8	2225	22 670.4	22 671.8	22 074.4	22 075.8					
426	4 434.9	4 436.3	4 140.5	4 141.9	826	8 796.4	8 797.8	8 272.5	8 273.9	1226	13 178.3	13 179.7	12 407.5	12 408.9	1626	17 310.4	17 311.8	16 537.5	16 538.9	2226	22 673.5	22 674.9	22 077.5	22 078.9					
					827	8 799.5	8 800.9	8 275.6	8 277	1227	13 181.4	13 182.8	12 410.6	12 412	1627	17 313.5	17 314.9	16 540.6	16 542	2227	22 676.6	22 678	22 080.6	22 082					
					828	8 802.6	8 804	8 278.7	8 280.1	1228	13 184.5	13 185.9	12 413.7	12 415.1	1628	17 316.6	17 318	16 543.7	16 545.1	2228	22 679.7	22 681.1	22 083.7	22 085.1					
					829	8 805.7	8 807.1	8 281.8	8 283.2	1229	13 187.6																		

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SECTION B

**Table of Single-Sideband Transmitting Frequencies for Simplex (Single-Frequency) Operation
and for Intership Cross-Band (Two-Frequency) Operation (in kHz)**

(See paragraph 4 of this Appendix)

4 MHz Band		6 MHz Band		8 MHz Band		12 MHz Band		16 MHz Band		22 MHz Band	
Carrier fre- quency	Assigned fre- quency	Carrier fre- quency	Assigned fre- quency	Carrier fre- quency	Assigned fre- quency	Carrier fre- quency	Assigned fre- quency	Carrier fre- quency	Assigned fre- quency	Carrier fre- quency	Assigned fre- quency
4 143.6	4 145	6 218.6 6 221.6	6 220 6 223	8 291.1 8 294.2	8 292.5 8 295.6	12 429.2 12 432.3 12 435.4	12 430.6 12 433.7 12 436.8	16 587.1 16 590.2 16 593.3	16 588.5 16 591.6 16 594.7	22 124 22 127.1 22 130.2 22 133.3 22 136.4	22 125.4 22 128.5 22 131.6 22 134.7 22 137.8

APPENDIX 17

**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 23 000 kHz**

(See Article 60, Section IV)

1. Power of the carrier:

a) for class R3E emissions the power of the carrier shall be:

*Bands between 1 606.5 kHz (1 605 kHz Region 2) and
4 000 kHz*

- for coast station transmitters until 1 January 1982 and for ship station transmitters in use or to be installed before 2 January 1982: 16 ± 2 dB below the peak envelope power;
- for coast station transmitters after 1 January 1982 and for ship station transmitters installed after 1 January 1982: 18 ± 2 dB below the peak envelope power;

Bands between 4 000 kHz and 23 000 kHz

- for ship station transmitters installed before 2 January 1978: 16 ± 2 dB below the peak envelope power;
- for coast station transmitters after 1 January 1978 and for ship station transmitters installed after 1 January 1978: 18 ± 2 dB below the peak envelope power;

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- b) for class J3E emissions the power of the carrier shall be at least 40 dB below the peak envelope power.**

2. Coast and ship stations shall use only the upper sideband.

3. The transmitter audio-frequency band shall be 350 Hz to 2 700 Hz with a permitted amplitude variation of 6 dB.

4. The carrier frequencies shall be maintained within the following tolerances:

a) coast stations: ± 20 Hz;

b) ship stations:

Bands between 1 606.5 kHz (1 605 kHz Region 2) and 4 000 kHz

- tolerance applicable to transmitters in use or to be installed before 2 January 1982: ± 100 Hz; the short-term limits (of the order of 15 minutes) shall be ± 40 Hz;**
- tolerance applicable to transmitters installed after 1 January 1982 but before 2 January 1985: ± 50 Hz;**
- tolerance applicable to transmitters installed after 1 January 1985 and to all transmitters after 1 January 1990: ± 40 Hz;**

Bands between 4 000 kHz and 23 000 kHz

- tolerance applicable to transmitters installed before 2 January 1978: ± 100 Hz; the short-term limits (of the order of 15 minutes) shall be ± 40 Hz;**
- tolerance applicable to transmitters installed after 1 January 1978 and to all transmitters after 1 January 1990: ± 50 Hz.**

5. The unwanted frequency modulation of the carrier shall be sufficiently low to prevent harmful distortion.

6. When class H3E, R3E or J3E emissions are used, the power of any unwanted emission supplied to the antenna transmission line on any discrete frequency shall, when the transmitter is driven to full peak envelope power, be in accordance with the following table:

a) Transmitters in use or installed before 2 January 1982 ¹:

Separation Δ in kHz between the frequency of the unwanted emission ² and the assigned frequency ³	Minimum attenuation below peak envelope power
$1.6 < \Delta \leq 4.8$	28 dB
$4.8 < \Delta \leq 8$	38 dB
$8 < \Delta$	43 dB without exceeding the power of 50 mW

Transmitters using reduced carrier or suppressed carrier emission may, as far as concerns out-of-band emissions⁴ and those spurious emissions⁵ which are a result of the modulation process but do not fall in the spectrum of out-of-band emissions⁴, be tested for compliance with this regulation by means of a two-tone-audio input signal with a frequency separation between the tones such that all intermodulation products occur at frequencies at least 1.6 kHz removed from the assigned frequency.

b) Transmitters installed after 1 January 1982 ¹:

Separation Δ in kHz between the frequency of the unwanted emission ² and the assigned frequency ³	Minimum attenuation below peak envelope power
$1.5 < \Delta \leq 4.5$	31 dB
$4.5 < \Delta \leq 7.5$	38 dB
$7.5 < \Delta$	43 dB without exceeding the power of 50 mW

Transmitters using reduced carrier or suppressed carrier emission may, as far as concerns out-of-band emissions⁴ and those spurious emissions⁵ which are a result of the modulation process but do not fall in the spectrum of out-of-band emissions⁴, be tested for compliance with this regulation by means of a two-tone-audio input signal with a frequency separation between the tones such that all intermodulation products occur at frequencies at least 1.5 kHz removed from the assigned frequency.

¹ All administrations recognize the need to reduce the level of unwanted emissions and will therefore endeavour to ensure that the new requirements will be met by all newly designed transmitters under their jurisdiction as soon as practicable before 2 January 1982.

² *Unwanted emission*: See Article 1, No. 140.

³ The assigned frequency is 1 400 Hz higher than the carrier frequency (see No. 4194).

⁴ *Out-of-band emission*: See Article 1, No. 138.

⁵ *Spurious emission*: See Article 1, No. 139.

APPENDIX 18

**Table of Transmitting Frequencies in the
Band 156-174 MHz for Stations in the
Maritime Mobile Service**

(See No. 613 and Articles 59 and 60)

Note 1: For assistance in understanding the Table, see notes *a*) to *q*) below.

Note 2: Channels 01 to 28, except 15 and 17, correspond to the channels of Appendix 18 to the Radio Regulations, Geneva, 1959, and channels 15, 17, and 60 to 88 correspond to those additional channels made available for assignment in accordance with the provisions of Appendix 18 Mar to the Radio Regulations, Geneva, 1967 (see Resolution 308).

Note 3: Channel designators 60 to 88 were chosen for the additional channels in order to separate them clearly from the original channels.

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[illegible]

Channel designators	Notes	Transmitting frequencies (MHz)		Inter- ship	Port operations		Ship movement		Public corres- pondence
		Ship stations	Coast stations		Single fre- quency	Two fre- quency	Single fre- quency	Two fre- quency	
16		156-800	156-800	DISTRESS SAFETY AND CALLING					
76	m)	Guardband 156.8125 156.8375 MHz							
17	g) l)	156-850	156-850	13	13				
77		156-875		11					
18	f)	156-900	161-500			3		22	
78		156-925	161-525			12		13	27
19	f)	156-950	161-550			4		21	
79	f) p)	156-975	161-575			14		1	
20	f)	157-000	161-600			1		23	
80	f) p)	157-025	161-625			16		2	
21	f) i)	157-050	156-050 or 161-650			5		20	
81		157-075	161-675			15		10	28
22	f)	157-100	161-700			2		24	
82		157-125	161-725			13		11	26
23	i)	157-150	156-150 or 161-750						5
83	i)	157-175	156-175 or 161-775						16
24		157-200	161-800						4
84		157-225	161-825			24		12	13
25		157-250	161-850						3
85		157-275	161-875						17
26		157-300	161-900						1
86	q)	157-325	161-925						15
27		157-350	161-950						2
87		157-375	161-975						14
28		157-400	162-000						6
88	j)	157-425	162-025						18

NOTES REFERRING TO THE TABLE

- a)* The figures in the column headed "Intership" indicate the normal sequence in which channels should be taken into use by mobile stations.
- b)* The figures in the columns headed "Port operations", "Ship movement" and "Public correspondence" indicate the normal sequence in which channels should be taken into use by each coast station. However, in some cases, it may be necessary to omit channels in order to avoid harmful interference between the services of neighbouring coast stations.
- c)* Administrations may designate frequencies in the intership, port operations and ship movement services for use by light aircraft and helicopters to communicate with ships or participating coast stations in predominantly maritime support operations under the conditions specified in Nos. **4144, 4148, 4149, 4150, 4151, 4152 and 4153**. However, the use of the channels which are shared with public correspondence shall be subject to prior agreement between interested and affected administrations.
- d)* The channels of the present Appendix, with the exception of 06, 15, 16, 17, 75 and 76, may also be used for high-speed data and facsimile transmissions, subject to special arrangement between interested and affected administrations.
- e)* Except in the United States of America, the channels of Appendix 18, preferably two adjacent channels from the series 87, 28, 88, with the exception of 06, 15, 16, 17, 75 and 76, may be used for narrow-band direct-printing telegraphy and data transmission, subject to special arrangement between interested and affected administrations.
- f)* The two-frequency channels for port operations (18, 19, 20, 21, 22, 79 and 80) may be used for public correspondence, subject to special arrangement between interested and affected administrations.
- g)* Until 1 January 1983, the effective radiated power of ship stations on channels 15 and 17 shall not exceed 1 W.

- h)* The frequency 156-300 MHz (channel 06) (see Nos. 2993 and 4154) may also be used for communication between ship stations and aircraft stations engaged in coordinated search and rescue operations. Ship stations shall avoid harmful interference to such communications on channel 06 as well as to communications between aircraft stations, ice-breakers and assisted ships during ice seasons.
- i)* In France and in Belgium, the frequencies 156-050, 156-150 and 156-175 MHz are used as ship station frequencies in channels 01, 03 and 63 respectively and as coast station frequencies in channels 21, 23 and 83 respectively when the latter are used in the special semiduplex public correspondence systems employed with 1 MHz separation between transmitting and receiving frequencies. These special provisions will cease to be used not later than 1 January 1983.
- j)* Channels 60 and 88 can be used subject to special arrangements between interested and affected administrations.
- k)* The frequencies in this Table may also be used for radiocommunications on inland waterways in accordance with the conditions specified in No. 613.
- l)* Channels 15 and 17 may also be used for on-board communications provided the effective radiated power does not exceed 1 W. and subject to the national regulations of the administration concerned when these channels are used in its territorial waters. (However, see Recommendation 305).
- m)* This guardband will apply after 1 January 1983 (see Nos. 3033, 3033.1, 4393 and 4393.1).
- n)* Within the European Maritime area and in Canada these frequencies (channels 10, 67, 73) may also be used, if so required, by the individual administrations concerned, for communication between ship stations, aircraft stations and participating land stations engaged in coordinated search and rescue and anti-pollution operations in local areas, under the conditions specified in Nos. 4144, 4148, 4149, 4150, 4151, 4152 and 4153.
- o)* The preferred first three frequencies for the purpose indicated in Note c) are 156-450 MHz (channel 09), 156-525 MHz (channel 70) and 156-625 MHz (channel 72).

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- p)** These channels (68, 69, 11, 71, 12, 13, 14, 74, 79, 80) are the preferred channels for the ship movement service. They may, however, be assigned to the port operations service until required for the ship movement service if this should prove to be necessary in any specific area.

 - q)** This channel (86) may be used as a calling channel if such a channel is required in an automatic radiotelephone system when such a system is recommended by the **CCIR**.
-

APPENDIX 19

**Technical Characteristics for Transmitters and Receivers
Used in the Maritime Mobile Service
in the Band 156 – 174 MHz**

(See Articles 59 and 60, Appendix 18 and Resolution 308)

1. Only frequency modulation with a pre-emphasis of 6 dB/octave (phase modulation) shall be used.
 2. The frequency deviation corresponding to 100% modulation shall approach ± 5 kHz as nearly as practicable. In no event shall the frequency deviation exceed ± 5 kHz.
 3. The frequency tolerance for coast and ship stations shall be 10 parts in 10^6 (see note 27) to Appendix 7).
 4. When transmitting on any of the frequencies designated in the table in Appendix 18, the emission of each station shall be vertically polarized at the source.
 5. The audio-frequency band shall be limited to 3 000 Hz.
 6. It shall be possible to reduce, readily, the mean power of a ship station transmitter to 1 W or less.
-

APPENDIX 20

**Characteristics of Equipment Used for
On-Board Communication in
the 450 – 470 MHz Bands**

(See Nos. 669 and 670)

1. The equipment should be fitted with sufficient channels for satisfactory operation in the area of intended use.
2. The effective radiated power shall be limited to the minimum required for satisfactory operation, but shall in no case exceed 2 W. Wherever practicable the equipment should be fitted with a suitable device to reduce readily the output power by at least 10 dB.
3. In the case of equipment installed at a fixed point on the ship, the height of its antenna shall not be more than 3.5 metres above the level of the bridge.
4. Only frequency modulation with a pre-emphasis of 6 dB/octave (phase modulation) shall be used.
5. The frequency deviation shall not exceed ± 5 kHz.
6. The frequency tolerance shall be 5 parts in 10^6 .
7. The audio-frequency band shall be limited to 3 000 Hz.
8. Control, telemetry and other non-voice signals shall be coded in such a manner as to minimize the possibility of false response to interfering signals.

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9. If the use of a repeater station is required on board a ship, the following frequency pairs shall be used (see also No. 670):

457.525 MHz and 467.525 MHz

457.550 MHz and 467.550 MHz

457.575 MHz and 467.575 MHz

APPENDIX 21

Reports of International Monitoring of Emissions

(See Article 20)

**Section I. Reports Concerning Stations in the
Terrestrial Radiocommunication Services**

1. Reports of measurements of frequency should contain as much as necessary of the following information:

- a)* identification of the monitoring station (administration or organization, and location);
- b)* date of measurement;
- c)* time of measurement (UTC);
- d)* call sign or other means of identification, or both, of the station monitored;
- e)* class of emission ¹;
- f)* assigned frequency or reference frequency;
- g)* frequency tolerance;
- h)* measured frequency;
- i)* accuracy of measurement;
- j)* departure from assigned or reference frequency;

¹ The class of emission shall contain the basic characteristics listed in Article 4 and, if possible, the additional characteristics listed in Appendix 6. If any characteristic cannot be determined, indicate the unknown symbol with a dash. However, if a station is not able to identify unambiguously whether the modulation is frequency or phase modulation, indicate frequency modulation (F).

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- k)* additional information (e.g. period covered by measurement, drift of measured frequency during that period, quality of received signal and conditions of reception);
- l)* remarks.

2. Reports of measurements of field strength or power flux-density should contain as much as necessary of the following information:

- a)* identification of the monitoring station (administration or organization, and location);
- b)* date of measurement;
- c)* time of measurement (UTC);
- d)* call sign or other means of identification, or both, of the station monitored;
- e)* class of emission ¹;
- f)* assigned frequency;
- g)* value of measured field strength or power flux-density;
- h)* estimated accuracy of measurement;
- i)* value of the measured component of polarization;
- j)* other elements or characteristics of the measurement;
- k)* remarks.

3. Reports of observations of spectrum occupancy should as far as practicable be made in the form recommended by the IFRB and contain if possible the following information:

- a)* identification of the monitoring station (administration or organization, and location);
- b)* date of measurement;

¹ See page AP21-1.

- c)* time of measurement (UTC);
- d)* call sign or other means of identification, or both, of the station monitored;
- e)* class of emission ¹;
- f)* class of station and nature of service;
- g)* measured frequency;
- h)* period during which the emission was heard or recorded;
- i)* value of measured field strength or power flux-density or signal strength according to the QSA scale;
- j)* occupied bandwidth (indicate whether measured or estimated, or indicate the necessary bandwidth notified to the IFRB);
- k)* information as to the locality or area in which reception is intended;
- l)* remarks.

4. In providing these data, the symbols contained in the Radio Regulations or in the Preface to the International Frequency List should be used as far as possible.

Section II. Reports Concerning Stations in the Space Radiocommunication Services

1. Reports of measurements of frequency should contain as much as necessary of the following information:

- a)* identification of the monitoring station (administration or organization, and location);
- b)* date of measurement;
- c)* time of measurement (UTC);

¹ See page AP21-1.

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- d)* call sign or other means of identification, or both, of the station monitored;
- e)* class of emission ¹;
- f)* assigned frequency or reference frequency;
- g)* frequency tolerance;
- h)* measured frequency;
- i)* accuracy of measurement;
- j)* departure from assigned or reference frequency;
- k)* additional information (e.g. period covered by measurement, drift of measured frequency during that period, quality of received signal and conditions of reception);
- l)* remarks.

2. Reports of measurements of field strength or power flux-density should contain as much as necessary of the following information:

- a)* identification of the monitoring station (administration or organization, and location);
- b)* date of measurement;
- c)* time of measurement (UTC);
- d)* call sign or other means of identification, or both, of the station monitored;
- e)* class of emission ¹;
- f)* assigned frequency;
- g)* value of measured field strength or power flux-density;

¹ See page AP21-1.

- h)* estimated accuracy of measurement;
- i)* value of the measured component of polarization;
- j)* other elements or characteristics of the measurement;
- k)* remarks.

3. Reports of observations of spectrum occupancy should as far as practicable be made in the form recommended by the IFRB and contain if possible the following information:

3.1 Reports of observations concerning emissions of space stations:

- a)* identification of the monitoring station (administration or organization, and location);
- b)* date of measurement;
- c)* time of measurement (UTC);
- d)* call sign or other means of identification, or both, of the station monitored;
- e)* class of emission ¹;
- f)* class of station and nature of service;
- g)* measured frequency;
- h)* period during which the emission was observed or recorded;
- i)* value of measured field strength or power flux-density or signal strength according to the QSA scale;
- j)* occupied bandwidth (indicate whether measured or estimated, or indicate the necessary bandwidth notified to the IFRB);
- k)* observed polarization;
- l)* information on orbit;

¹ See page AP21-1.

- m)* information as to the locality or area in which reception is intended, if known;
- n)* remarks.

3.2 Reports of observations concerning emissions of earth stations:

- a)* identification of the monitoring station (administration or organization, and location);
- b)* date of measurement;
- c)* time of measurement (UTC);
- d)* call sign or other means of identification, or both, of the station monitored;
- e)* class of emission ¹;
- f)* class of station and nature of service;
- g)* measured frequency;
- h)* period during which the emission was observed or recorded;
- i)* value of measured field strength or power flux-density or signal strength according to the QSA scale;
- j)* occupied bandwidth (indicate whether measured or estimated, or indicate the necessary bandwidth notified to the IFRB);
- k)* information as to the orbital position where reception is intended;
- l)* remarks.

4. In providing these data, the symbols contained in the Radio Regulations or in the Preface to the International Frequency List should be used as far as possible.

¹ See page AP21-1.

APPENDIX 22

**Report of an Irregularity or of an Infringement
of the Convention or the Radio Regulations ¹**

(See Articles 21 and 22)

Particulars concerning the station infringing the Regulations:

1. Name ¹ if known (in BLOCK letters)
2. Call sign or other identification (in BLOCK letters)
3. Nationality, if known
4. Frequency used (kHz, MHz, GHz or THz)
5. Class of emission ²
6. Class of station and nature of service, if known
7. Location ^{3, 4, 5}

Particulars concerning the station, the centralizing office or inspection service reporting the irregularity or infringement:

8. Name (in BLOCK letters)
9. Call sign or other identification (in BLOCK letters)
10. Nationality
11. Location ^{3, 4}

Particulars of the irregularity or infringement:

- 12. Name ⁶ of the station (in **BLOCK** letters) in communication with the station committing the irregularity or infringement
- 13. Call sign or other identification (in **BLOCK** letters) of the station in communication with the station committing the irregularity or infringement
- 14. Date and time ⁷
- 15. Nature of the irregularity or infringement ⁸
- 16. Extracts from ship log or other information supporting the report

Particulars concerning the transmitting station interfered with ⁹:

- 17. Name of the station (in **BLOCK** letters)
- 18. Call sign or other identification (in **BLOCK** letters)
- 19. Frequency assigned (kHz, MHz, GHz or THz)
- 20. Frequency measured at the time of the interference
- 21. Class of emission ² and bandwidth (indicate whether measured or estimated, or indicate the necessary bandwidth notified to the IFRB)
- 22. Receiving location ^{3, 4} (in **BLOCK** letters) where the interference was experienced

23. **Certificate:**

I certify that the foregoing report represents, to the best of my knowledge, a complete and accurate account of what took place.

Signatures¹⁰ Date:

Instructions for filling in this form

¹ Each report shall refer to only one station (see note 6). If it is forwarded as a letter, it shall be in duplicate, and whenever practicable should be typewritten. It may also be forwarded as a telegram.

² The class of emission shall contain the basic characteristics listed in Article 4 and, if possible, the additional characteristics listed in Appendix 6. If any characteristic cannot be determined, indicate the unknown symbol with a dash. However, if a station is not able to identify unambiguously whether the modulation is frequency or phase modulation, indicate frequency modulation (F).

³ In the case of land, fixed, or earth stations, the position shall be expressed in latitude and longitude (Greenwich). If the position cannot be furnished, the area of operation should be indicated.

⁴ In the case of ship or aircraft stations, the position shall be expressed either in latitude and longitude (Greenwich) or by a true bearing in degrees and distance in nautical miles, or in kilometres, from some well known place. If the position cannot be furnished, the area of operation should be indicated.

⁵ Where space stations are concerned, information shall be furnished on the orbit.

⁶ If both communicating stations infringe the Regulations, a separate report shall be made for each of these stations.

⁷ The time must be expressed as Coordinated Universal Time (UTC) by a group of four figures (0000 to 2359). If the infringement is prolonged or repeated, the dates and times shall be shown.

⁸ A separate report is required for each irregularity or infringement, unless they are repeated within a short time.

⁹ This information is to be given only in case of a complaint about interference.

¹⁰ This report shall be signed by the operator who has reported the infringement and countersigned by the Master of the ship or person responsible for the aircraft, or the officer in charge of the station in the case of an infringement reported by a station of the mobile service. When the report originates from a centralizing office or from an inspection service, it shall be signed by the head of that office or service and countersigned by an official of the administration sending it.

For the use of the administration only

- 1. Company controlling the installation of the station against which complaint is made
- 2. Name of the operator of the station held responsible for the irregularity or infringement of the Regulations
- 3. Action taken

APPENDIX 23

Report of Harmful Interference

(See Article 22)

Particulars concerning the station causing the interference:

- a. Name, call sign or other means of identification
- b. Frequency measured Date:
Time (UTC):
- c. Class of emission ¹
- d. Bandwidth (indicate whether measured or estimated)
- e. Measured field strength or power flux-density ²
Date:
Time (UTC):
- f. Observed polarization
- g. Class of station and nature of service
- h. Location/position/area/bearing (QTE)
- i. Location of the facility which made the above measurements

Particulars concerning the transmitting station interfered with:

- j. Name, call sign or other means of identification
- k. Frequency assigned

¹ The class of emission shall contain the basic characteristics listed in Article 4 and, if possible, the additional characteristics listed in Appendix 6. If any characteristic cannot be determined, indicate the unknown symbol with a dash. However, if a station is not able to identify unambiguously whether the modulation is frequency or phase modulation, indicate frequency modulation (F).

² When measurements are not available, signal strengths according to the QSA scale should be provided.

l. Frequency measured Date:
Time (UTC):

m. Class of emission ¹

n. Bandwidth (indicate whether measured or estimated, or indicate the necessary bandwidth notified to the IFRB)

o. Location/position/area

p. Location of the facility which made the above measurements

q. Name of station

r. Location/position/area

s. Dates and times (UTC) of occurrence of harmful interference

t. Bearings (QTE) or other particulars

u. Nature of interference

v. Field strength or power flux-density of the wanted emission at the receiving station experiencing the interference²

Date:

Time (UTC):

w. Polarization of the receiving antenna or observed polarization

x. Action requested

For notes, see page AP23-1.

APPENDIX 24

Phonetic Alphabet and Figure Code

(See Articles 37 and 65)

1. When it is necessary to spell out call signs, service abbreviations and words, the following letter spelling table shall be used:

Letter to be transmitted	Code word to be used	Spoken as*
A	Alfa	<u>AL</u> FAH
B	Bravo	<u>BRAH</u> VOH
C	Charlie	<u>CHAR</u> LEE or <u>SHAR</u> LEE
D	Delta	<u>DELL</u> TAH
E	Echo	<u>ECK</u> OH
F	Foxtrot	<u>FOKS</u> TROT
G	Golf	GOLF
H	Hotel	HOH <u>TELL</u>
I	India	<u>IN</u> DEE AH
J	Juliett	<u>JEW</u> LEE <u>ETT</u>
K	Kilo	<u>KEY</u> LOH
L	Lima	<u>LEE</u> MAH
M	Mike	MIKE
N	November	NO <u>VEM</u> BER
O	Oscar	<u>OSS</u> CAH

* The syllables to be emphasized are underlined.

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Letter to be transmitted	Code word to be used	Spoken as*
P	Papa	PAH <u>PAH</u>
Q	Quebec	KEH <u>BECK</u>
R	Romeo	<u>ROW</u> ME OH
S	Sierra	SEE <u>AIR</u> RAH
T	Tango	<u>TANG</u> GO
U	Uniform	<u>YOU</u> NEE FORM or <u>OO</u> NEE FORM
V	Victor	<u>VIK</u> TAH
W	Whiskey	<u>WISS</u> KEY
X	X-ray	<u>ECKS</u> <u>RAY</u>
Y	Yankee	<u>YANG</u> KEY
Z	Zulu	<u>ZOO</u> LOO

2. When it is necessary to spell out figures or marks, the following table shall be used:

Figure or mark to be transmitted	Code word to be used	Spoken as**
0	Nadazero	NAH-DAH-ZAY-ROH
1	Unaone	OO-NAH-WUN
2	Bissotwo	BEES-SOH-TOO
3	Terrathree	TAY-RAH-TREE
4	Kartefour	KAR-TAY-FOWER
5	Pantafive	PAN-TAH-FIVE
6	Soxisix	SOK-SEE-SIX

* The syllables to be emphasized are underlined.

** Each syllable should be equally emphasized.

Figure or mark to be transmitted	Code word to be used	Spoken as*
7	Setteseven	SAY-TAY-SEVEN
8	Oktoeight	OK-TOH-AIT
9	Novenine	NO-VAY-NINER
Decimal point	Decimal	DAY-SEE-MAL
Full stop	Stop	STOP

3. However, stations of the same country, when communicating between themselves, may use any other table recognized by their administration.

* Each syllable should be equally emphasized.

APPENDIX 25

Frequency Allotment Plan for Coast Radiotelephone Stations operating in the Exclusive Maritime Mobile Bands between 4 000 kHz and 23 000 kHz

(See Nos. 4198 and 4212 of the
Radio Regulations and Appendix 16)

Note a): The frequencies in Column 1 are assigned frequencies (see No. 142) as listed in Appendix 16 to the Radio Regulations. Each frequency is followed, in parentheses, by the carrier frequency and the channel number. (See Section A of Appendix 16 to the Radio Regulations.)

Note b): The coast radiotelephone stations operating in the exclusive maritime mobile bands between 4 000 kHz and 23 000 kHz must use the minimum power required to cover their service area. They may in no case use a peak envelope power above 10 kW per channel. (See No. 4373 of the Radio Regulations.)

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Note c): The Plan contained in this Appendix is updated in accordance with the procedure defined in Article 16 of the Radio Regulations.

Column 1	Column 2	Column 3
Assigned frequency (carrier frequency) (channel number)	Country or area	Observations

Column 3 *Observations*

1/. This allotment has been entered in the Plan as a result of the application of the procedure of Article 16. The number following the slant stroke indicates the line entry in the "Table of allotments added to the Plan" which appears on the pages following channel 2240 in Volume 2 of the Radio Regulations at the end of Appendix 25. The line entry contains the basic characteristics of the allotment as published in Part B of the relevant special section of the IFRB circular, the numbers and date of which appear in Column 12 of the Table.

(November 1980)

1	2	3
4 358.8 (4 357.4) (Ch. No. 401)	Germany (Federal Republic of) Chile Cook Islands Korea Cuba Denmark Spain United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Greece Indonesia Japan Niue Island Norway Paraguay Western Samoa Somalia South Africa Sweden Thailand Turkey Ukraine Uruguay U.S.S.R. (Southern Asia) U.S.S.R. (Northern Asia) U.S.S.R. (Europe) U.S.S.R. (Far East) U.S.S.R. (North West) Yemen (P.D.R. of) Yugoslavia Zaire	
4 361.9 (4 360.5) (Ch. No. 402) (cont.)	Alaska Albania Argentina	

1	2	3
4 361.9 (4 360.5) (Ch. No. 402) (cont.)	Bangladesh China United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Guam Hawaii Iran Italy Japan Madagascar Panama Papua New Guinea Poland Puerto Rico United Kingdom Thailand Tunisia U.S.S.R. (Southern Asia) U.S.S.R. (North West)	
4 365 (4 363.6) (Ch. No. 403)	Argentina Canada (East) Canada (North) Canada (West) Denmark Spain United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Ethiopia Greece Hawaii India (East) Iraq Macao Mexico Monaco	
(cont.)		

1	2	3
4 365 (4 363.6) (Ch. No. 403) <i>(cont.)</i>	Norway Peru Puerto Rico Sri Lanka South Africa Sweden Togo Ukraine U.S.S.R. (Far East)	
4 368.1 (4 366.7) (Ch. No. 404)	 Alaska Australia Bangladesh Brazil Chile (South) China Congo Ivory Coast United States of America (Central) United States of America (East) United States of America (West) France Guadeloupe (French Department of) Iran Israel Japan Martinique (French Department of) Mexico New Caledonia and Dependencies Oman Easter Island Poland Reunion (French Department of) S. Pierre and Miquelon (French Dep. of) Senegal Thailand	

1	2	3
4 371.2 (4 369.8) (Ch. No. 405)	Alaska Australia (East) Brazil Cameroon Canary Islands Chile China United States of America (East) United States of America (West) United States of America (South) France Gambia Greece Hawaii Iran Jamaica Netherlands German Democratic Republic Romania Singapore South Africa Uruguay U.S.S.R. (Southern Asia) U.S.S.R. (Europe) U.S.S.R. (Far East)	
4 374.3 (4 372.9) (Ch. No. 406) (cont.)	Alaska Albania Saudi Arabia Argentina China Cyprus Colombia Congo Spain	

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1	2	3
4 377.4 (4 376) (Ch. No. 407) <i>(cont.)</i>	U.S.S.R. (Northern Asia) U.S.S.R. (North West)	
4 380.5 (4 379.1) (Ch. No. 408)	Alaska Netherlands Antilles Argentina Belgium Canada (East) Canada (West) United States of America (East) United States of America (West) Guam Hawaii Indonesia Iran Italy Japan Liberia Mexico Mozambique New Zealand Poland American Samoa Switzerland Yugoslavia	1/1
4 383.6 (4 382.2) (Ch. No. 409) <i>(cont.)</i>	Saudi Arabia Brazil China Cuba Denmark United States of America (Central) United States of America (East) United States of America (West) United States of America (South)	

1	2	3
4 383.6 (4 382.2) (Ch. No. 409) <i>(cont.)</i>	India (West)	
	Italy	
	Norway	
	Papua New Guinea	
	Philippines	
	Sweden	
	Thailand	
4 386.7 (4 385.3) (Ch. No. 410)	Turkey	
	Zaire	
	Algeria	
	Argentina (South)	
	Bermuda	
	Canada (West)	
	Canary Islands	
	China	
	United States of America (East)	
	Greece	
	Guam	
	Hungary	
	Iran	
	Israel	
	Jamaica	
	Malta	
	Mauritania	
	New Zealand	
	Netherlands	
	German Democratic Republic	
4 389.8 (4 388.4) (Ch. No. 411) <i>(cont.)</i>	Romania	
	United Kingdom	
	Seychelles (Republic of)	
	Sri Lanka	
	Argentina (North)	
	Bangladesh	
	Belgium	

1	2	3
4 389.8 (4 388.4) (Ch. No. 411) <i>(cont.)</i>	Spain United States of America (Central) United States of America (East) United States of America (West) Falkland Islands (Malvinas) Hongkong Indonesia Iran Japan Liberia S. Paul and Amsterdam Islands Turkey Ukraine U.S.S.R. (North West)	 1/2
4 392.9 (4 391.5) (Ch. No. 412)	 Germany (Federal Republic of) Australia United States of America (East) United States of America (West) United States of America (South) India (West) Iraq Italy Japan Peru Philippines Ukraine U.S.S.R. (Far East) U.S.S.R. (Europe) U.S.S.R. (North West) Yemen (P.D.R. of)	
4 396 (4 394.6) (Ch. No. 413) <i>(cont.)</i>	 Azores Alaska Algeria	

1	2	3
4 396 (4 394.6) (Ch. No. 413) <i>(cont.)</i>	Germany (Federal Republic of) Angola Argentina Bahrain Bangladesh Canada (East) Canada (West) Cape Verde United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Finland Greece Guam Guinea-Bissau Hawaii Japan Madeira Mexico Monaco Panama Puerto Rico Portugal Portuguese Timor Ukraine U.S.S.R. (Far East)	
4 399.1 (4 397.7) (Ch. No. 414)	Alaska Germany (Federal Republic of) Cyprus Spain United States of America (East) United States of America (South) Finland Indonesia Iceland Japan Kenya Peru	
<i>(cont.)</i>		

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1	2	3
4 399.1 (4 397.7) (Ch. No. 414) <i>(cont.)</i>	Puerto Rico S. Helena U.S.S.R. (Europe) U.S.S.R. (Far East)	
4 402.2 (4 400.8) (Ch. No. 415)	Alaska Argentina Australia China Denmark United States of America (East) United States of America (West) United States of America (South) France Greece Guam Hawaii Iran Liberia Madagascar Malaysia Norway Pakistan Panama Puerto Rico Romania U.S.S.R. (Europe) U.S.S.R. (North West)	
4 405.3 (4 403.9) (Ch. No. 416) <i>(cont.)</i>	Alaska Bangladesh Brazil United States of America (Central) United States of America (East) United States of America (West)	

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1	2	3
4 405.3 (4 403.9) (Ch. No. 416) (cont.)	France Greece Hungary Indonesia Iran Iceland Jamaica Japan Mauritius Peru French Polynesia United Kingdom U.S.S.R. (Europe)	
4 408.4 (4 407) (Ch. No. 417)	 Argentina Australia Belgium United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Finland Hongkong India (West) Japan Malaysia Morocco Papua New Guinea United Kingdom Czechoslovakia Turkey U.S.S.R. (Far East) Yemen (P.D.R. of) Yugoslavia	

1	2	3
4 411.5 (4 410.1) (Ch. No. 418)	Argentina Bulgaria Canada (East) Canada (West) Cuba Denmark Djibouti Egypt Spain United States of America (Central) Hawaii Indonesia Israel Japan Mauritania Norway Philippines Reunion (French Department of) Romania S. Pierre and Miquelon (French Department of) Sweden U.S.S.R. (Southern Asia)	
4 414.6 (4 413.2) (Ch. No. 419) (cont.)	Australia Brazil Chile China Korea Ivory Coast United States of America (West) United States of America (South) France Guam Hawaii Iceland	

1	2	3
4 414.6 (4 413.2) (Ch. No. 419) (cont.)	Japan	
	Kuwait	
	Libya	
	Pakistan	
	Netherlands	
	Puerto Rico	
	German Democratic Republic	
	Czechoslovakia	
4 417.7 (4 416.3) (Ch. No. 420)	U.S.S.R. (North West)	
	Yugoslavia	
	Alaska	
	Bulgaria	
	Cameroon	
	Denmark	
	United States of America (East)	
	United States of America (West)	
	Guam	
	Hawaii	
	India (East)	
	Iran	
	Italy	
	Japan	
	Jordan	
	Malaysia	
	Morocco	
	Norway	
	Panama	
	Puerto Rico	
	Sweden	
	Turkey	
	U.S.S.R. (Southern Asia)	
	U.S.S.R. (Northern Asia)	

1	2	3
4 423.9 (4 422.5) (Ch. No. 422)	Alaska Belgium Canada (West) Canary Islands China Cuba United States of America (East) United States of America (West) Finland Greece Guiana (French Department of) Hungary Indonesia Iraq Japan Liberia Libya Morocco United Kingdom U.S.S.R. (Europe)	
4 427 (4 425.6) (Ch. No. 423)	Alaska Germany (Federal Republic of) Brazil China United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Indonesia Israel Italy Japan Pakistan Panama Papua New Guinea	1/3

1	2	3
4 427 (4 425.6) (Ch. No. 423) (cont.)	Poland Qatar	1/4
4 430.1 (4 428.7) (Ch. No. 424)	Alaska Algeria Argentina Australia (West) China Denmark United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Greece Guadeloupe (French Department of) Guam Hawaii Morocco Martinique (French Department of) Norway Puerto Rico Sweden Switzerland Thailand	
4 433.2 (4 431.8) (Ch. No. 425)	Alaska Belgium Brazil Chile Denmark Spain United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Greece Guam	1/5
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1	2	3
4 433.2 (4 431.8) (Ch. No. 425) <i>(cont.)</i>	Hawaii Hungary Japan Kuwait Libya Malaysia Norway New Zealand Panama Netherlands Puerto Rico	
4 436.3 (4 434.9) (Ch. No. 426)	 Azores Alaska Algeria Angola Argentina Bulgaria Cape Verde China Cyprus Denmark United States of America (East) United States of America (West) United States of America (South) Guam Guinea-Bissau Hawaii Japan Lebanon Madeira Mozambique Norway Panama Puerto Rico Portugal United Kingdom Thailand Portuguese Timor	

1	2	3
6 507.8 (6 506.4) (Ch. No. 601)		
	Alaska	
	Algeria	
	Germany (Federal Republic of)	
	Saudi Arabia	
	Argentina (Central)	
	Argentina (South)	
	Bangladesh	
	Canada (West)	
	Chile (Central)	
	Chile (North)	
	China	
	Congo	
	United States of America (Central)	
	United States of America (East)	
	United States of America (West)	
	United States of America (South)	
	Greece	
	Guam	
	Hawaii	
	Hungary	
	Indonesia	
	Iran	
	Iraq	
	Iceland	
	Japan	
	Libya	
	Malaysia	
	Mexico (East)	
	Mexico (West)	
	New Zealand	
	Peru	
	Puerto Rico	
	Romania	
	Sri Lanka	
	Czechoslovakia	
	Ukraine	
	U.S.S.R. (Southern Asia)	
	U.S.S.R. (Europe)	
	Yugoslavia	

1	2	3
6 510.9 (6 509.5) (Ch. No. 602)	Alaska Bangladesh Belgium Bulgaria Canada (East) Canada (West) Korea Ivory Coast United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Guam Hawaii Indonesia Iran Italy Kuwait Madagascar Monaco Netherlands Peru Poland Puerto Rico Portugal Singapore South Africa Tunisia Turkey U.S.S.R. (Southern Asia) U.S.S.R. (Northern Asia) U.S.S.R. (Europe) U.S.S.R. (Far East) Yugoslavia	

1	2	3
6 514 (6 512.6) (Ch. No. 603)	Alaska Albania Algeria Saudi Arabia Argentina Bangladesh Bermuda Canada (North) Canada (West) Cyprus Ivory Coast Denmark Spain United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Greece Guam Hawaii Hungary India (East) Indonesia Iran Iraq Iceland Israel Japan Libya Mauritania Mexico Norway Peru Philippines Puerto Rico Romania Western Samoa Sweden Thailand	
(cont.)		

1	2	3
6 514 (6 512.6) (Ch. No. 603) <i>(cont.)</i>	Togo Ukraine U.S.S.R. (Far East) U.S.S.R. (North West)	
6 517.1 (6 515.7) (Ch. No. 604)	 Alaska Australia Bangladesh Bulgaria Cameroon Canada (West) Chile China Spain United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Guam Hawaii Hongkong Indonesia Iran Israel Italy Madagascar Mauritania Mexico Pakistan Papua New Guinea Peru Poland Puerto Rico Tunisia Turkey U.S.S.R. (North West) Yugoslavia	

1	2	3
6 520.2 (6 518.8) (Ch. No. 605)		
	Alaska	
	Algeria	
	Bangladesh	
	Bulgaria	
	Canada (East)	
	Canada (West)	
	Canary Islands	
	Congo	
	Korea	
	Denmark	
	Egypt	
	United States of America (Central)	
	United States of America (East)	
	United States of America (West)	
	United States of America (South)	
	Ethiopia	
	Guam	
	Hawaii	
	Hungary	
	India (West)	
	Indonesia	
	Iran	
	Iraq	
	Jamaica	
	Japan	
	Kuwait	
	Libya	
	Madagascar	
	Norway	
	Netherlands	
	Peru	
	Philippines	
	Puerto Rico	
	Sweden	
	Thailand	
	Ukraine	
	Uruguay	
	U.S.S.R. (Far East)	
	Yugoslavia	

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8 720.3 (8 718.9) (Ch. No. 801)		
	Alaska	
	Bahrain	
	Bangladesh	
	Chile	
	Denmark	
	Spain	
	United States of America (East)	
	United States of America (West)	
	United States of America (South)	
	Guam	
	Hawaii	
	Israel	
	Japan	
	Malaysia	
	Norway	
	Panama	
	Puerto Rico	
	Romania	
	South Africa	
	Sweden	
	U.S.S.R. (Northern Asia)	
8 723.4 (8 722) (Ch. No. 802)		
	Azores	
	Alaska	
	Algeria	
	Angola	
	Argentina	
	Australia	
	Cape Verde	
	China	
	United States of America (East)	
	United States of America (South)	
	Finland	
	Greece	
	Guinea-Bissau	
	Hawaii	
	India (East)	
(cont.)		

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8 723.4 (8 722) (Ch. No. 802) (cont.)	Iraq Madeira Mozambique Netherlands Portugal German Democratic Republic United Kingdom Sri Lanka	
8 726.5 (8 725.1) (Ch. No. 803)	Netherlands Antilles Belgium Canada (East) Korea Cuba Spain United States of America (Central) Norway Pakistan Papua New Guinea Senegal South Africa Sweden Turkey U.S.S.R. (Europe) U.S.S.R. (Far East) U.S.S.R. (North West)	
8 729.6 (8 728.2) (Ch. No. 804) (cont.)	Argentina Spain United States of America (East) United States of America (West) United States of America (South) Finland Greece Iraq Japan	

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8 729.6 (8 728.2) (Ch. No. 804) <i>(cont.)</i>	Monaco	1/6
	Peru	
	Poland	
	Qatar	
	Sierra Leone	
	Singapore	
	U.S.S.R. (Southern Asia)	
8 732.7 (8 731.3) (Ch. No. 805)	U.S.S.R. (Northern Asia)	
	U.S.S.R. (Far East)	
	Albania	
	Belgium	
	Spain	
	United States of America (East)	
	United States of America (West)	
	United States of America (South)	
	Ethiopia	
	Finland	
	Iran	
	Iceland	
	Israel	
	Japan	
	Liberia	
	New Caledonia and Dependencies	
	Papua New Guinea	
	Netherlands	
	South Africa	
	U.S.S.R. (Europe)	
	U.S.S.R. (Far East)	
8 735.8 (8 734.4) (Ch. No. 806) <i>(cont.)</i>	Alaska	
	Argentina	
	Bahrain	
	Bangladesh	
	Belgium	
	Ivory Coast	

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8 742 (8 740.6) (Ch. No. 808) (cont.)	Bahamas Denmark Spain United States of America (East) United States of America (West) Greece Guam Hawaii Japan Norway Philippines Romania Sri Lanka South Africa Sweden	
8 745.1 (8 743.7) (Ch. No. 809)	 Algeria Australia (West) Canary Islands Chile Cuba United States of America (East) United States of America (West) Finland Greece Iceland Japan Kuwait Mexico Monaco Norway Pakistan German Democratic Republic Czechoslovakia Thailand	

1	2	3
8 748.2 (8 746.8) (Ch. No. 810)	Argentina Bangladesh Bulgaria Canada (East) China Spain United States of America (East) United States of America (West) United States of America (South) Fiji Indonesia Iran Japan Mozambique Norway Poland Portuguese Timor Togo Turkey Yugoslavia	
8 751.3 (8 749.9) (Ch. No. 811)	Saudi Arabia Argentina Australia Denmark United States of America (East) United States of America (West) United States of America (South) France Hongkong Hungary Japan Norway Peru Sweden Turkey	
(cont.)		

1	2	3
8 751.3 (8 749.9) (Ch. No. 811) (cont.)	Yugoslavia	
8 754.4 (8 753) (Ch. No. 812)	Alaska Argentina (South) Belgium Canada (North) China Spain United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Hawaii Indonesia Israel Jamaica Japan New Zealand Pakistan Poland U.S.S.R. (Europe) U.S.S.R. (North West) Zaire	
8 757.5 (8 756.1) (Ch. No. 813)	Azores Alaska Algeria Angola Australia Belgium Cape Verde Chile (North) China Denmark United States of America (Central) United States of America (East)	
(cont.)		

1	2	3
8 757.5 (8 756.1) (Ch. No. 813) (cont.)	United States of America (West) United States of America (South) Greece Guam Guinea-Bissau Hawaii Hungary India (West) Madeira Mozambique Norway Panama Puerto Rico Portugal	
8 760.6 (8 759.2) (Ch. No. 814)	 Alaska Argentina Canada (West) Cuba United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Greece Hawaii Indonesia Italy Japan Liberia Pakistan Philippines Thailand U.S.S.R. (Southern Asia) U.S.S.R. (Northern Asia) U.S.S.R. (Europe) U.S.S.R. (Far East)	

1	2	3
8 763.7 (8 762.3) (Ch. No. 815)	Germany (Federal Republic of) Australia (West) Belgium Chile China United States of America (East) United States of America (West) United States of America (South) Greece Guiana (French Department of) Iraq Japan Morocco Singapore U.S.S.R. (Europe) U.S.S.R. (North West) Zaire	
8 766.8 (8 765.4) (Ch. No. 816)	Alaska Argentina Barbados China Congo Spain United States of America (East) United States of America (West) United States of America (South) Greece Guam Hawaii Indonesia Pakistan Puerto Rico United Kingdom Tunisia U.S.S.R. (Europe)	
(cont.)		

1	2	3
8 766.8 (8 765.4) (Ch. No. 816) <i>(cont.)</i>	U.S.S.R. (North West)	
8 769.9 (8 768.5) (Ch. No. 817)	Alaska Germany (Federal Republic of) Australia Bangladesh Bermuda Canada (East) Chile Egypt United States of America (Central) United States of America (East) United States of America (West) United States of America (South) France Guam Hawaii Iran Mexico Nauru Philippines Puerto Rico Romania Thailand U.S.S.R. (Europe) U.S.S.R. (Far East) Yemen (P.D.R. of)	1/8
8 773 (8 771.6) (Ch. No. 818) <i>(cont.)</i>	Alaska Argentina Bulgaria Cameroon China Cyprus	

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8 773 (8 771.6) (Ch. No. 818) <i>(cont.)</i>	Denmark United States of America (East) United States of America (West)	
	Guam	
	Hawaii	
	Libya	
	Malaysia	
	Norway	
	Pakistan	
	Panama	
	Puerto Rico	
	Seychelles (Republic of)	
	Sweden	
	Ukraine	
8 776.1 (8 774.7) (Ch. No. 819)		
	Alaska	
	Brazil	
	Canada (West)	
	United States of America (Central)	
	United States of America (East)	
	United States of America (West)	
	United States of America (South)	
	Greece	
	Guam	
	Hawaii	
	Indonesia	
	Italy	
	Japan	
	Easter Island	
	Reunion (French Department of)	
	United Kingdom	
	Thailand	
	U.S.S.R. (Southern Asia)	
	U.S.S.R. (Northern Asia)	
	U.S.S.R. (Europe)	
	U.S.S.R. (North West)	
	Yemen (P.D.R. of)	

1	2	3
8 779.2 (8 777.8) (Ch. No. 820)	Alaska Germany (Federal Republic of) Argentina Cyprus United States of America (East) United States of America (West) Greece Guam Hawaii India (East) Iran Italy Japan Panama Philippines Puerto Rico Western Samoa U.S.S.R. (North West) Zaire	
8 785.4 (8 784) (Ch. No. 822) (cont.)	Bangladesh Brazil China Ivory Coast United States of America (East) United States of America (West) United States of America (South) Hungary Iran Kenya Morocco United Kingdom Switzerland Thailand Ukraine	

1	2	3
8 785.4 (8 784) (Ch. No. 822) (cont.)	Yugoslavia	
8 788.5 (8 787.1) (Ch. No. 823)	Argentina Canada (East) Denmark Greece India (West) Iraq Italy Jamaica Japon Norway Romania Sweden Portuguese Timor U.S.S.R. (Far East) U.S.S.R. (North West)	
8 791.6 (8 790.2) (Ch. No. 824)	Germany (Federal Republic of) Brazil China United States of America (East) United States of America (West) United States of America (South) Greece Iran Jamaica Morocco Oman Peru Poland Reunion (French Department of) Singapore Switzerland Tunisia U.S.S.R. (North West)	

1	2	3
8 794.7 (8 793.3) (Ch. No. 825)	Alaska Algeria Argentina Barbados Canada (Central) Cook Islands Denmark United States of America (East) United States of America (West) United States of America (South) France Guadeloupe (French Department of) Hungary India (East) Iran Martinique (French Department of) Norway Philippines S. Paul and Amsterdam Islands Ukraine U.S.S.R. (Southern Asia) U.S.S.R. (Far East)	1/9
8 797.8 (8 796.4) (Ch. No. 826) (cont.)	Cameroon Canada (West) China Colombia United States of America (Central) United States of America (East) Guam Indonesia Italy Japan Mexico Netherlands	

1	2	3
8 797.8 (8 796.4) (Ch. No. 826) (cont.)	German Democratic Republic United Kingdom Ukraine	
8 800.9 (8 799.5) (Ch. No. 827)	Alaska Argentina Bangladesh Korea Denmark Djibouti Spain United States of America (East) United States of America (West) Guam Hawaii Iran Israel Macao Niue Island Norway Panama Peru Puerto Rico Sweden Yugoslavia	
8 804 (8 802.6) (Ch. No. 828)	Alaska Albania Germany (Federal Republic of) Brazil United States of America (East) United States of America (West) France Guadaloupe (French Department of) Guam Hawaii Hungary Indonesia	
(cont.)		

1	2	3
8 804 (8 802.6) (Ch. No. 828) <i>(cont.)</i>	Japan Lebanon Morocco Martinique (French Department of) Mauritius Mauritania Norway Panama Puerto Rico Ukraine	
8 807.1 (8 805.7) (Ch. No. 829)	 Australia Bangladesh Belgium China Cyprus Denmark United States of America (East) United States of America (West) United States of America (South) Finland Gambia Iran Libya Mexico Norway Paraguay French Polynesia Sweden Ukraine	
8 810.2 (8 808.8) (Ch. No. 830) <i>(cont.)</i>	 Brazil Bulgaria United States of America (South)	

1	2	3
8 810.2 (8 808.8) (Ch. No. 830) (cont.)	France	
	India (West)	
	Indonesia	
	Iran	
	Papua New Guinea	
	Peru	
	Poland	
	Puerto Rico	
	S. Pierre and Miquelon (French Dep. of)	
	U.S.S.R. (Southern Asia)	
8 813.3 (8 811.9) (Ch. No. 831)	U.S.S.R. (Far East)	
	Yemen (P.D.R. of)	
	Yugoslavia	
	China	
	Congo	
	United States of America (West)	
	United States of America (South)	
	Falkland Islands (Malvinas)	
	Iran	
	Iceland	
	Italy	
	Japan	
	Madagascar	
	Malaysia	
	Morocco	
	Pakistan	
	Puerto Rico	
	German Democratic Republic	
	United Kingdom	
	Switzerland	
	Turkey	

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13 102.2 (13 100.8) (Ch. No. 1201)	Argentina Canada (North) China Cyprus Spain United States of America (East) United States of America (West) United States of America (South) Guiana (French Department of) Indonesia Philippines United Kingdom Ukraine U.S.S.R. (Europe) U.S.S.R. (Far East) U.S.S.R. (North West)	
13 105.3 (13 103.9) (Ch. No. 1202)	Saudi Arabia Bangladesh Chile United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Fiji Greece Hungary Japan Morocco German Democratic Republic United Kingdom Switzerland Tunisia U.S.S.R. (Northern Asia)	

1	2	3
13 108.4 (13 107) (Ch. No. 1203)	Azores Alaska Angola Australia (East) Cape Verde China Colombia Denmark United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Greece Guinea-Bissau Hawaii Iraq Libya Madeira Mozambique Norway Portugal Sweden Portuguese Timor U.S.S.R. (Far East)	
13 111.5 (13 110.1) (Ch. No. 1204) (cont.)	Alaska United States of America (East) United States of America (West) United States of America (South) France Greece Guam Hawaii Israel Japan Macao Norway	

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13 111.5 (13 110.1) (Ch. No. 1204) (cont.)	Panama Puerto Rico German Democratic Republic Thailand U.S.S.R. (Europe)	
13 114.6 (13 113.2) (Ch. No. 1205)	Alaska Germany (Federal Republic of) Argentina Bangladesh Ivory Coast Spain United States of America (East) United States of America (West) United States of America (South) Guam Hawaii Italy Japan Mozambique Norway New Caledonia and Dependencies Puerto Rico Portuguese Timor Ukraine U.S.S.R. (Europe) Yemen (P.D.R. of)	
13 117.7 (13 116.3) (Ch. No. 1206)	Albania Australia (West) China Spain United States of America (East) United States of America (West) United States of America (South) Finland Iran	

1	2	3
13 117.7 (13 116.3) (Ch. No. 1206) <i>(cont.)</i>	Iceland Italy Japan Madagascar Morocco Peru German Democratic Republic United Kingdom Turkey	
13 120.8 (13 119.4) (Ch. No. 1207)	 Azores Algeria Angola Netherlands Antilles Belgium Canada (West) Cape Verde China Greece Iran Israel Japan Madeira Mozambique Netherlands Portugal Portuguese Timor U.S.S.R. (North West) Yugoslavia	
13 123.9 (13 122.5) (Ch. No. 1208) <i>(cont.)</i>	 Germany (Federal Republic of) Argentina Bangladesh China Cyprus United States of America (East)	

1	2	3
13 123.9 (13 122.5) (Ch. No. 1208) <i>(cont.)</i>	United States of America (South) Greece Hungary Iceland Japan Liberia U.S.S.R. (Europe)	
13 127 (13 125.6) (Ch. No. 1209)	Alaska Bahrain Brazil Canada (West) Spain United States of America (East) United States of America (West) United States of America (South) Finland Indonesia Italy Japan Mexico New Zealand Peru Poland South Africa Turkey U.S.S.R. (Europe) U.S.S.R. (North West)	
13 130.1 (13 128.7) (Ch. No. 1210) <i>(cont.)</i>	Chile Denmark Djibouti Spain United States of America (East) United States of America (West)	

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13 130.1 (13 128.7) (Ch. No. 1210) <i>(cont.)</i>	United States of America (South) Greece Guam India (West) Indonesia Norway Reunion (French Department of) Romania Sweden Uruguay U.S.S.R. (Northern Asia) U.S.S.R. (Far East)	
13 133.2 (13 131.8) (Ch. No. 1211)	 Alaska Brazil China Cuba Denmark Spain United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Iraq Italy Japan Malaysia Norway Easter Island Sweden U.S.S.R. (Southern Asia) U.S.S.R. (Northern Asia)	
13 136.3 (13 134.9) (Ch. No. 1212) <i>(cont.)</i>	 Alaska Germany (Federal Republic of) Ivory Coast	

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13 136.3 (13 134.9) (Ch. No. 1212) <i>(cont.)</i>	United States of America (East)	
	United States of America (South)	
	Greece	
	Hawaii	
	Indonesia	
	Japan	
	Mauritius	
	Peru	
13 139.4 (13 138) (Ch. No. 1213)	Puerto Rico	
	U.S.S.R. (Europe)	
	U.S.S.R. (Far East)	
	Argentina	
	Barbados	
	Belgium	
	Canada (East)	
	Canary Islands	
	China	
	Korea	
	Finland	
	Greece	
	India (East)	
	Iran	
	Iraq	
	Israel	
	Italy	
13 142.5 (13 141.1) (Ch. No. 1214) <i>(cont.)</i>	Liberia	
	Norway	
	Netherlands	
	Western Samoa	
	U.S.S.R. (Northern Asia)	
	Alaska	
	Australia	
	Brazil	

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13 142.5 (13 141.1) (Ch. No. 1214) (cont.)	Canada (West) Cuba Denmark United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Greece Guam Hungary Iran Norway Puerto Rico Sweden Thailand U.S.S.R. (Far East)	
13 145.6 (13 144.2) (Ch. No. 1215)	 Algeria Belgium Cameroon Denmark Spain United States of America (West) United States of America (South) Greece India (West) Iceland Israel Japan Panama Netherlands Peru Puerto Rico Romania Seychelles (Republic of) Sweden	

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13 148.7 (13 147.3) (Ch. No. 1216)	Alaska Albania Argentina China Egypt United States of America (East) United States of America (West) United States of America (South) Finland Guam Hawaii Iran Lebanon Malta Morocco Panama Poland Puerto Rico Singapore Turkey	1/10
13 151.8 (13 150.4) (Ch. No. 1217) (cont.)	Algeria Bulgaria Cuba Denmark United States of America (Central) United States of America (East) United States of America (West) United States of America (South) Greece Guadeloupe (French Department of) Guam India (East) Iraq Japan Martinique (French Department of)	

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13 151.8 (13 150.4) (Ch. No. 1217) <i>(cont.)</i>	Norway S. Helena Sweden U.S.S.R. (Southern Asia) U.S.S.R. (Far East)	
13 154.9 (13 153.5) (Ch. No. 1218)	 Alaska Germany (Federal Republic of) Bangladesh Belgium Cameroon Canary Islands Chile United States of America (East) United States of America (West) United States of America (South) Guam Hawaii Iran Italy Japan Niue Island Norway Panama Puerto Rico Turkey U.S.S.R. (Europe)	
13 158 (13 156.6) (Ch. No. 1219) <i>(cont.)</i>	 Alaska Belgium Brazil Bulgaria Denmark United States of America (East) United States of America (West) United States of America (South) Japan	

1	2	3
13 158 (13 156.6) (Ch. No. 1219) <i>(cont.)</i>	Morocco Norway Netherlands Singapore Sweden Ukraine U.S.S.R. (Europe) U.S.S.R. (Far East) U.S.S.R. (North West)	
13 161.1 (13 159.7) (Ch. No. 1220)	 Alaska Argentina Bangladesh Bermuda United States of America (East) United States of America (West) United States of America (South) Fiji Greece Guam Hawaii Iran Iceland Japan Panama Philippines Poland Puerto Rico Tunisia	
13 167.3 (13 165.9) (Ch. No. 1222) <i>(cont.)</i>	 Argentina Canada (East) Cook Islands France Guadeloupe (French Department of) Hawaii	

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13 167.3 (13 165.9) (Ch. No. 1222) (cont.)	India (West) Iran Japan Martinique (French Department of) Mexico Norway Romania Turkey U.S.S.R. (Far East)	
13 170.4 (13 169) (Ch. No. 1223)	Saudi Arabia Bangladesh Brazil Denmark United States of America (East) United States of America (West) United States of America (South) Greece Guam Japan Morocco Norway Sweden Czechoslovakia Ukraine	
13 173.5 (13 172.1) (Ch. No. 1224) (cont.)	Alaska Germany (Federal Republic of) Chile United States of America (East) United States of America (West) Finland Guam Hawaii Jamaica Japan Kuwait Monaco	

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13 173.5 (13 172.1) (Ch. No. 1224) (cont.)	New Zealand Panama Puerto Rico United Kingdom Sri Lanka South Africa Yugoslavia	
13 176.6 (13 175.2) (Ch. No. 1225)	 China Spain United States of America (East) United States of America (South) Greece Iran Madagascar Mexico Norway Papua New Guinea Romania U.S.S.R. (North West)	
13 179.7 (13 178.3) (Ch. No. 1226)	 Australia Bangladesh Chile Denmark United States of America (East) United States of America (West) United States of America (South) France Iran Japan Norway Czechoslovakia Togo Turkey U.S.S.R. (North West)	

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13 182.8 (13 181.4) (Ch. No. 1227)	Alaska Australia Spain United States of America (East) United States of America (West) Finland Guam Hawaii India (East) Kuwait Panama Poland Puerto Rico Switzerland U.S.S.R. (Far East) Yugoslavia Zaire	
13 185.9 (13 184.5) (Ch. No. 1228)	Brazil Chile China Cuba United States of America (Central) United States of America (East) United States of America (West) Hungary Norway Pakistan United Kingdom Ukraine U.S.S.R. (Europe)	

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13 189 (13 187.6) (Ch. No. 1229)	Argentina Australia Bulgaria Canada (East) Korea United States of America (West) France Japan Poland Qatar U.S.S.R. (Southern Asia) U.S.S.R. (Northern Asia) U.S.S.R. (Europe) U.S.S.R. (North West) Yugoslavia	1/11
13 192.1 (13 190.7) (Ch. No. 1230)	Argentina Bangladesh Cyprus United States of America (East) United States of America (West) United States of America (South) Finland Hawaii Italy Japan Mauritania United Kingdom Switzerland Ukraine	
13 195.2 (13 193.8) (Ch. No. 1231) (cont.)	Alaska Australia United States of America (East)	

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13 195.2 (13 193.8) (Ch. No. 1231) <i>(cont.)</i>	United States of America (West)	
	France	
	Greece	
	Guam	
	Hawaii	
	Hongkong	
	Iran	
	Libya	
	Norway	
	Panama	
13 198.3 (13 196.9) (Ch. No. 1232)	Paraguay	
	Peru	
	Poland	
	Puerto Rico	
	Alaska	
	Algeria	
	Argentina	
	United States of America (East)	
	United States of America (West)	
	Greece	
	Guam	
	Hawaii	
	Japan	
	Mauritania	
	Pakistan	
	German Democratic Republic	
	United Kingdom	
	American Samoa	
	U.S.S.R. (Southern Asia)	1/12

1	2	3
17 234.3 (17 232.9) (Ch. No. 1601)	Alaska Argentina Denmark United States of America (East) United States of America (South) Hawaii Japon Norway Seychelles (Republic of) Sweden Tunisia Ukraine U.S.S.R. (Europe) U.S.S.R. (North West)	
17 237.4 (17 236) (Ch. No. 1602)	Saudi Arabia Australia (East) Bangladesh Cameroon United States of America (East) United States of America (West) United States of America (South) Greece Morocco United Kingdom U.S.S.R. (Northern Asia) U.S.S.R. (Europe) U.S.S.R. (Far East)	
17 240.5 (17 239.1) (Ch. No. 1603) (cont.)	Alaska Argentina (Norte) Bangladesh	

1	2	3
17 240.5 (17 239.1) (Ch. No. 1603) <i>(cont.)</i>	China Cyprus Denmark United States of America (East) United States of America (West) United States of America (South) Guadeloupe (French Department of) Hungary Italy Malta Martinique (French Department of) Norway Sweden	 1/13
17 243.6 (17 242.2) (Ch. No. 1604)	 Australia Canada (East) France Greece Japan Mexico Norway Romania	
17 246.7 (17 245.3) (Ch. No. 1605) <i>(cont.)</i>	 Denmark United States of America (East) United States of America (West) France India (West) Iran Japan Norway Philippines French Polynesia Sweden Ukraine	

1	2	3
17 246.7 (17 245.3) (Ch. No. 1605) (<i>cont.</i>)	U.S.S.R. (Europe)	
17 249.8 (17 248.4) (Ch. No. 1606)	Bangladesh Brazil Cuba United States of America (West) United States of America (South) Finland Iceland Italy Japan New Zealand Puerto Rico United Kingdom Turkey U.S.S.R. (Europe)	
17 252.9 (17 251.5) (Ch. No. 1607)	Alaska Netherlands Antilles Canada (East) United States of America (East) United States of America (West) United States of America (South) Greece India (East) Iran Liberia Monaco Norway Poland U.S.S.R. (Far East) U.S.S.R. (North West)	

1	2	3
17 256 (17 254.6) (Ch. No. 1608)	Canada (West) China Denmark Italy Mauritania Norway Peru South Africa Sweden Czechoslovakia Turkey	
17 259.1 (17 257.7) (Ch. No. 1609)	Saudi Arabia Belgium Cook Islands Spain United States of America (East) United States of America (West) United States of America (South) Greece India (East) Israel Japan U.S.S.R. (North West)	
17 262.2 (17 260.8) (Ch. No. 1610)	Germany (Federal Republic of) Australia China Egypt United States of America (East) United States of America (West) United States of America (South) Indonesia Iran	
(cont.)		

1	2	3
17 262.2 (17 260.8) (Ch. No. 1610) (cont.)	Mauritania Norway Tunisia Ukraine Uruguay U.S.S.R. (North West)	
17 265.3 (17 263.9) (Ch. No. 1611)	 Brazil United States of America (East) United States of America (West) United States of America (South) Finland Japan Libya Malaysia Peru United Kingdom Switzerland Turkey Yugoslavia	
17 268.4 (17 267) (Ch. No. 1612)	 Alaska Australia Cuba United States of America (East) United States of America (West) United States of America (South) Guam Hawaii Morocco Pakistan Puerto Rico Ukraine U.S.S.R. (Europe) U.S.S.R. (Far East) U.S.S.R. (North West)	

1	2	3
17 271.5 (17 270.1) (Ch. No. 1613)	Alaska Belgium Brazil Spain United States of America (East) United States of America (West) United States of America (South) Greece Guam Hawaii Iran Israel Norway Panama Puerto Rico Romania Singapore U.S.S.R. (Far East)	
17 274.6 (17 273.2) (Ch. No. 1614)	Canada (West) China Denmark Finland Italy Mexico Niue Island Norway Sweden U.S.S.R. (Northern Asia)	
17 277.7 (17 276.3) (Ch. No. 1615) (cont.)	Azores Angola Cape Verde	

1	2	3
17 277.7 (17 276.3) (Ch. No. 1615) (cont.)	Finland	
	Guinea-Bissau	
	Iran	
	Iceland	
	Madeira	
	Mozambique	
	Portugal	
	United Kingdom	
	Switzerland	
	Portuguese Timor	
	U.S.S.R. (Far East)	
17 280.8 (17 279.4) (Ch. No. 1616)		
	Alaska	
	Germany (Federal Republic of)	
	United States of America (East)	
	United States of America (West)	
	United States of America (South)	
	Hawaii	
	Iran	
	Italy	
	Japan	
	Morocco	
	Turkey	
	U.S.S.R. (North West)	
17 283.9 (17 282.5) (Ch. No. 1617) (cont.)		
	Bangladesh	
	Brazil	
	Canary Islands	
	Denmark	
	France	
	Greece	
	Hungary	
	Iran	
	Israel	
	Mexico	
	Norway	
	Sweden	

1	2	3
17 283.9 (17 282.5) (Ch. No. 1617) (cont.)	U.S.S.R. (Northern Asia) U.S.S.R. (Far East)	
17 287 (17 285.6) (Ch. No. 1618)	 Argentina Bahrain Bermuda Denmark India (West) Japan Morocco Norway United Kingdom Sweden Turkey Yugoslavia	
17 290.1 (17 288.7) (Ch. No. 1619)	 Alaska United States of America (East) United States of America (West) France Greece Guam Hawaii Kuwait Liberia Mauritius Norway Panama Peru Puerto Rico German Democratic Republic U.S.S.R. (Far East)	

1	2	3
17 293.2 (17 291.8) (Ch. No. 1620)	United States of America (Central) United States of America (East) Japan Libya Norway Turkey Ukraine U.S.S.R. (Europe)	
17 299.4 (17 298) (Ch. No. 1622)	Australia Bangladesh Denmark France Greece Japan Kuwait Norway Romania Sweden	
17 302.5 (17 301.1) (Ch. No. 1623) (cont.)	Alaska China Spain United States of America (East) United States of America (West) United States of America (South) Finland Guam Hawaii Pakistan Panama Paraguay	

1	2	3
17 302.5 (17 301.1) (Ch. No. 1623) <i>(cont.)</i>	Netherlands Puerto Rico Reunion (French Department of) United Kingdom Ukraine	
17 305.6 (17 304.2) (Ch. No. 1624)	Germany (Federal Republic of) Bangladesh Spain United States of America (East) United States of America (West) United States of America (South) Italy Japan Western Samoa U.S.S.R. (Europe)	
17 308.7 (17 307.3) (Ch. No. 1625)	Alaska Belgium United States of America (East) United States of America (West) United States of America (South) Greece Guam Hawaii Iran Iceland Japan Poland Puerto Rico	

1	2	3
17 311.8 (17 310.4) (Ch. No. 1626)	Canada (West) Cuba United States of America (East) Greece Iraq Netherlands Qatar U.S.S.R. (Northern Asia) U.S.S.R. (Far East) U.S.S.R. (North West)	1/14
17 314.9 (17 313.5) (Ch. No. 1627)	Belgium Spain Greece Hungary Japan Norway Peru U.S.S.R. (Europe) Yugoslavia	
17 318 (17 316.6) (Ch. No. 1628)	Bangladesh Cuba France Greece Guadeloupe (French Department of) Iraq Israel Martinique (French Department of) Romania U.S.S.R. (Far East) U.S.S.R. (North West)	

1	2	3
17 321.1 (17 319.7) (Ch. No. 1629)	Algeria Australia Canada (East) Greece Iran Japan Norway German Democratic Republic Senegal	
17 324.2 (17 322.8) (Ch. No. 1630)	Alaska Belgium Spain United States of America (East) United States of America (West) United States of America (South) Guam Hawaii India (West) Iceland Panama Puerto Rico U.S.S.R. (Europe)	
17 327.3 (17 325.9) (Ch. No. 1631) (cont.)	Algeria Bulgaria Chile China United States of America (East) Greece Iraq Poland Switzerland	

1	2	3
17 327.3 (17 325.9) (Ch. No. 1631) (cont.)	Togo	
17 330.4 (17 329) (Ch. No. 1632)	Azores Alaska Argentina Bangladesh Cyprus United States of America (East) United States of America (West) United States of America (South) Hungary Japan Madagascar Madeira Pakistan Portugal United Kingdom	
17 333.5 (17 332.1) (Ch. No. 1633)	Alaska Brazil China United States of America (East) United States of America (West) France Greece Guam Hawaii Panama Poland Puerto Rico German Democratic Republic South Africa U.S.S.R. (Southern Asia)	

1	2	3
17 336.6 (17 335.2) (Ch. No. 1634)	Germany (Federal Republic of) Canada (North) Korea Ivory Coast Spain Greece Japan Romania	
17 339.7 (17 338.3) (Ch. No. 1635)	Azores Angola Australia Bangladesh Bulgaria Cape Verde Denmark Guinea-Bissau Japan Macao Madeira Mozambique Norway Portugal Sweden Portuguese Timor	
17 342.8 (17 341.4) (Ch. No. 1636) <i>(cont.)</i>	Alaska Algeria United States of America (East) United States of America (West) Finland Greece	

1	2	3
17 342.8 (17 341.4) (Ch. No. 1636) <i>(cont.)</i>	Guam Hawaii India (East) Japan Pakistan Panama Netherlands Puerto Rico	
17 345.9 (17 344.5) (Ch. No. 1637)	Korea Spain Hongkong Jamaica Madagascar New Zealand United Kingdom U.S.S.R. (Southern Asia)	
17 349 (17 347.6) (Ch. No. 1638)	Alaska Bulgaria United States of America (East) United States of America (West) Finland Guam Hawaii Morocco Pakistan Poland American Samoa Yugoslavia	1/15
17 352.1 (17 350.7) (Ch. No. 1639) <i>(cont.)</i>	Alaska Albania Germany (Federal Republic of)	

1	2	3
17 352.1 (17 350.7) (Ch. No. 1639) (cont.)	Spain United States of America (East) United States of America (West) Guam Hawaii Panama Netherlands Puerto Rico Zaire	
17 355.2 (17 353.8) (Ch. No. 1640)	 Barbados Chile Greece Japan German Democratic Republic United Kingdom Sri Lanka Thailand U.S.S.R. (Europe)	
17 358.3 (17 356.9) (Ch. No. 1641)	 Algeria Denmark United States of America (East) United States of America (West) United States of America (South) Iraq Japan Norway Singapore Sweden Ukraine	

1	2	3
22 597.4 (22 596) (Ch. No. 2201)	Australia Cameroon China Spain United States of America (East) United States of America (West) United States of America (South) Greece Guam Hungary U.S.S.R. (North West)	
22 600.5 (22 599.1) (Ch. No. 2202)	Argentina Bangladesh Canada (East) Hungary Iran Italy Mauritania Norway Peru Ukraine U.S.S.R. (Far East)	
22 603.6 (22 602.2) (Ch. No. 2203)	Australia (East) Bulgaria Denmark Iran Japan Morocco Norway Sweden	

1	2	3
22 606.7 (22 605.3) (Ch. No. 2204)	Argentina Canada (North) Finland France Israel Kuwait South Africa U.S.S.R. (Far East) U.S.S.R. (North West) Yugoslavia	
22 609.8 (22 608.4) (Ch. No. 2205)	Algeria Australia United States of America (East) United States of America (West) United States of America (South) Greece Iran Netherlands U.S.S.R. (Europe) U.S.S.R. (Far East) U.S.S.R. (North West)	
22 612.9 (22 611.5) (Ch. No. 2206)	Alaska United States of America (East) United States of America (West) United States of America (South) Guam Hawaii India (West) Japan Morocco	
(cont.)		

1	2	3
22 612.9 (22 611.5) (Ch. No. 2206) (cont.)	Peru Poland Puerto Rico United Kingdom South Africa Yugoslavia	
22 616 (22 614.6) (Ch. No. 2207)	 Azores Germany (Federal Republic of) Bangladesh Cape Verde China Israel Madeira Portugal Portuguese Timor Tunisia U.S.S.R. (Europe)	
22 619.1 (22 617.7) (Ch. No. 2208)	 Argentina (North) Bulgaria Denmark India (East) Japan Morocco Norway Sweden	
22 622.2 (22 620.8) (Ch. No. 2209) (cont.)	 Alaska Belgium Korea United States of America (East) United States of America (West) Greece	

1	2	3
22 622.2 (22 620.8) (Ch. No. 2209) <i>(cont.)</i>	Guam Hawaii Morocco Panama Poland Puerto Rico U.S.S.R. (North West)	
22 625.3 (22 623.9) (Ch. No. 2210)	 Bangladesh Spain United States of America (East) Finland Greece Japan Netherlands Ukraine	
22 628.4 (22 627) (Ch. No. 2211)	 Cuba Denmark Italy Japan Norway Sweden Ukraine	
22 631.5 (22 630.1) (Ch. No. 2212) <i>(cont.)</i>	 Alaska Australia Cyprus United States of America (East) United States of America (West) Guam	

1	2	3
22 631.5 (22 630.1) (Ch. No. 2212) <i>(cont.)</i>	Hawaii Hungary Panama Puerto Rico United Kingdom Singapore	
22 634.6 (22 633.2) (Ch. No. 2213)	 Bulgaria Canada (East) Denmark Spain Iraq Libya Norway New Zealand Sweden Turkey U.S.S.R. (Europe) U.S.S.R. (Far East)	
22 637.7 (22 636.3) (Ch. No. 2214)	 Bangladesh Belgium China Spain United States of America (East) United States of America (West) United States of America (South) Finland Iran Switzerland Turkey Uruguay U.S.S.R. (North West)	

1	2	3
22 640.8 (22 639.4) (Ch. No. 2215)	United States of America (East) United States of America (West) United States of America (South) France Greece Iraq Japan Norway Peru Poland	
22 643.9 (22 642.5) (Ch. No. 2216)	Canada (West) Denmark United States of America (East) United States of America (South) Greece Guam Italy Japan Kuwait Mauritania Norway	
22 647 (22 645.6) (Ch. No. 2217)	Alaska Germany (Federal Republic of) Bangladesh Spain United States of America (East) United States of America (West) Greece Guam Hawaii	
(cont.)		

1	2	3
22 647 (22 645.6) (Ch. No. 2217) <i>(cont.)</i>	Hongkong Iran Israel Liberia Panama Peru Puerto Rico	
22 650.1 (22 648.7) (Ch. No. 2218)	Alaska Cyprus Denmark United States of America (East) United States of America (West) United States of America (South) France Guam Hawaii Norway Puerto Rico Sweden Ukraine	
22 653.2 (22 651.8) (Ch. No. 2219)	Bangladesh Belgium China Cuba Greece Liberia Monaco Poland Western Samoa	

1	2	3
22 656.3 (22 654.9) (Ch. No. 2220)	Canada (West) Greece German Democratic Republic United Kingdom Senegal Switzerland Czechoslovakia	1/16
22 662.5 (22 661.1) (Ch. No. 2222)	Azores Germany (Federal Republic of) Saudi Arabia Cape Verde Korea United States of America (East) United States of America (West) United States of America (South) Finland Greece Madeira Portugal Portuguese Timor	
22 665.6 (22 664.2) (Ch. No. 2223)	Alaska Germany (Federal Republic of) Australia Bangladesh United States of America (East) United States of America (West) Hawaii Italy Japan	
(cont.)		

1	2	3
22 665.6 (22 664.2) (Ch. No. 2223) (cont.)	Malta Puerto Rico Togo Turkey	1/17
22 668.7 (22 667.3) (Ch. No. 2224)	Alaska Spain United States of America (East) United States of America (West) Greece Guam Hawaii Iraq Mauritius Panama Puerto Rico German Democratic Republic	
22 671.8 (22 670.4) (Ch. No. 2225)	Algeria Belgium Chile Ivory Coast Greece India (West) Iceland Japan Mexico	
22 674.9 (22 673.5) (Ch. No. 2226) (cont.)	Albania Bangladesh China Egypt France Iceland	

1	2	3
22 674.9 (22 673.5) (Ch. No. 2226) (cont.)	German Democratic Republic Romania	
22 678 (22 676.6) (Ch. No. 2227)	Algeria United States of America (East) United States of America (West) United States of America (South) Greece Guadeloupe (French Department of) India (East) Japan Martinique (French Department of) Pakistan United Kingdom Ukraine	
22 681.1 (22 679.7) (Ch. No. 2228)	Australia Bangladesh Denmark United States of America (East) United States of America (West) Greece Morocco Norway Sweden U.S.S.R. (Far East)	
22 684.2 (22 682.8) (Ch. No. 2229) (cont.)	Canada (East) Spain India (West) Japan United Kingdom Thailand	

1	2	3
22 684.2 (22 682.8) (Ch. No. 2229) <i>(cont.)</i>	Ukraine	
22 687.3 (22 685.9) (Ch. No. 2230)	Alaska Australia Spain United States of America (East) United States of America (West) Guam Hawaii Norway Panama Puerto Rico German Democratic Republic Sweden Turkey U.S.S.R. (Southern Asia)	
22 690.4 (22 689) (Ch. No. 2231)	Alaska Saudi Arabia Canada (West) United States of America (East) United States of America (West) United States of America (South) Finland France Greece Japan Malaysia Niue Island U.S.S.R. (Europe)	

1	2	3
22 693.5 (22 692.1) (Ch. No. 2232)	Cuba Greece Iraq Netherlands Poland Switzerland U.S.S.R. (Europe) U.S.S.R. (Far East)	
22 696.6 (22 695.2) (Ch. No. 2233)	Alaska Bangladesh Cook Islands United States of America (East) United States of America (West) United States of America (South) Guam Hawaii Iran Norway Panama Puerto Rico Romania	
22 699.7 (22 698.3) (Ch. No. 2234)	Argentina Denmark Indonesia Japan Libya Mexico Norway Romania Sweden	

1	2	3
22 702.8 (22 701.4) (Ch. No. 2235)	Alaska United States of America (East) United States of America (West) United States of America (South) France Greece Guam Hawaii Iran Japan Puerto Rico Qatar U.S.S.R. (North West)	 1/18
22 705.9 (22 704.5) (Ch. No. 2236)	Denmark Spain United States of America (East) United States of America (West) Greece Iraq Japan Norway New Zealand Ukraine	 0
22 709 (22 707.6) (Ch. No. 2237) (cont.)	Azores United States of America (East) United States of America (West) United States of America (South) Iran Italy	

1	2	3
22 709 (22 707.6) (Ch. No. 2237) <i>(cont.)</i>	Japan Madeira Norway Portugal Romania	
22 712.1 (22 710.7) (Ch. No. 2238)	Algeria Germany (Federal Republic of) Australia Brazil Greece Hungary Iraq Japan Mexico U.S.S.R. (Europe)	
22 715.2 (22 713.8) (Ch. No. 2239)	Alaska Belgium Spain United States of America (East) United States of America (West) Guam Hawaii India (East) Iran Norway Panama Puerto Rico Yugoslavia	

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TABLE OF ALLOTMENTS ADDED TO THE PLAN

Column headings

1. Channel number (the corresponding carrier and assigned frequencies are indicated in Section A of Appendix 16 and in the present Appendix).
2. Country or area of allotment.
- 3.1 Main service area.
A number between 1 and 22 refers to a Zone defined on the Map of HF Maritime Radiotelephone Zones appearing in the Preface to the International Frequency List.
- 3.2 Maximum length of circuit in kilometres.
4. Nature of service.
5. Class of emission.
6. Peak envelope power (Pp) in kW.
7. Transmitting antenna characteristics.
- 7.1 In the case of a non-directional antenna, the symbol ND is entered in this column and columns 7.2a), b) and c) are left blank. In the case of a directional antenna, the symbol D is entered in this column and the characteristics are given in columns 7.2a), b) and c).
- 7.2a) Azimuth of maximum radiation. The symbol ROT entered in this column means that a rotatable antenna is used.
- 7.2b) Angular width of the main lobe.
- 7.2c) Relative gain of the antenna (in dB).
8. Planned scheduled hours of operation in the channel (GMT).
- 9.a) Estimated peak hours of traffic.
- 9.b) Estimated daily volume of traffic in minutes.
10. Special Section No./IFRB Circular No./Date (e.g. MAR/10/1305/280278).

(November 1980)

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1	2	3		4	5	6	7				8	9		10
		3.1	3.2				7.1	7.2 a)	7.2 b)	7.2 c)		9 a)	9 b)	
1	408	SMA	SO PACIF	1000	CP	A3J	1	ND			1800-0400		30	MAR/10/1305/280278
2	411	AMS	10	—	CP	A3A A3J	0.3	ND			0430-0445 0830-0845 1230-1245		5-25	MAR/15/1347/191278
3	423	B		800	CV	A3J	0.5	ND			0000-2400			MAR/16/1350/160179
4	423	QAT	GULF, INDN OC GULF, INDN OC GULF, INDN OC GULF, INDN OC	800 1500 1500 1500	CP	A3A A3J	5	ND	130 200 310	60 60 60	9 9 9	0000-2400	200	MAR/23/1412/010480
5	425	B		800										
6	804	QAT	GULF, RED SEA, INDN OC GULF, INDN OC GULF, RED SEA, INDN OC GULF, RED SEA, INDN OC, MEDIT	1500 2500 2500 2500	CP	A3A A3J	5	ND	130 200 310	60 60 60	10 10 10	0000-2400	200	MAR/23/1412/010480
7	806	SMA	SO PACIF	3000	CP	A3J	1	ND				1800-0400	30	MAR/11/1310/040478
8	817	NRU	PACIF	2500	CP	A3A A3J	1	ND				2030-0500	3	MAR/28/1440/141080
9	825	AMS	10	—	CP	A3A A3J	0.3	ND				0445-0500 0845-0900 1245-1300	5-25	MAR/15/1347/191278
10	1216	MLT	MEDIT, NO ATLANT	3000	CP	A3A A3J	1.5	ND				0000-2400		MAR/22/1399/030180
11	1229	QAT	GULF, RED SEA, INDN OC, MEDIT GULF, INDN OC GULF, RED SEA, INDN OC, MEDIT GULF, RED SEA, INDN OC, MEDIT	2000 3000 3000 3000	CP	A3A A3J	5	ND	130 200 310	60 60 60	11 11 11	0400-0600 1400-1600	200	MAR/23/1412/010480
12	1232	SMA	SO PACIF	3000	CP	A3J	1	ND				1800-0400	30	MAR/11/1310/040478
13	1603	MLT	MEDIT, NO ATLANT	3000	CP	A3A A3J	1.5	ND				0000-1159		MAR/21/1379/070879
14	1626	QAT	INDN OC, RED SEA, MEDIT INDN OC INDN OC, RED SEA, MEDIT RED SEA, MEDIT, ATLANT	4000 6000 6000 6000	CP	A3A A3J	10	ND	130 200 310	60 60 60	11 11 11	0600-0800 1200-1400	200	MAR/23/1412/010480
15	1638	SMA	SO PACIF	4000	CP	A3J	1	ND				1800-0400	30	MAR/10/1305/280278
16	2220	SUI	6, 10, 18, 20, 21	14000	CP	A3J	10	ROT	70	8.5		0600-1800	60	MAR/27/1431/120880
17	2223	MLT	MEDIT, NO ATLANT	3000	CP	A3A A3J	1.5	ND				0000-1159		MAR/20/1372/190679
18	2235	QAT	INDN OC, MEDIT INDN OC INDN OC, MEDIT, ATLANT MEDIT, ATLANT	5000 8000 8000 8000	CP	A3A A3J	10	ND	130 200 310	60 60 60	11 11 11	0800-1200	200	MAR/23/1412/010480

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APPENDIX 25

Rev. 2, November 1980

**Bringing up to date the Frequency Allotment Plan for Coast
Radiotelephone Stations operating in the Exclusive Maritime
Mobile Band between 4 000 kHz and 23 000 kHz**

(Article 16 of the Radio Regulations)

1. This revised version of the Plan is published in accordance with No. 1722.
2. The present revision takes into account the deletion of the following allotments in application of No. 1720:

<i>Symbol</i>	<i>Country or-area</i>	<i>Channel(s)</i>
AGL	Angola	2207 2222
CBG	Khmer Republic	406 410 604 828 830 1206 1604 2203
CLM	Colombia	1615
CTI	Ivory Coast	1605 2203
ETH	Ethiopia	413 425 602 812 827 829 1201 1204 1214 1228 1231 1604 1611 1614 1620 1627 1640 2201 2212 2216 2226 2229 2234
GAB	Gabon	401 403 602 603 806 811 1201 1210 1614 1617 2211
GHA	Ghana	402 409 601 602 823 825 1202 1224 1616 1622 2213 2215
GMB	Gambia	831
GNB	Guinea-Bissau	1207
GTM	Guatemala	402
MOZ	Mozambique	2207 2222
NIG	Nigeria	414 423 425 601 604 605 801 817 819 1220 1225 1231 1625 1627 1640 2202 2204 2206
PAK	Pakistan	403 406 414 424 426 601 807 826 828 1201 1204 1207 1215 1608 2201 2209 2211 2218 2220
PNR	Panama	401 403 424 602 817 819 1204
PRG	Paraguay	410 826 1217 1227 1637

(November 1980)

<i>Symbol</i>	<i>Country or area</i>	<i>Channel(s)</i>
PRU	Peru	1617 2211
STP	Sao Tome and Principe	413 426 802 813 1203 1207 1615 1635
SUR	Surinam	408 808 1207 1608
TGK	Tanzania (Tanganyika)	417 419 820 823 1227
TMP	Portuguese Timor	802 813
TUR	Turkey	822 828 1211 1227 1615 1624 2239
VEN	Venezuela	409 419 602 827 829 1203 1219 1604 1622 2203 2206
ZAN	Tanzania (Zanzibar)	417 419 820 823 1227

These deletions have been published in Sub-Section C of Special Sections
Nos. MAR/22/1399 of 3 January 1980 and MAR/29/1441 of 21 October 1980.

APPENDIX 26

**Frequency Allotment Plan for the Aeronautical Mobile Service
and Related Information**

This Appendix was published as a separate booklet. As far as the Aeronautical Mobile (R) Service is concerned, a revised Plan was adopted in 1966 by the Aeronautical Conference: it is contained in Appendix 27. However, the Plan adopted in 1959 for the Aeronautical Mobile (OR) Service remains in force, so that for this service reference should be made to Appendix 26. Copies of Appendix 26 (1959 edition) are obtainable from the General Secretariat of the ITU.

APPENDIX 27

**Frequency Allotment Plan for the Aeronautical Mobile (R) Service
and Related Information Between 2 850 kHz and 17 970 kHz**

This Appendix is published as a separate booklet. It contains provisions relating exclusively to the aeronautical mobile (R) service, which have replaced the provisions relating to this service that are contained in Appendix 26. Reference should therefore be made exclusively to Appendix 27 as far as the aeronautical mobile (R) service is concerned.*

* *Note by the General Secretariat:* Appendix 27Aer2, which will replace Appendix 27 at 0001 hours UTC on 1 February 1983, will be published in due time before it enters into force. The modifications to Appendix 27 (Appendix 27Aer2) are contained in the Final Acts of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978. The Annex to Resolution 404 contains changes to be made to Appendix 27Aer2 approved by the WARC-79.

APPENDIX 28

**Method for the Determination of the Coordination Area Around an
Earth Station in Frequency Bands Between 1 GHz and 40 GHz Shared
Between Space and Terrestrial Radiocommunication Services**

1. *Objectives*

The coordination area (see No. 165) is determined by calculating, in all directions of azimuth from the earth station, the coordination distances (see No. 167) and drawing to scale on an appropriate map the coordination contour (see No. 166).

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

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

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

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

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

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

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

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

2. *General considerations*

2.1 *Concept of minimum permissible transmission loss*

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

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

$$L(p) = P_i' - P_r(p) \quad (1)$$

where:

P_i' : maximum available transmitting power level (dBW) in the reference bandwidth at the input to the antenna of an interfering station;

* Primes refer to the parameters associated with the interfering station.

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

P_t and $P_r(p)$ are defined for the same radio frequency bandwidth (reference bandwidth) and $L(p)$ and $P_r(p)$ for the same percentage of the time, dictated by the performance criteria of the interfered-with system.

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

- attenuation of signals subject to tropospheric propagation via near-great circle paths; mode (1) see § 3;
- attenuation of signals subject to scatter due to hydrometeors; mode (2) see § 4.

2.2 *Concept of minimum permissible basic transmission loss*

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

$$L_b(p) = P_t + G_t + G_r - P_r(p) \quad (2)$$

where:

- $L_b(p)$: minimum permissible basic transmission loss (dB) for $p\%$ of the time; this value must be exceeded by the predicted basic transmission loss for $(100 - p)\%$ of the time;
- G_t : gain (dB relative to isotropic) of the transmitting antenna of the interfering station. If the interfering station is an earth station, this is the antenna gain towards the physical horizon on the azimuth considered; in the case of a terrestrial station, the maximum antenna gain is to be used;
- G_r : gain (dB relative to isotropic) of the receiving antenna of the interfered-with station. If the interfered-with station is an earth station, this is the gain towards the physical horizon on the azimuth considered; in the case of a terrestrial station, the maximum antenna gain is to be used.

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

When considering non-geostationary satellites, G_i or G_r (whichever pertains to the earth station antenna) is variable with time. In such cases, an equivalent time-invariant earth station antenna gain is to be used*. This equivalent gain is either 10 dB less than the maximum horizon antenna gain or is that value of horizon antenna gain exceeded for no more than 10% of the time (if available), whichever is the greater.

2.3 *Derivation and tabulation of interference parameters*

2.3.1 *Permissible level of the interfering emission*

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

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

where:

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

with:

- k : Boltzmann's constant (1.38×10^{-23} J/K);
- T_e : thermal noise temperature of the receiving system (K), at the output of the receiving antenna (see *Note 1*);
- B : reference bandwidth (Hz) (bandwidth of the interfered-with system over which the power of the interfering emission can be averaged);
- J : ratio (dB) of the permissible long term (20% of the time) interfering emission power to the thermal noise power of the receiving system, referred to the output terminals of the receiving antenna (see *Note 2*);

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

- p_0 : percentage of the time during which the interference from all sources may exceed the permissible value;
- n : number of expected entries of interference, assumed to be uncorrelated;
- p : percentage of the time during which the interference from one source may exceed the permissible value; since the entries of interference are not likely to occur simultaneously: $p = p_0/n$;
- $M_0(p_0)$: ratio (dB) between the permissible powers of the interfering emission, during $p_0\%$ and 20% of the time, respectively, for all entries of interference (see *Note 3*);
- $M(p)$: ratio (dB) between the permissible powers of the interfering emission during $p\%$ of the time for one entry of interference, and during 20% of the time for all entries of interference;
- W : equivalence factor (dB) relating interference from interfering emissions to that caused by the introduction of additional thermal noise of equal power in the reference bandwidth. It is positive when the interfering emissions would cause more degradation than thermal noise (see *Note 4*).

Tables I and II list values for the above parameters.

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

Note 1: The noise temperature, in kelvins, of the receiving system, referred to the output terminals of the receiving antenna, may be determined from:

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

where:

- T_a : noise temperature (K) contributed by the receiving antenna;
- e : numerical loss in the transmission line (e.g. a waveguide) between antenna and receiver front end;
- T_r : noise temperature (K) of the receiver front end, including all successive stages, referred to the front end input.

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

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

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

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

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

In the case of digital systems, system performance at frequencies above 10 GHz can, in most areas of the world, usefully be defined as the percentage of the time p_0 for which the wanted signal is allowed to drop below its operating threshold, defined by a given bit error rate. During non-faded operation of the system, the desired signal will exceed its threshold level by some margin M_s , which depends on the rain climate in which the station operates. The greater this margin, the greater the enhancement of the interfering emission which would

degrade the system to threshold performance. As a first order estimate it may be assumed that, for small percentages of the time (of the order of 0.001% to 0.003%), the level of interfering emissions may be allowed to equal the thermal noise which exists at the demodulator input during faded conditions. Thus, M_0 in Tables I and II may, for digital systems operating above 10 GHz, be assumed to be equal to the fade margin M_f of the system. For digital radio-relay systems operating below 10 GHz it is assumed that the short term power of an interfering emission can be allowed to exceed the long term power of the interfering emission by an amount equal to the fade margin of the system minus J , i.e. 41 dB, where $J = -6$ dB.

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

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

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

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

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

2.3.2.1 *General*

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

2.3.2.2 *Pre-assigned narrow-band transmissions*

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

2.3.2.3 *Demand-assigned narrow-band transmissions*

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

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

3. *Determination of coordination distance for propagation mode (1) — Great circle propagation mechanisms*

3.1 *Radio-climatic zones*

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

Zone A: Entirely land.

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

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

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

3.2.1 *General*

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

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

3.2.2 *Numerical method*

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

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

in which:

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

β : rate of attenuation (dB/km);

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

A_h : horizon angle correction (dB);

f : frequency (GHz).

A_h is given by:

$$A_h = 20 \log (1 + 4.5 f^{1/2} \varepsilon) + f^{1/2} \varepsilon \quad \text{for } \varepsilon > 0^\circ \quad (7a) *$$

$$A_h = 8 \varepsilon \quad \text{for } -0.5^\circ \leq \varepsilon \leq 0^\circ \quad (7b)$$

$$A_h = -4 \quad \text{for } \varepsilon \leq -0.5^\circ \quad (7c)$$

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

in which:

ϵ : horizon angle* (degrees).

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

$$d_1 = (L_b(p) - A_0 - A_h)/\beta \quad (8)$$

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

$$\beta = \beta_z + \beta_v + \beta_o \quad (9)$$

in which:

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

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

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

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

for Zone A,

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

for Zones B and C,

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

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

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

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

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

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

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

β_o depends on the frequency as follows:

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

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

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

3.2.3 Graphical method

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

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

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

Values for the horizon angle correction are obtained from Fig. 1 for the appropriate frequency and horizon angle*.

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

$$d_A = d_A(0.01) \times \Delta p_A \quad (15)$$

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

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

3.3 *Mixed paths*

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

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

$$L_b(p) - A_0 - A_h = \beta_i d_i \quad (16)$$

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

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

$$L_b(p) - A_0 - A_h - \beta_i D_i = \beta_j d_j \quad (17)$$

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

$$L_b(p) - A_0 - A_h - \beta_i D_i - \beta_j D_j = \beta_k d_k \quad (18)$$

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

$$d_1 = D_i + D_j + d_k \quad (\text{km}) \quad (19)$$

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

3.4 *Maximum coordination distance for propagation mode (1)*

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

4. *Determination of the coordination contour for propagation mode (2) — Scattering from hydrometeors*

The determination of the coordination contour for scattering from hydrometeors (rain-scatter) is predicated on a path geometry which is substantially different from that of the great circle propagation mechanisms. As a first

approximation, energy is scattered isotropically by rain, so that interference may result for large scattering angles, and for beam intersections away from the great circle path.

4.1 Normalized transmission loss L_2 (0.01)

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

$$L_2(0.01) = P_t + \Delta G - P_r(p) - F(p, f) \quad (20)$$

where:

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

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

All other parameters have been defined in § 2. For terrestrial stations, values of P_t are listed in Table II.

4.2 Rain-climatic zones

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

4.3 Calculation of the rain-scatter distance d_r

4.3.1 Numerical method

The normalized transmission loss is composed of six terms:

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

in which:

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

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

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

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

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

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

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

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

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

and

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

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

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

$$A_6 = d_o \beta_o + d_r \beta_r \quad (28)$$

where:

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

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

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

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

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

β_o is given in (13).

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

4.3.2 Graphical method

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

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

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

4.4 *Maximum rain-scatter distances*

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

4.5 *Construction of the rain-scatter coordination contour*

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

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

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

Alternatively, Δd may be determined from Fig. 14.

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

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

4.6 *Absence of mixed path effects*

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

5. *Minimum value of coordination distance*

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

6. *Coordination distance*

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

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

7. *Mobile (except aeronautical mobile) earth stations*

For the purpose of establishing whether prior agreement with another administration under the provisions of Nos. 1108 to 1111 is required, it is necessary to determine the coordination area which would encompass all coordination areas determined for each location within the service area within which operation of the mobile earth stations is proposed.

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

8. *Revision of propagation data*

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

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

TABLE I
Parameters Required for the Determination of Coordination Distance
for a Transmitting Earth Station

Space Radiocommunication Service Designation		Space Operation	Fixed-Satellite Mobile-Satellite	Fixed-Satellite	Space Research	Fixed-Satellite Mobile-Satellite Meteorological-Satellite	Fixed-Satellite (*)	Fixed-Satellite	Fixed-Satellite (*)	Fixed-Satellite (*)	Fixed-Satellite
Frequency Bands (GHz)		1.427–1.429	2.655–2.690	5.725–7.075	7.145–7.235	7.900–8.400	10.7–11.7	12.5–14.5	14.5–14.8	17.7–18.1	27–37.5
Modulation at Terrestrial Station (1)		A	A	A	A	A	A	A	A	N	N
Interference Parameters and Criteria	p_0 (%)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003	0.003
	n	2	1	2	2	2	2	2	2	1	1
	p (%)	0.005	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.003	0.003
	J (dB)	16	9	16	16	16	16	16	16	0	0
	$M_0(p_0)$ (dB)	17	17	17	17	17	17	17	17	30	30
	W (dB)	0	0	0	0	0	0	0	0	0	0
Terrestrial Station Parameters	B (Hz)	4×10^3	4×10^3	4×10^3	4×10^3	4×10^3	4×10^3	4×10^3	4×10^3	1×10^6	1×10^6
	G_r (dB) (2)	35	52(3)	45	47	47	50	50	50	50	50
	ΔG (dB)	–7	10(3)	3	5	5	8	8	8	8	8
	T_r (K)	750	500(3)	750	750	750	1500	1500	1500	3200	3200
Auxiliary Parameters	S (dBW) (4)	166	192	176	178	178	178	178	178	154	154
	$P_r(p)$ (dBW) in B	–131	–140	–131	–131	–131	–128	–128	–128	–104	–104

(1) A = analogue modulation; N = digital modulation.

(2) Feeder losses are not included.

(3) In these bands the parameters for the terrestrial station associated with transhorizon systems have been used.

(4) For a definition of the parameter S see Annex I.

(5) The parameters associated with these columns are for feeder links to broadcasting satellites and are provisional pending further study by the CCIR: see Resolution 101.

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TABLE II
Parameters Required for the Determination of Coordination Distance for a Receiving Earth Station

Space Radiocommunication Service Designation		Space Operation (°)	Meteorological-Satellite (°)	Meteorological-Satellite	Space Research		Fixed-Satellite		Fixed-Satellite		Fixed-Satellite		Fixed-Satellite Meteorological-Satellite Mobile-Satellite		Earth Exploration-Satellite	Space Research		Fixed-Satellite		Meteorological-Satellite	Fixed-Satellite	Mobile-Satellite
					Near Earth	Deep Space; Manned										Near Earth	Deep Space					
Frequency Bands (GHz)		1.525–1.535	1.670–1.700	1.700–1.790	1.700–1.710 2.290–2.300		2.500–2.690		3.400–4.200		4.500–4.800		7.250–7.750		8.025–8.400	8.400–8.500		10.7–12.75		17.7–40.0		
Modulation at Earth Station (°)					–	–	A	N	A	N	A	N	A	N	–	–	–	A	N		N	
Interference Parameters and Criteria	p_0 (%)				0.1	0.001	0.03	0.003	0.03	0.003	0.03	0.003	0.03	0.003	1.0	0.1	0.001	0.03	0.003		0.003	
	n				2	1	3	3	3	3	3	3	3	3		2	1	2	1		1	
	p (%)				0.05	0.001	0.01	0.001	0.01	0.001	0.01	0.001	0.01	0.001		0.05	0.001	0.015	0.003		0.003	
	J (dB)				–	–	–8	0	–8	0	–8	0	–8	0		–	–	–8	0		0	
	$M_0(p_0)$ (dB)				–	–	17	5	17	5 (°)	17	5 (°)	17	5 (°)		–	–	17	5 (°)		5 (°)	
	W (dB)				–	–	4	0	4	0	4	0	4	0		–	–	4	0		0	
Terrestrial Station Parameters	E (dBW) in B (°)	55	55	92 (°)	62(°)(°)	62(°)(°)	92 (°)	92 (°)	55	55	92 (°)	92 (°)	55	55	55	25 (°)	25 (°)	55	55		35 (°)	
	P_f (dBW) in B	13	13	40 (°)	10(°)(°)	10(°)(°)	40 (°)	40 (°)	13	13	40 (°)	40 (°)	13	13	13	–17(°)	–17(°)	10	10		–10(°)	
	ΔG (dB)	0	0	10 (°)	10 (°)	10 (°)	10 (°)	10 (°)	0	0	10 (°)	10 (°)	0	0	0	0	0	3	3		3	
Reference Bandwidth (°)	B (Hz)			10°	1	1	10°	10°	10°	10°	10°	10°	10°	10°	10°	1	1	10°	10°		10°	
Permissible Interference Power	$P_f(p)$ (dBW) in B				–220	–222	–	–	–	–	–	–	–	–	–154	–220	–220	–	–		–	

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

(°) A = analogue modulation; N = digital modulation.

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

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

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

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

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

(°) For the definition of E , see Annex I.

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TABLE III
Maximum Coordination Distance for Propagation Mode (1)

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

TABLE IV
Characteristic Values of Parameters for the Five Rain-Climatic Zones
(0.01% of the time)

Parameter	Rain-Climatic Zone					Unit
	1	2	3	4	5	
Surface Rainfall Rate (R)	75	55	37	26	14	mm/h
Rain Cell Diameter (D)	2.5	2.8	3	3	4.5	km
Water Vapour Density (ρ_m)	10	5	2	2	2	g/m ³

TABLE V
Maximum Rain-Scatter Distances (km)

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

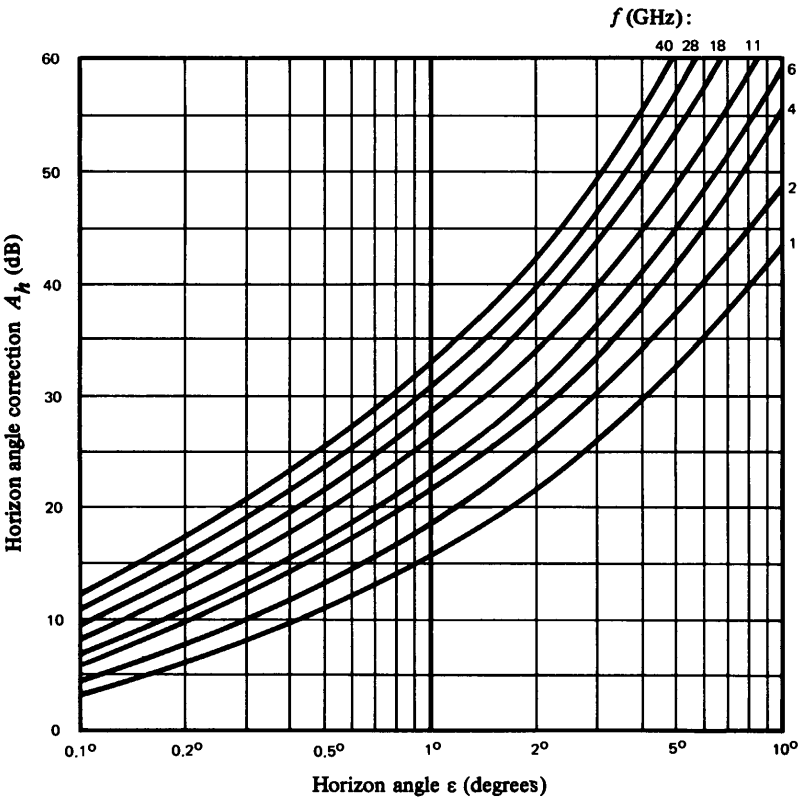


FIGURE 1

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

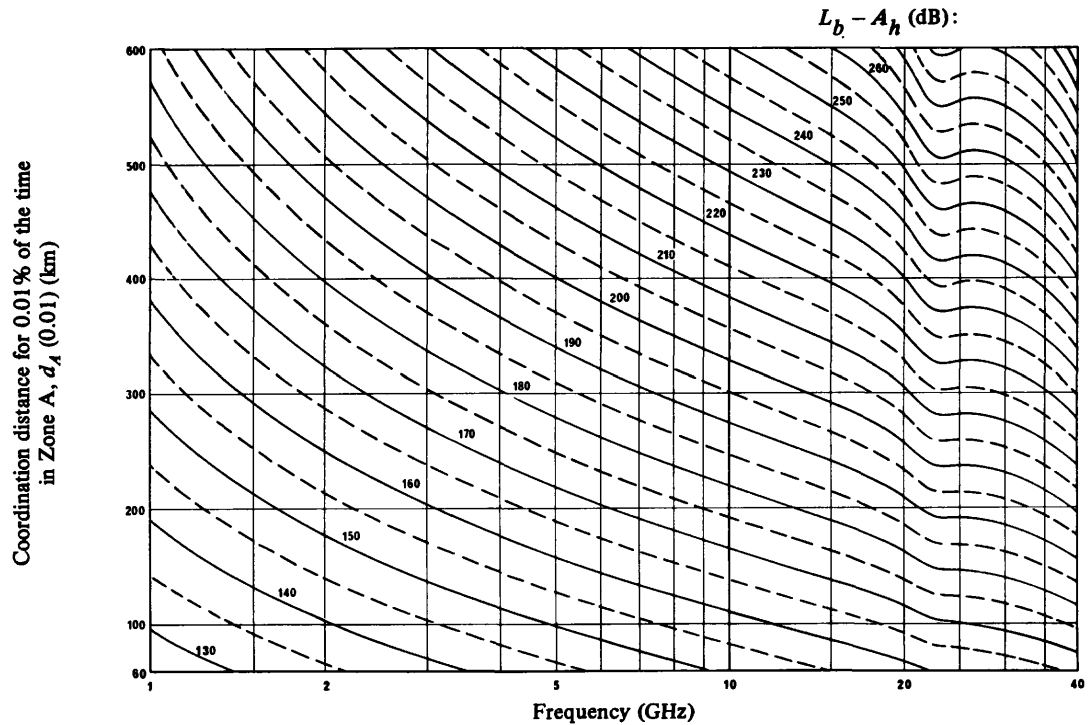


FIGURE 2

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

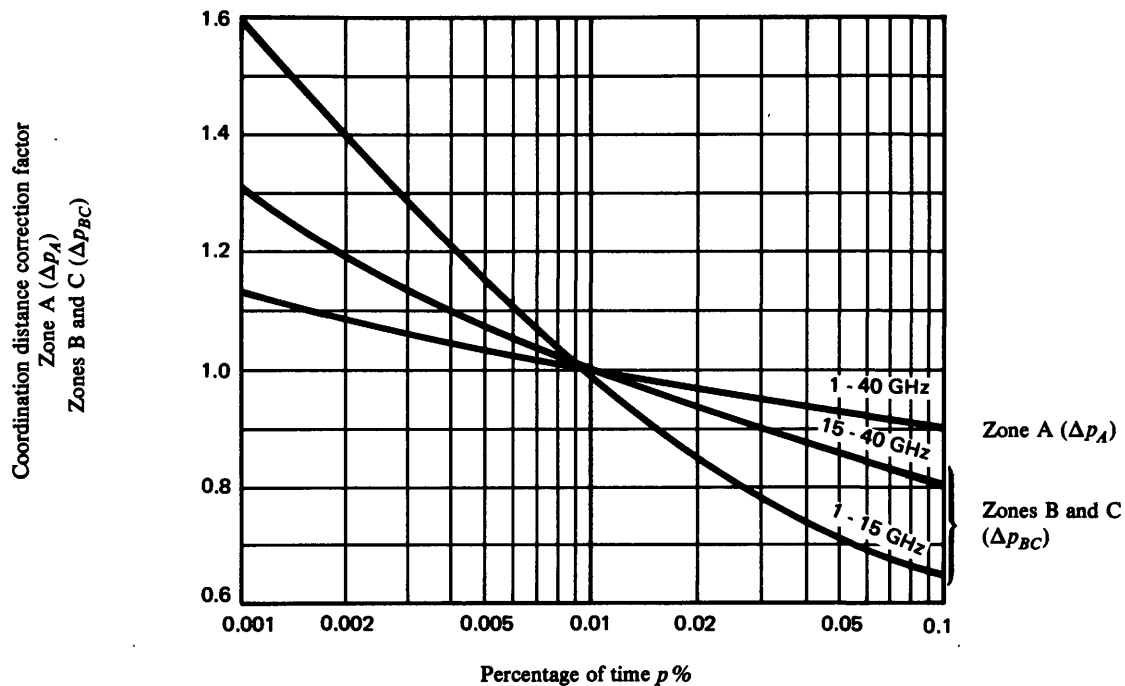


FIGURE 3

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

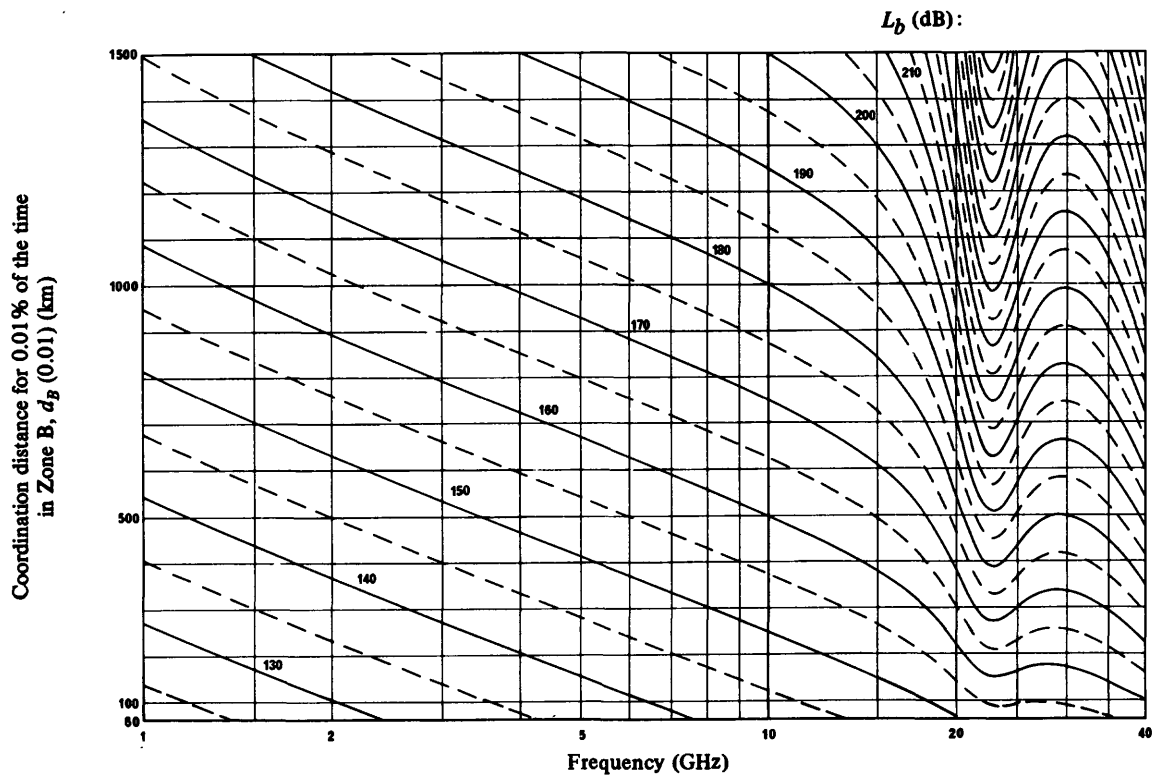


FIGURE 4

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

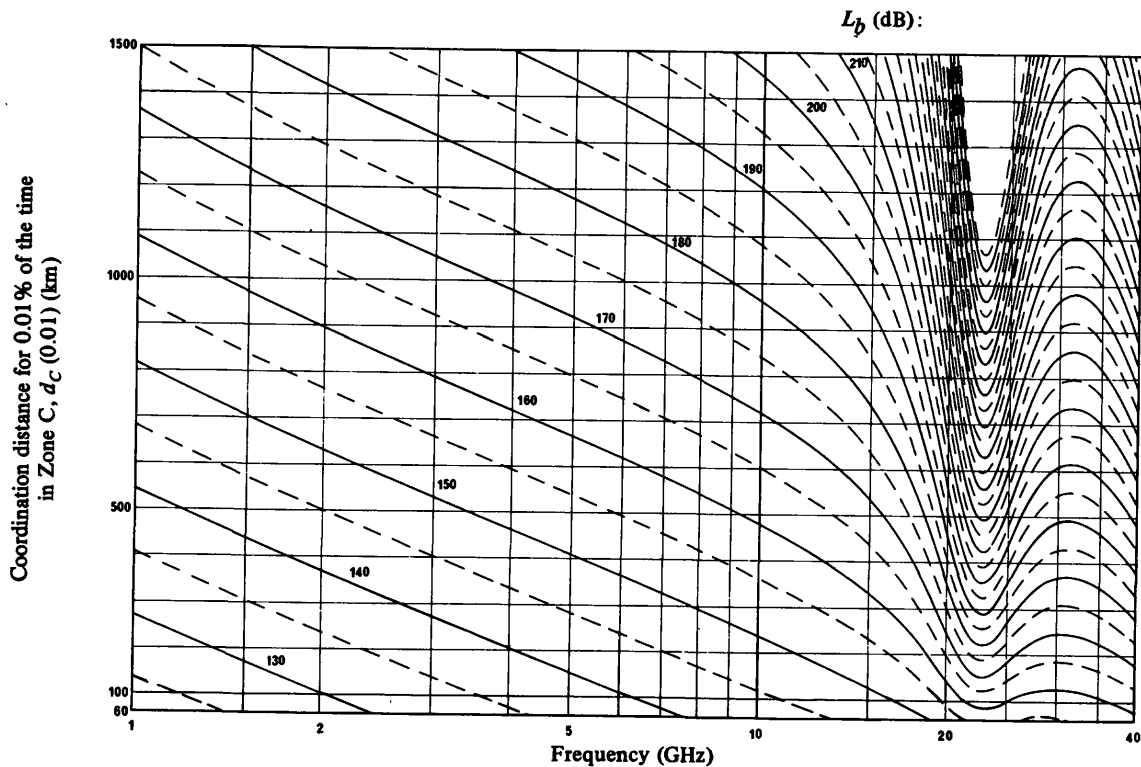


FIGURE 5

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

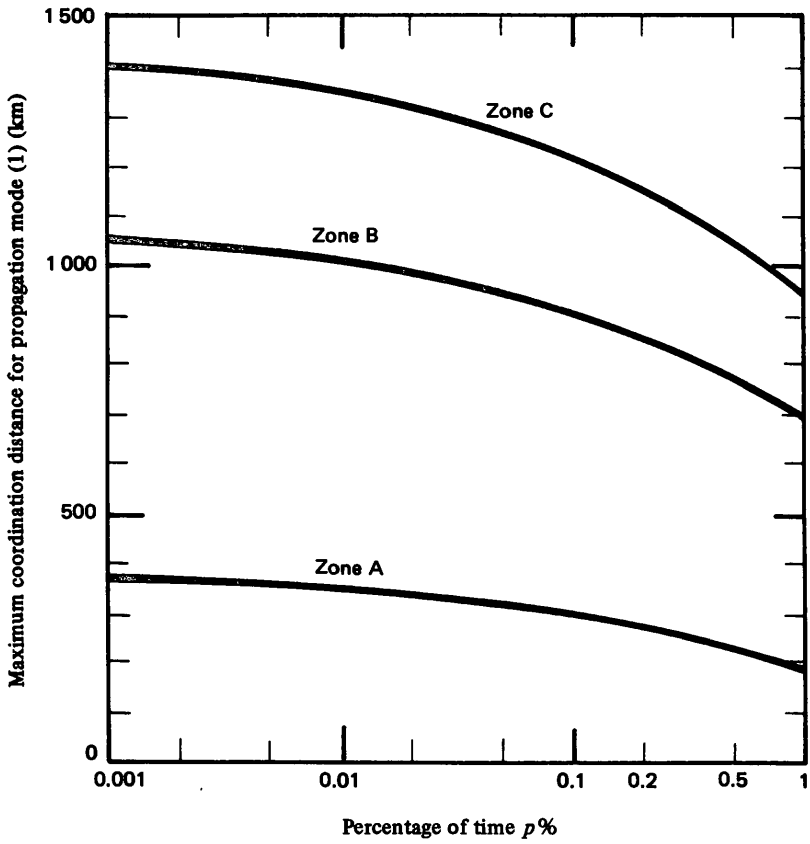


FIGURE 6

*Maximum coordination distance for propagation mode (1)
as a function of percentage of time*

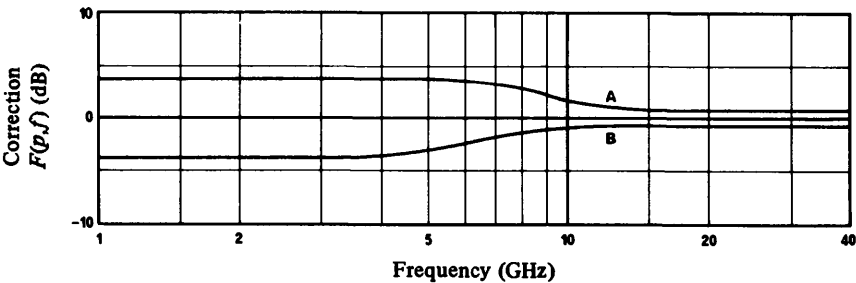


FIGURE 7

Correction for conversion from 0.01 % of the time for all rain-climatic zones

Curve A : Conversion to 0.1 %

Curve B : Conversion to 0.001 %

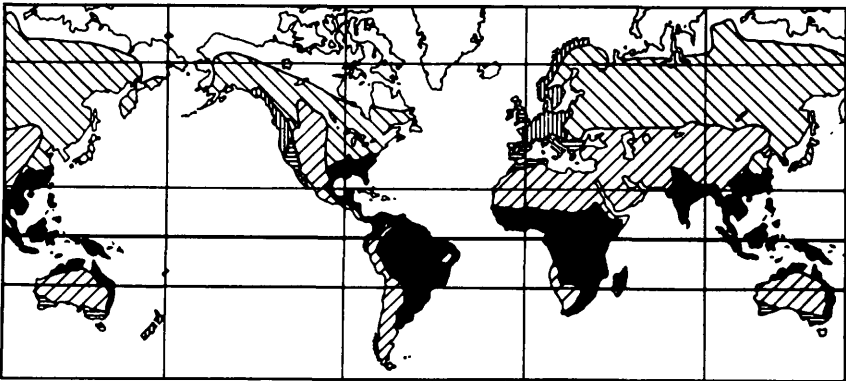


FIGURE 8

*Regions corresponding to the five rain-climatic zones
(see § 4.2)*

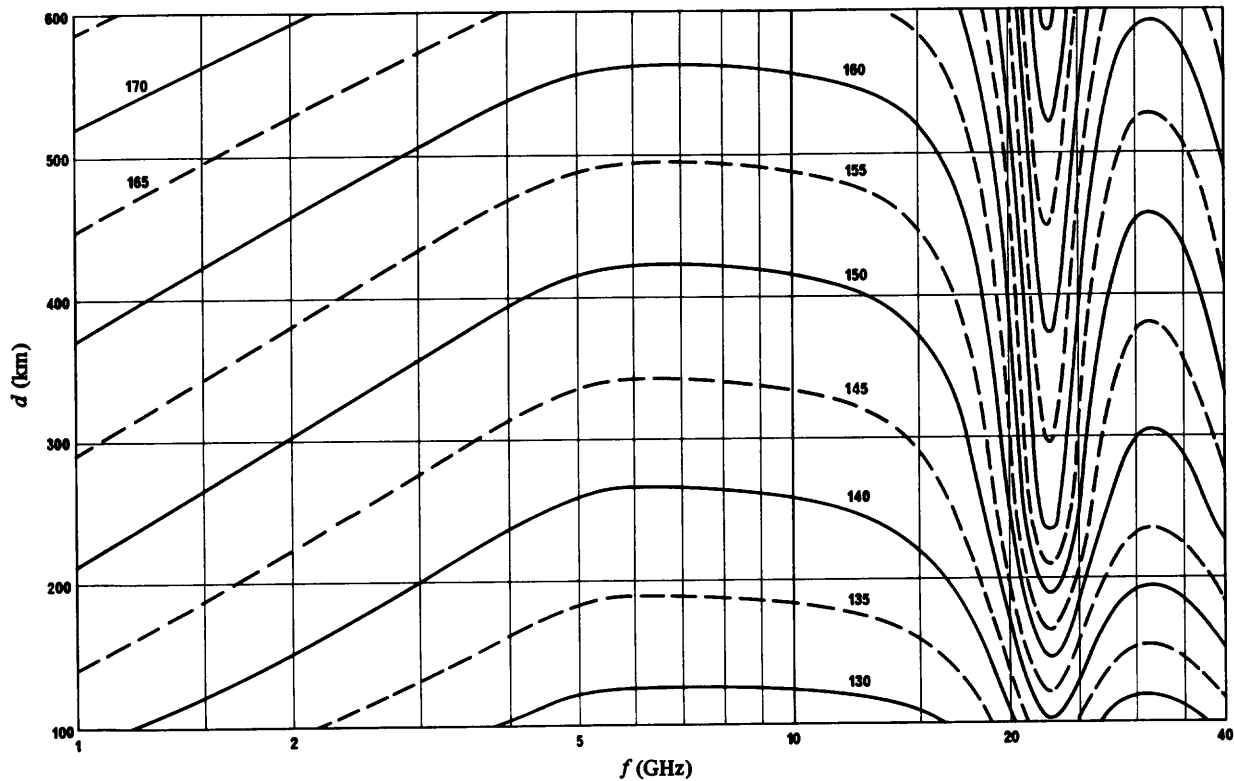


FIGURE 9

Rain-scatter distance as a function of frequency for 0.01 % of the time – Rain-Climatic Zone 1

Contours have transmission loss values shown in dB.

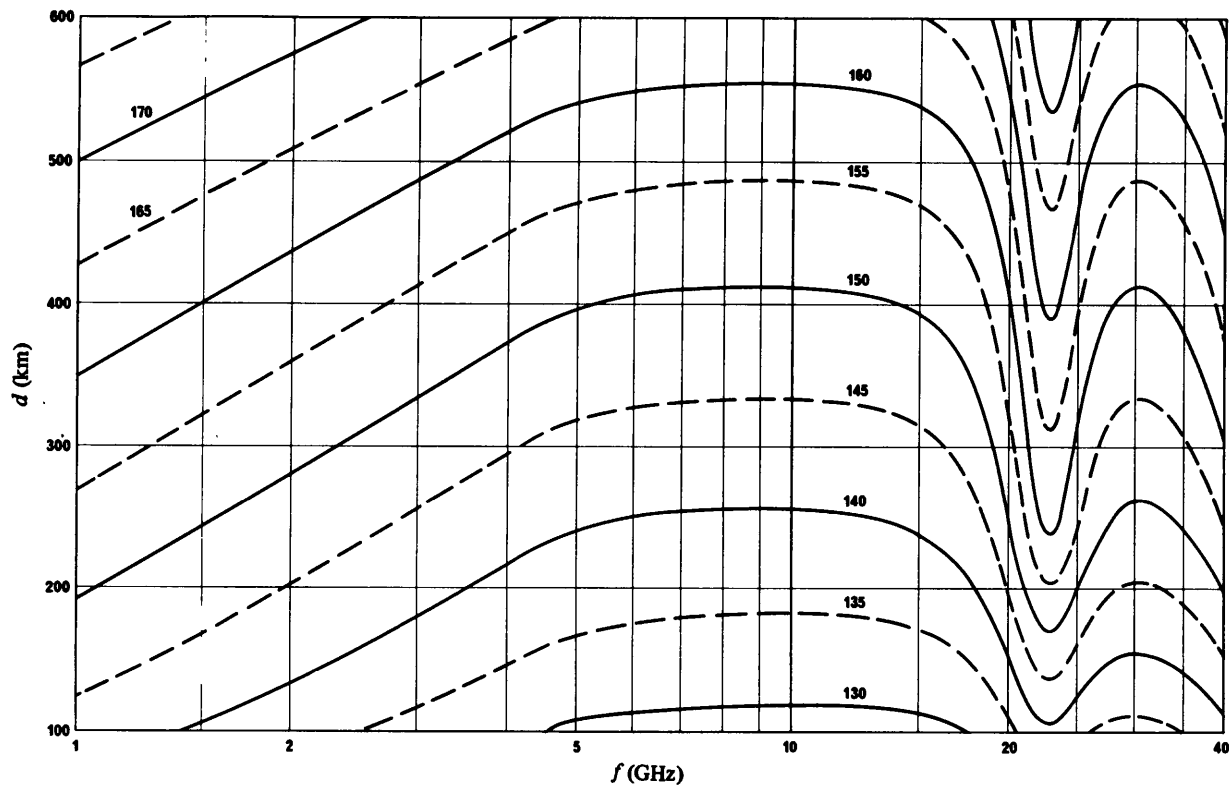


FIGURE 10

Rain-scatter distance as a function of frequency for 0.01% of the time – Rain-Climatic Zone 2

Contours have transmission loss values shown in dB.

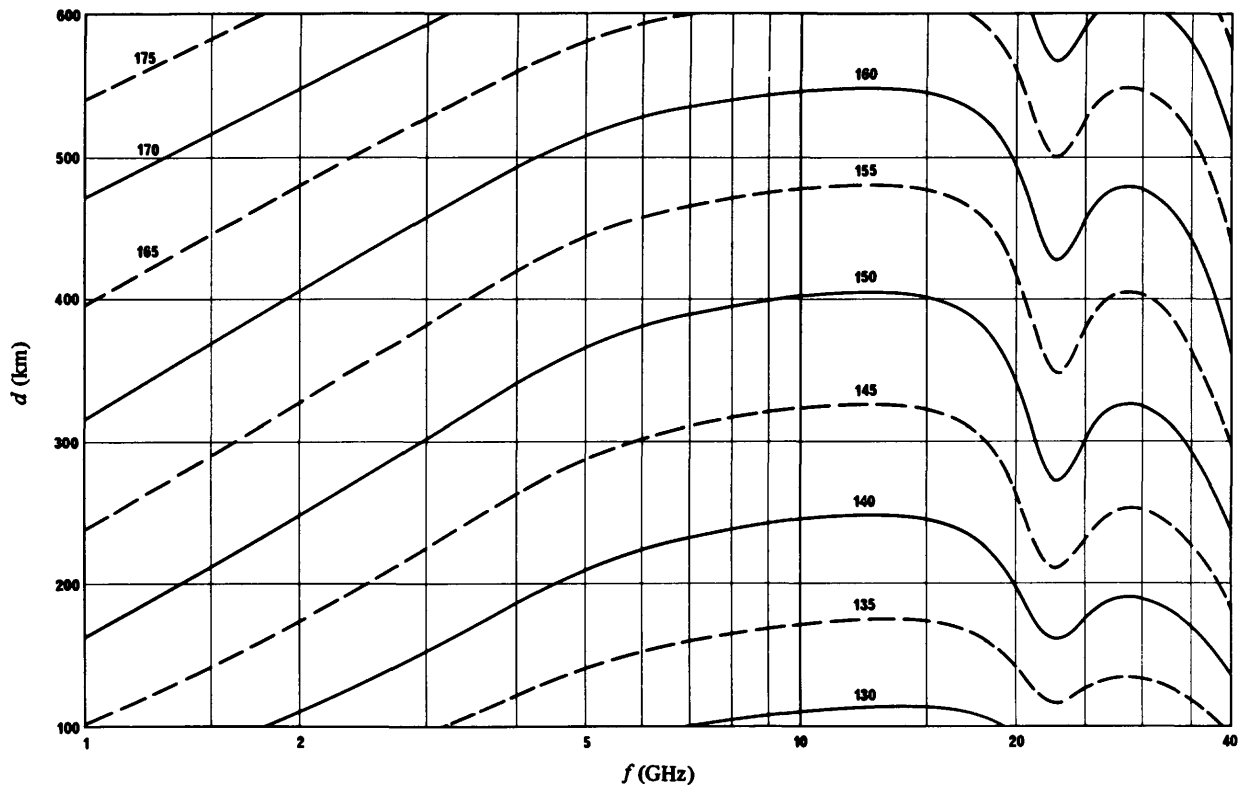


FIGURE 11

Rain-scatter distance as a function of frequency for 0.01% of the time – Rain-Climatic Zone 3

Contours have transmission loss values shown in dB.

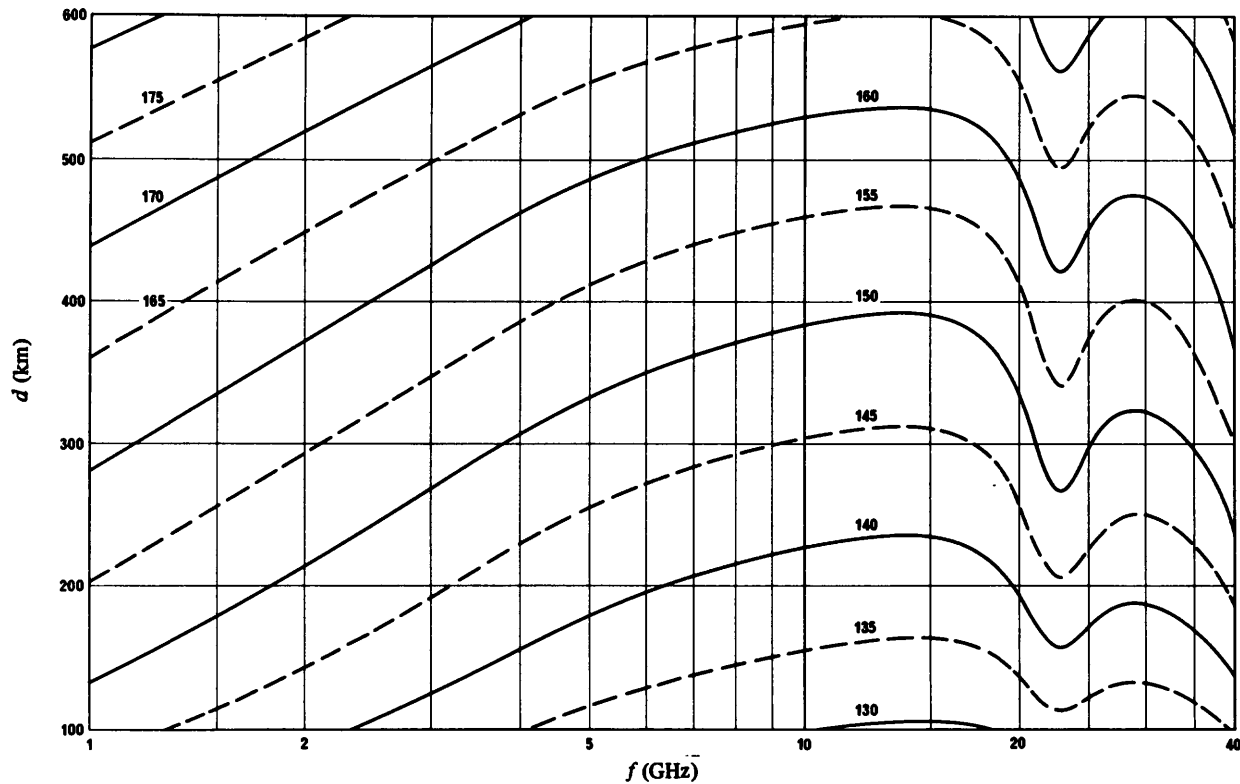


FIGURE 12

Rain-scatter distance as a function of frequency for 0.01% of the time – Rain-Climatic Zone 4

Contours have transmission loss values shown in dB.

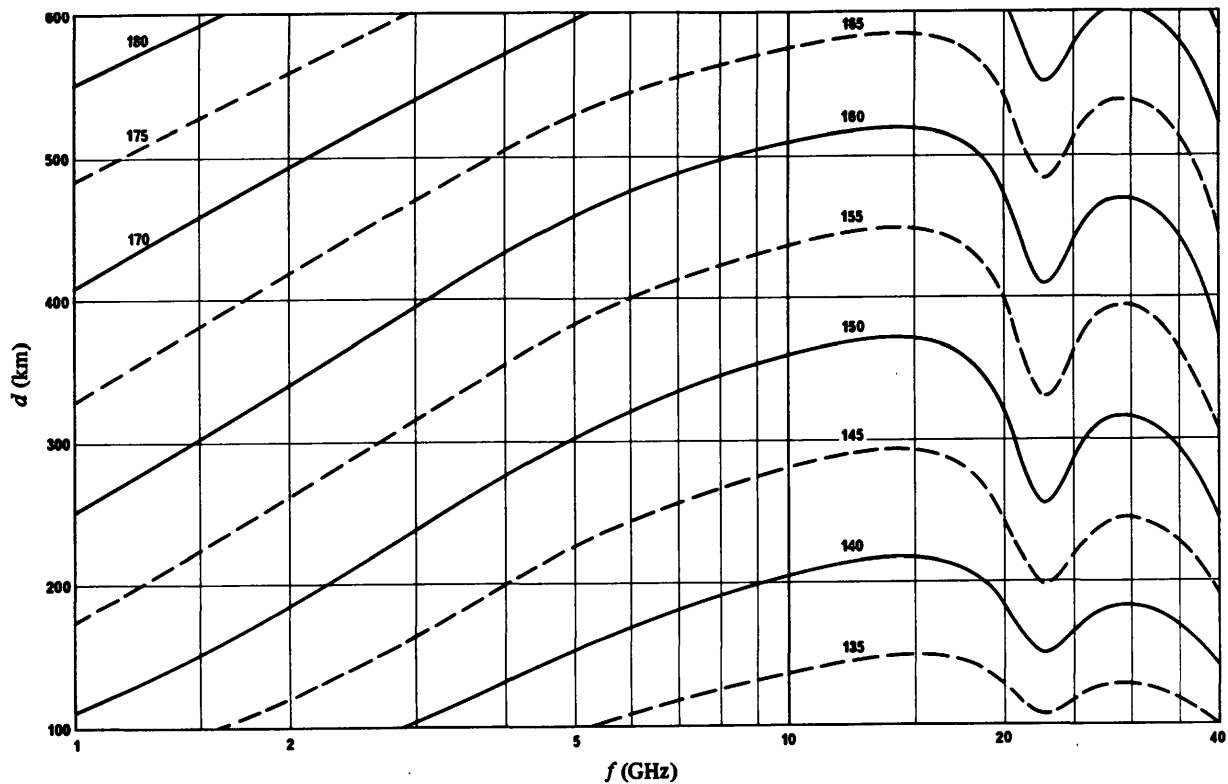


FIGURE 13

Rain-scatter distance as a function of frequency for 0.01% of the time – Rain-Climatic Zone 5

Contours have transmission loss values shown in dB.

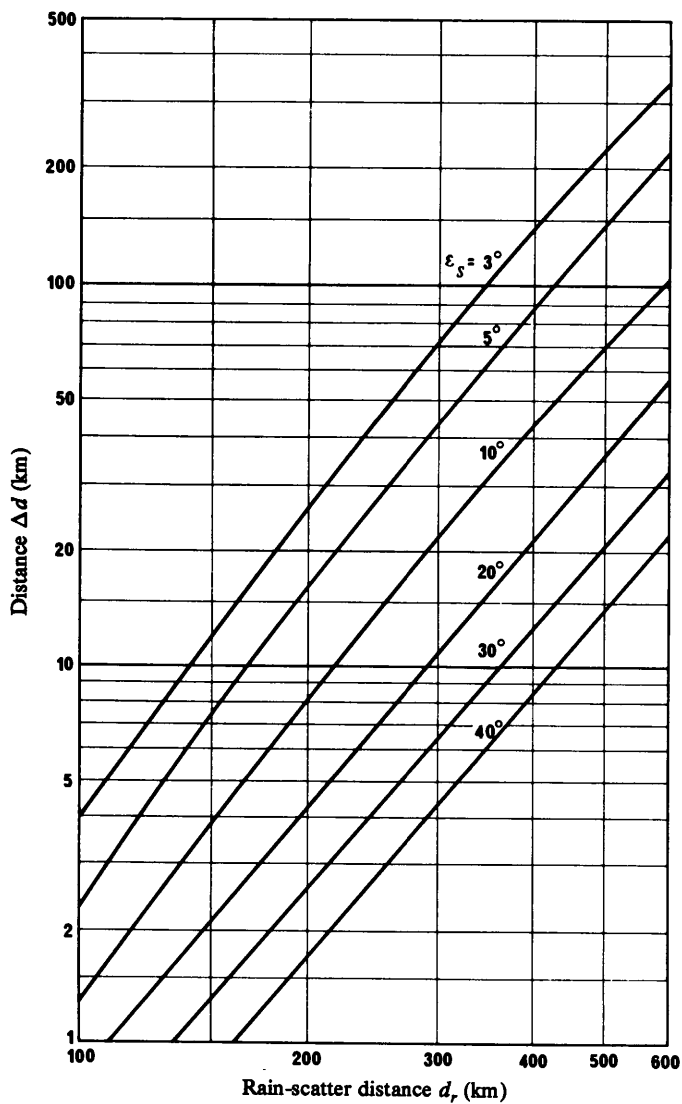


FIGURE 14

Distance Δd as a function of rain-scatter distance d_r and earth station antenna main beam elevation angle ϵ_s

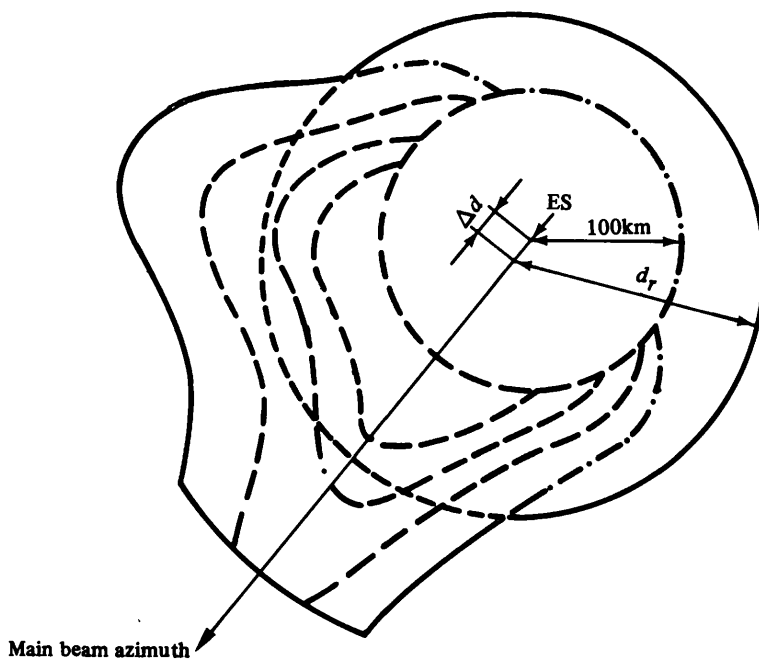


FIGURE 15

Example of a coordination contour

ES: Earth station

- Coordination contour
- · - · - · - Contour for propagation mode (1)
- - - - - Contour for propagation mode (2)
- - - - - Auxiliary contours for propagation mode (1)

Note: If by using the auxiliary contours it is seen that a terrestrial station can be eliminated with respect to propagation mode (1) then:

- if that terrestrial station is outside the contour for propagation mode (2), it may be eliminated from any further consideration;
- if that terrestrial station is within the contour for propagation mode (2), it must still be considered, but for this mode only.

ANNEX I

Determination and Use of Auxiliary Contours**1. *Introduction***

For great circle propagation mechanisms mode (1) auxiliary contours are of great value in eliminating certain existing or planned terrestrial stations falling within the coordination area without recourse to precise and arduous calculations. The work of both the earth station administration and the affected administrations is therefore eased during subsequent negotiations if these auxiliary contours are supplied.

2. *Determination of the auxiliary contours*

Two types of contours may be determined, depending on whether the earth station is used for transmission or reception.

2.1 *Transmitting earth station*

From equation (2) one may isolate the terms $G_r - P_r(p)$ and define an interference sensitivity factor S (dBW) of the interfered-with terrestrial stations:

$$S = G_r - P_r(p) \quad (32)$$

Table I shows values of this factor for various types of terrestrial stations.

The coordination contour is associated with a (maximum) sensitivity factor S and labelled with its value.

The auxiliary contours are determined in the same way as the corresponding coordination contour for propagation mode (1), but using terrestrial station interference sensitivity factor S values (dBW) which are 5, 10, 15, 20 dB, etc. lower than the value (given in Table I) corresponding to the coordination contour.

2.2 *Receiving earth station*

From equation (2) one may, likewise, isolate the terms $P_r + G_r$ and define the equivalent isotropically radiated power E (dBW) of the interfering terrestrial stations:

$$E = P_r + G_r \quad (33)$$

values for which are listed in Table II.

The coordination contour is associated with a maximum value for E and labelled with this value.

The auxiliary contours are determined in the same way as the corresponding coordination contour for propagation mode (1), but using terrestrial station e.i.r.p. values E (dBW) which are 5, 10, 15, 20 dB, etc. lower than the value (given in Table II) corresponding to the coordination contour.

3. *Use of auxiliary contours*

The auxiliary contours, the coordination contour for great circle propagation mode (1) and the coordination contour for rain-scatter mode (2) are all plotted on the same diagram for a given shared band. An illustrative example is given in Fig. 15.

For each terrestrial station situated within the coordination area, a two stage procedure may be applied, one for the great circle propagation mechanism and the other for scattering from hydrometeors.

3.1 *Great circle propagation mechanisms mode (1)*

If a transmitting terrestrial station is outside the coordination area corresponding to mode (1), it need not be considered further with respect to mode (1).

For each transmitting terrestrial station situated within the coordination area corresponding to mode (1), the e.i.r.p. value in the direction of the earth station is determined. If this value is less than the value associated with the nearest contour defining an area outside of which the station is situated, the station may be considered not to cause more than a permissible level of interference and therefore may be eliminated from further consideration with respect to mode (1).

For each receiving terrestrial station, the analogous procedure may be applied using the interference sensitivity factor instead of the e.i.r.p. value.

3.2 *Elimination of a terrestrial station and rain-scatter propagation mechanism mode (2)*

Terrestrial stations eliminated by the above procedure from further consideration with regard to propagation mode (1) need, nevertheless, be further considered with regard to propagation mode (2) when they lie within the rain-scatter coordination area.

ANNEX II

**Antenna Gain in the Direction of the Earth Station
Horizon for Geostationary Satellites**

1. *General*

The gain component of the earth station antenna in the direction of the physical horizon around an earth station is a function of the angular separation φ between the antenna main beam axis and the horizon direction under consideration. Therefore, knowledge of the angle φ is required for each azimuth.

The elevation ε , and azimuth α , of geostationary satellites as seen from an earth station at a latitude ζ are uniquely related. Fig. II-1 shows the possible location arcs of geostationary satellites in a rectangular elevation/azimuth plot, each arc corresponding to an earth station latitude.

Specific relative satellite longitudes may not be known beforehand, but even when they are, the possibility of the addition of a new satellite or the repositioning of an existing one suggests that all or a portion of the applicable arc be considered to hold satellites.

2. *Graphical method for the determination of $\varphi(\alpha)$*

With the correct arc or segment of arc chosen and suitably marked in Fig. II-1, the horizon profile $\varepsilon(\alpha)$ is added to the plot of Fig. II-1, as shown in Fig. II-2, where an example is given for an earth station located at 45° N latitude for a satellite expected to be located somewhere between relative longitudes of 10° E and 45° W.

For each point on the local horizon $\varepsilon(\alpha)$ the smallest distance to the arc is determined and measured on the elevation scale. The example of Fig. II-2 shows the determination of the off-beam angle φ at an azimuth α ($= 210^\circ$) with a horizontal elevation ε ($= 4^\circ$). The measurement of φ yields a value of 26° .

When this is done for all azimuths (in suitable increments, e.g. 5°), a relationship $\varphi(\alpha)$ results.

3. *Numerical method for the determination of $\varphi(\alpha)$*

For this purpose the following equations may be used:

$$\psi = \arccos(\cos \zeta \cdot \cos \delta) \quad (34)$$

$$\alpha'_s = \arccos(\tan \zeta \cdot \cot \psi) \quad (35)$$

$$\alpha_s = \alpha'_s + 180^\circ \quad \text{for earth stations located in the northern hemisphere and satellites located west of the earth station} \quad (36a)$$

$$\alpha_s = 180^\circ - \alpha'_s \quad \text{for earth stations located in the northern hemisphere and satellites located east of the earth station} \quad (36b)$$

$$\alpha_s = 360^\circ - \alpha'_s \quad \text{for earth stations located in the southern hemisphere and satellites located west of the earth station} \quad (36c)$$

$$\alpha_s = \alpha'_s \quad \text{for earth stations located in the southern hemisphere and satellites located east of the earth station} \quad (36d)$$

$$\epsilon_s = \arctan\left(\frac{K - \cos \psi}{\sin \psi}\right) - \psi \quad (37)$$

$$\varphi(\alpha) = \arccos[\cos \epsilon \cdot \cos \epsilon_s \cdot \cos(\alpha - \alpha_s) + \sin \epsilon \cdot \sin \epsilon_s] \quad (38)$$

where:

- ζ : latitude of earth station;
- δ : difference in longitude between the satellite and the earth station;
- ψ : great circle arc between the earth station and the sub-satellite point;
- α_s : satellite azimuth as seen from the earth station;
- ϵ_s : satellite elevation angle as seen from the earth station;
- α : azimuth of the pertinent direction;
- ϵ : elevation angle of the horizon in the pertinent azimuth α ;
- $\varphi(\alpha)$: angle between the main beam axis and the horizon direction corresponding to the pertinent azimuth α ;
- K : orbit radius/earth radius, assumed to be 6.62.

All arcs mentioned above are in degrees.

4. *Determination of antenna gain*

The relationship $\varphi(\alpha)$ may be used to derive a function for the horizon antenna gain G (dB) as a function of the azimuth α , by using the actual earth station antenna pattern or a formula giving a good approximation. For

example, in cases where the ratio between the antenna diameter and the wavelength is not less than 100, the following equation should be used:

$$G(\varphi) = G_{\max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda} \varphi \right)^2 \quad \text{for } 0 < \varphi < \varphi_m \quad (39a)$$

$$G(\varphi) = G_1 \quad \text{for } \varphi_m \leq \varphi < \varphi_r \quad (39b)$$

$$G(\varphi) = 32 - 25 \log \varphi \quad \text{for } \varphi_r \leq \varphi < 48^\circ \quad (39c)$$

$$G(\varphi) = -10 \quad \text{for } 48^\circ \leq \varphi \leq 180^\circ \quad (39d)$$

where:

D : antenna diameter }
 λ : wavelength } expressed in the same unit

G_1 : gain of the first sidelobe = $2 + 15 \log \frac{D}{\lambda}$

$$\varphi_m = \frac{20\lambda}{D} \sqrt{G_{\max} - G_1} \quad (\text{degrees})$$

$$\varphi_r = 15.85 \left(\frac{D}{\lambda} \right)^{-0.6} \quad (\text{degrees})$$

When it is not possible, for antennae with $\frac{D}{\lambda}$ of less than 100, to use the above reference antenna pattern and when neither measured data nor a relevant CCIR Recommendation accepted by the administrations concerned can be used instead, administrations may use the reference diagram as described below:

$$G(\varphi) = G_{\max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda} \varphi \right)^2 \quad \text{for } 0 < \varphi < \varphi_m \quad (40a)$$

$$G(\varphi) = G_1 \quad \text{for } \varphi_m \leq \varphi < 100 \frac{\lambda}{D} \quad (40b)$$

$$G(\varphi) = 52 - 10 \log \frac{D}{\lambda} - 25 \log \varphi \quad \text{for } 100 \frac{\lambda}{D} \leq \varphi < 48^\circ \quad (40c)$$

$$G(\varphi) = 10 - 10 \log \frac{D}{\lambda} \quad \text{for } 48^\circ \leq \varphi \leq 180^\circ \quad (40d)$$

where:

D : antenna diameter }
 λ : wavelength } expressed in the same unit

$$G_1: \text{ gain of the first sidelobe} = 2 + 15 \log \frac{D}{\lambda}$$

$$\varphi_m = \frac{20\lambda}{D} \sqrt{G_{\max} - G_1} \text{ (degrees)}$$

The above patterns may be modified as appropriate to achieve a better representation of the actual antenna pattern.

In cases where $\frac{D}{\lambda}$ is not given, it may be estimated from the expression $20 \log \frac{D}{\lambda} \approx G_{\max} - 7.7$, where $G_{\max}$ is the main lobe antenna gain in dB.

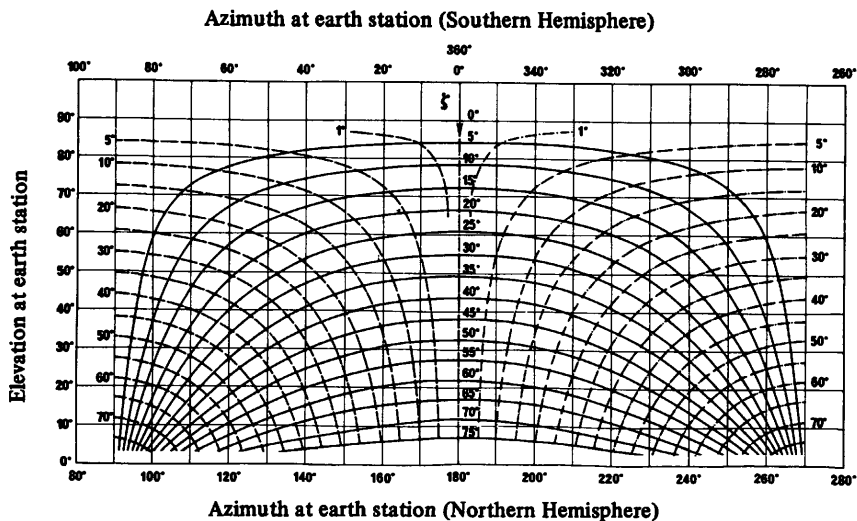


FIGURE II-1

Position arcs of geostationary satellites

- Arc of geostationary-satellite orbit visible from earth station at terrestrial latitude ζ
- Difference in longitude between earth station and the sub-satellite point :
 - Satellite longitude E of earth station longitude
 - Satellite longitude W of earth station longitude
 - Satellite longitude equal to the earth station longitude

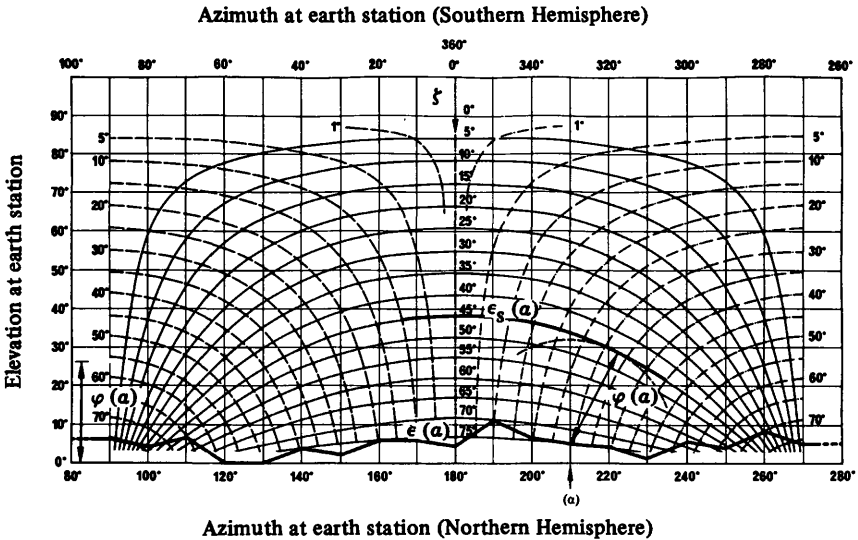


FIGURE II-2

Example of derivation of φ

- Arc of geostationary-satellite orbit visible from earth station at terrestrial latitude ζ
- Horizon profile $\varepsilon(a)$
- Difference in longitude between earth station and the sub-satellite point :
- Satellite longitude E of earth station longitude
- Satellite longitude W of earth station longitude
- Satellite longitude equal to the earth station longitude

ANNEX III

Graphical Method for the Determination of Coordination Distance for Mixed Paths

1. *Two zones*

The procedure to be followed in the case of a mixed path involving two zones is illustrated by the example shown in Fig. III-1(a). The earth station is situated in Zone A at a distance of 75 km from Zone B. The graphical

presentation described below is particularly useful where more than one boundary between zones may be involved, as in this example.

In the example given below, the coordination loss is assumed to be 180 dB, the frequency 20 GHz, and the percentage of time 0.01 %. The procedure is as follows:

- 1.1 determine the distance entirely in Zone A that would give the coordination loss. Mark this distance (in this case it is 160 km) from the origin along the abscissa axis of linear graph paper as indicated by the point A (Fig. III-1 (b));
- 1.2 determine the distance entirely in Zone B that would give the same coordination loss. Mark this distance (in this case it is 530 km) from the origin along the ordinate axis of the chart as indicated by the point B;
- 1.3 draw a straight line between points A and B representing these distances from the origin;
- 1.4 starting from the origin, the distance of 75 km from the earth station to Zone B is set off along the abscissa axis of the chart as indicated by the point A_1 ;
- 1.5 starting from point A_1 the Zone B path length of 150 km is then set off parallel to the ordinate axis of the chart as indicated by the point B_1 ;
- 1.6 the further distance in the next Zone A region is then measured parallel to the abscissa axis from the point B_1 to the point of intersection of the mixed path curve as indicated by X. In Fig. III-1 (b), this distance is 40 km;
- 1.7 the coordination distance is the sum of distances OA_1 , $A_1 B_1$ and $B_1 X$ and is equal to:

$$75 + 150 + 40 = 265 \text{ km}$$

2. *Three zones*

In some special cases, the mixed path involves all three radio-climatic Zones A, B and C. A solution to this problem can be found in adding a third dimension to the procedure to be followed for mixed paths involving only two zones. Theoretically, it means that the third coordinate has to be determined for a point having coordinates corresponding to the known distances in the first two zones and lying in a plane defined by three points on the axes X, Y and Z, corresponding to distances in Zones A, B and C, respectively, that would give the required basic transmission loss.

In practice, the procedure can be reduced to a simple graphical method shown in Fig. III-2(a) assuming for example a coordination loss (L_1) of 180 dB at a frequency of 20 GHz. It is required to find the coordination distance from the earth station in the direction given in Fig. III-2(a). Here an earth station is situated in Zone A at a distance of 75 km in a given azimuthal direction from Zone B. In the same azimuthal direction Zone B is 150 km long and followed by an unknown portion in Zone C (Fig. III-2(a)).

In this case, the procedure to be applied should be as follows (Fig. III-2(b)):

- 2.1 repeat the same procedure as for mixed paths involving only two zones, given in steps 1.1 to 1.5 above, and continue as follows:
- 2.2 from the point B_1 draw a line parallel to the line AB to intersect the abscissa axis as indicated by the point D;
- 2.3 determine the distance, entirely in Zone C, that would give the coordination loss. Mark this distance (in this case it is 350 km) from the origin along the ordinate axis of the chart as indicated by the length OC. Draw a straight line between points C and A;
- 2.4 at the point D draw a line parallel to the ordinate axis to intersect the line CA as indicated by X;
- 2.5 the distance between the points D and X, which is the unknown distance in Zone C, is found to be 85 km;
- 2.6 the coordination distance is then the sum of the distances OA_1 , A_1B_1 , and DX and in this example is equal to:

$$75 + 150 + 85 = 310 \text{ km}$$

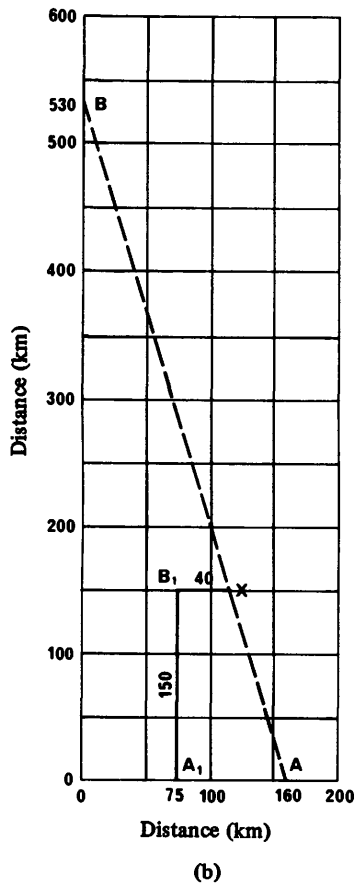
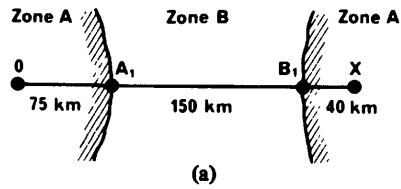


FIGURE III-1

*Example of determination of coordination distance
for mixed paths involving Zones A and B*

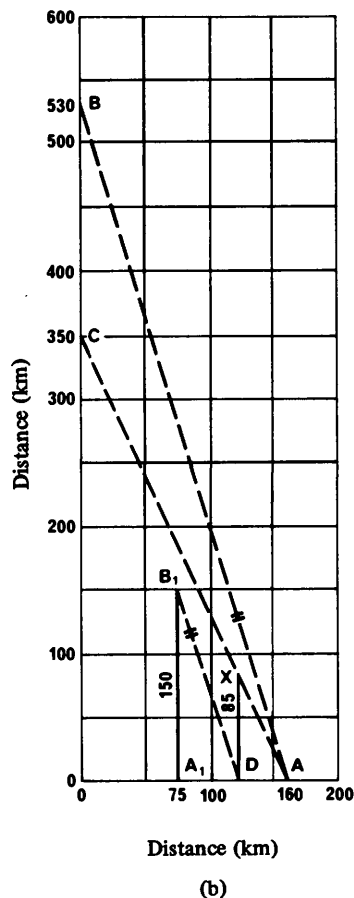
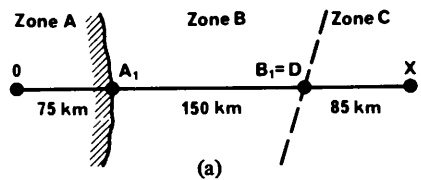


FIGURE III-2

*Example of determination of coordination distance
for mixed paths involving Zones A, B and C*

APPENDIX 29

**Method of Calculation for Determining if Coordination is
Required Between Geostationary-Satellite Networks
Sharing the Same Frequency Bands**

1. *Introduction*

The method of calculation for determining if coordination is required under provision No. 1060 is based on the concept that the noise temperature of a system subject to interference increases as the level of the interfering emission increases. It can, therefore, be applied irrespective of the modulation characteristics of these satellite networks, and of the precise frequencies used.

In this method, the apparent increase in the equivalent satellite link noise temperature resulting from an interfering emission of a given system is calculated (see § 2 below) and the ratio of this increase to the equivalent satellite link noise temperature, expressed as a percentage, is compared to a threshold value (see § 3 below).

2. *Calculation of the apparent increase in equivalent noise temperature of the satellite link subject to an interfering emission*

Two possible cases are considered:

Case I: wanted and interfering networks share one or more frequency bands, each in the same direction of transmission;

Case II: wanted and interfering networks share one or more frequency bands, each in opposite directions of transmission (bidirectional use).

These two cases cover all relative satellite positions from closely-spaced to near-antipodal positions.

2.1 *Parameters*

Let A be a satellite link of network R associated with satellite S and A' be a satellite link of network R' associated with satellite S'. The symbols relating to satellite link A' bear primes, those relating to satellite link A do not bear primes.

The parameters are defined as follows (for satellite link A):

- T : the equivalent satellite link noise temperature, referred to the output of the receiving antenna of the earth station (K);
- T_s : the receiving system noise temperature of the space station, referred to the output of the receiving antenna of the space station (K);
- T_e : the receiving system noise temperature of the earth station, referred to the output of the receiving antenna of the earth station (K);
- ΔT_s : apparent increase in the receiving system noise temperature of the satellite S, caused by an interfering emission, referred to the output of the receiving antenna of this satellite (K);
- ΔT_e : apparent increase in the receiving system noise temperature of the earth station e_R , caused by an interfering emission, referred to the output of the receiving antenna of this station (K);
- p_s : maximum power density per Hz delivered to the antenna of satellite S (averaged over the worst 4 kHz band for a carrier frequency below 15 GHz or over the worst 1 MHz band above 15 GHz) (W/Hz);
- $g_3(\eta)$: transmitting antenna gain of satellite S in the direction η (numerical power ratio);

η_A : direction, from satellite S, of the receiving earth station e_R of satellite link A;

$\eta_{e'}$: direction, from satellite S, of the receiving earth station e'_R of satellite link A';

Note: The product $p_s g_2(\eta_{e'})$ is the maximum e.i.r.p. per Hz of satellite S in the direction of the receiving earth station e'_R of satellite link A'.

η_s : direction, from satellite S, of satellite S';

p_e : maximum power density per Hz delivered to the antenna of the transmitting earth station e_T (averaged over the worst 4 kHz band for a carrier frequency below 15 GHz or over the worst 1 MHz band above 15 GHz) (W/Hz);

$g_2(\delta)$: receiving antenna gain of satellite S in the direction δ (numerical power ratio);

δ_A : direction, from satellite S, of the transmitting earth station e_T of satellite link A;

$\delta_{e'}$: direction, from satellite S, of the transmitting earth station e'_T of satellite link A';

δ_s : direction, from satellite S, of satellite S';

θ_t : topocentric angular separation in degrees between the two satellites¹, taking the longitudinal station-keeping tolerances into account;

Note: Only the topocentric angle θ_t should be used in dealing with Case I.

¹ A method for calculation of the topocentric angular separation is given in Annex I.

θ_g : geocentric angular separation in degrees between the two satellites, taking the longitudinal station-keeping tolerances into account;

Note: Only the geocentric angle θ_g should be used in dealing with Case II.

$g_1(\theta_i)$: transmitting antenna gain of the earth station e_T in the direction of satellite S' (numerical power ratio);

$g_4(\theta_i)$: receiving antenna gain of the earth station e_R in the direction of satellite S' (numerical power ratio);

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

l_d : free-space transmission loss¹ on the down-link (numerical power ratio), evaluated from satellite S to the receiving earth station e_R for satellite link A;

Note: The free-space transmission loss on any down-link evaluated from the satellites S or S' to the receiving earth stations e_R or e'_R is considered to be equal to l_d .

l_u : free-space transmission loss¹ on the up-link (numerical power ratio), evaluated from the earth station e_T , to satellite S for satellite link A;

Note: The free-space loss on any up-link evaluated from the earth stations e_T or e'_T to the satellite S or S' is considered to be equal to l_u .

l_s : free-space transmission loss¹ on the inter-satellite link (numerical power ratio), evaluated from satellite S' to satellite S ;

¹ A method for calculation of the free-space transmission loss is given in Annex II.

- γ : transmission gain of a specific satellite link subject to interference evaluated from the output of the receiving antenna of satellite S to the output of the receiving antenna of the earth station e_R (numerical power ratio, usually less than 1).

2.2 General method

In the following equations, the frequency to be used for the calculation of l_d , l_u , and l_s is the average frequency of the band common to both networks in the direction considered. If, in a given direction, there is no overlap of the assigned frequency bands of the two networks, the corresponding value (ΔT_s or ΔT_e) is taken to be equal to zero. For cases where the Appendix 3 data have not been published, the assigned frequency band for that network shall be considered as being the frequency range as provided for in Appendix 4.

2.2.1 Case I – Wanted and interfering networks sharing the same frequency band in the same direction of transmission

The gains $g_1(\theta_i)$ and $g_4(\theta_i)$ are those of the earth stations concerned. When neither measured data nor a relevant CCIR Recommendation accepted by the administrations concerned are available the radiation patterns set out in Annex III should be used.

2.2.1.1 Simple frequency-changing transponder on board the satellite

The parameters ΔT_s and ΔT_e are given by the following equations:

$$\Delta T_s = \frac{p'_e g'_1(\theta_i) g_2(\delta_e)}{kl_u} \quad (1)$$

$$\Delta T_e = \frac{p'_s g'_3(\eta_e) g_4(\theta_i)}{kl_d} \quad (2)$$

The symbol ΔT will be used to denote the apparent increase in the equivalent noise temperature for the entire satellite link referred to the output of the receiving antenna of the receiving earth station e_R due to the interfering emission from link A' .

This increase is the result of the interfering emissions entering at both the satellite and the earth station receiver of link A and can accordingly be expressed as:

$$\Delta T = \gamma \Delta T_s + \Delta T_e \quad (3)$$

Hence,

$$\Delta T = \gamma \frac{p'_e g'_1(\theta_i) g'_2(\delta_{e'})}{kl_u} + \frac{p'_s g'_3(\eta_e) g'_4(\theta_i)}{kl_d} \quad (4)$$

An example calculation for the application of the method of this Appendix in Case I is given in Annex IV.

In the same way, the increase $\Delta T'$ in the equivalent noise temperature for the entire satellite link, referred to the output of the receiving antenna of the receiving earth station e'_R , under the effect of the interference caused by satellite link A , is given by the following equations:

$$\Delta T'_{s'} = \frac{p_e g_1(\theta_i) g'_2(\delta_e)}{kl_u} \quad (5)$$

$$\Delta T'_{e'} = \frac{p_s g_3(\eta_{e'}) g'_4(\theta_i)}{kl_d} \quad (6)$$

$$\Delta T' = \gamma' \frac{p_e g_1(\theta_i) g'_2(\delta_e)}{kl_u} + \frac{p_s g_3(\eta_{e'}) g'_4(\theta_i)}{kl_d} \quad (7)$$

2.2.1.2 *Cases requiring independent treatment of the up-link and the down-link*

If there is a change of modulation in the satellite or if the transmission originates on board the satellite, then the apparent increase in the noise temperature must be related to the total receiving system noise temperature of the specific link being examined (the space station or the earth station, whichever is applicable). In this case, the equivalent noise temperature of the entire satellite link and the transmission gain are not used and equations (1) and (2) above are used separately as required (see § 2.3).

2.2.2 *Case II – Wanted and interfering networks sharing the same frequency band in opposite directions of transmission (bidirectional use)*

The calculation method below only applies to interfering emissions between satellites.

Interference between earth stations using the same frequency band in opposite directions of transmission (bidirectional use) is to be dealt with by coordination procedures analogous to those used for coordination between earth and terrestrial stations.

All the equations relating to Case II shall use the geocentric angle θ_g .

2.2.2.1 *Simple frequency-changing transponder on board the satellite*

The noise temperature increase ΔT_s , referred to the output of the receiving antenna of the satellite of link A is given by:

$$\Delta T_s = \frac{p'_s g'_3(\eta_s) g_2(\delta_{s'})}{k l_s} \quad (8)$$

The apparent increase in equivalent link noise temperature is then given by:

$$\Delta T = \gamma \Delta T_s \quad (9)$$

The increase $\Delta T'$ in the equivalent noise temperature of the link A' caused by interfering emissions from the satellite associated with the link A is given by:

$$\Delta T' = \gamma' \Delta T'_s = \frac{\gamma' p_s g_3 (\eta_{s'}) g'_2 (\delta_s)}{kl_s} \quad (10)$$

2.2.2.2 Cases requiring independent treatment of the up-link and down-link

In this case equation (8) is used directly with T_s to obtain the percentage increase. The increase $\Delta T'_s$ in the noise temperature of link A' caused by interfering emissions from the satellite associated with link A is obtained in a similar manner.

2.2.3 Consideration of polarization isolation

The polarization isolation factor described in this paragraph shall be considered only if the administration responsible for each network has consented to such a course and has notified its polarization or published it for coordination under No. 1060. In this case, the apparent increase in the equivalent satellite link noise temperature shall be determined by the following expressions:

$$\text{Case I} \quad \Delta T = \frac{\gamma \Delta T_s}{Y_u} + \frac{\Delta T_e}{Y_d}$$

$$\text{Case II} \quad \Delta T = \frac{\gamma \Delta T_s}{Y_{ss}}$$

where the values of ΔT_s and ΔT_e are those given in § 2.2.1 and § 2.2.2 and the values of the factors of polarization isolation Y_u , Y_d and Y_{ss} are those given in the table below.

Polarization		Factor of polarization isolation (numerical ratio) Y
network R	network R'	
LHC	RHC	4
LHC	L	1.4
RHC	L	1.4
LHC	LHC	1
RHC	RHC	1
L	L	1

where: LHC = left-hand circular (anti-clockwise)

RHC = right-hand circular (clockwise)

L = linear

2.3 *Determination of the satellite links to be considered in calculating the increase in equivalent satellite link noise temperature (Case I only)*

The greatest increase in equivalent satellite link noise temperature caused to any link of another satellite network, existing or planned, by interfering emissions of the proposed satellite network must be determined.

The most unfavourably sited transmitting earth station of the interfering satellite network should be determined for each satellite receiving antenna of the network subject to interference by superimposing the "Earth-to-space" service areas of the interfering network on the space station receiving antenna gain contours plotted on a map of the Earth's surface. The most unfavourably sited transmitting earth station is the one in the direction of which the satellite receiving antenna gain of the network subject to interference is the greatest.

The most unfavourably sited receiving earth station of the network subject to interference should be determined in an analogous manner for each "space-to-Earth" service area of that network. The most unfavourably sited receiving earth station is the one in the direction of which the satellite transmitting antenna gain of the interfering network is the greatest.

2.4 *Use of information furnished under Appendix 4*

When an administration elects to use information furnished under Appendix 4 with the calculation procedures of § 2.2.1.1 and § 2.2.2.1 in order to formulate comments to the advance publication of a new network, the calculations need to be made for both sets of values of γ and T furnished. The greater of the two values of $\Delta T/T$ resulting from these calculations is the one to be used.

3. *Comparison between calculated percentage increase in noise temperature and the threshold value*

3.1 *Simple frequency-changing transponder on board the satellite*

The calculated values of the $\frac{\Delta T}{T}$ and $\frac{\Delta T'}{T'}$, expressed as percentages, shall be compared with the threshold value of 4%.

- If the calculated value of $\frac{\Delta T}{T}$, expressed as a percentage, due to any interfering emission from satellite link A' to satellite link A, is no greater than the threshold value, coordination is not required with respect to interference from link A' to link A.
- If the calculated value of $\frac{\Delta T}{T}$, expressed as a percentage, is greater than the threshold value, coordination is required.

The comparison of $\frac{\Delta T'}{T'}$, with the threshold value, expressed as a percentage, shall be carried out in a similar manner.

3.2 *Cases requiring independent treatment of the up-link and the down-link*

- a) In the case of interference into only one link, the up-link or the down-link, the value $\Delta T_e/T_e$ or $\Delta T_s/T_s$, expressed as a percentage, shall be compared with the threshold value of 4%.
- b) In the case of interference into both the up-link and the down-link, between which there is a change of modulation on board the satellite, the values of $\Delta T_e/T_e$ and $\Delta T_s/T_s$, expressed as a percentage, shall each be compared with the threshold value of 4%.

When none of the calculated values due to any interfering emission from satellite link A' to satellite link A is greater than the threshold value, coordination is not required with respect to interference from link A' to link A.

When at least one of the calculated values exceeds the threshold value, coordination is required.

The comparison of $\frac{\Delta T_e'}{T_e'}$ or $\frac{\Delta T_s'}{T_s'}$, expressed as a percentage, with the threshold value shall be carried out in a similar manner.

4. *Consideration of narrow-band carriers*

The method of calculation described in this Appendix may underestimate the interference from slow swept TV carriers into certain narrow-band (single channel per carrier, SCPC) carriers.

In order to facilitate coordination between the satellite systems and to reduce the number of administrations involved in this procedure, the administrations whose SCPC assignments are either recorded in the Master Register or are under coordination may inform an administration notifying its new assignment of the radio frequency channels used in their systems for SCPC transmission, so that the notifying administration may be able to avoid using these channels for FM-TV transmissions.

Conversely, administrations introducing new systems using SCPC transmissions may seek appropriate information from other administrations on their FM-TV transmissions.

ANNEX I

Calculation of the Topocentric Angular Separation Between Two Geostationary Satellites

The topocentric angular separation θ_t between two geostationary satellites from a given earth station can be determined by using the equation:

$$\theta_t = \arccos \left(\frac{d_1^2 + d_2^2 - \left(84\,332 \sin \frac{\theta_g}{2} \right)^2}{2 d_1 \cdot d_2} \right)$$

where d_1 and d_2 are the distances, in km, from the earth station to the two satellites respectively, and evaluated as d by the method described in Annex II, and θ_g is as defined in § 2.1.

ANNEX II

Calculation of the Free-Space Transmission Loss

The free-space transmission loss L can be determined by using the following equation:

$$L = 20 (\log f + \log d) + 32.45 \quad (\text{dB})$$

where:

f : frequency (MHz);

d : distance (km).

- a) The distance d between an earth station and a geostationary satellite is given by the equation:

$$d = 42\,644 \sqrt{1 - 0.2954 \cos \psi} \quad (\text{km})$$

where:

$$\cos \psi = \cos \zeta \times \cos \beta$$

where:

ζ : latitude of the earth station;

β : difference in longitude between the satellite and the earth station.

Note: If $\cos \psi < 0.151$, the satellite is below the horizontal plane.

- b) The distance d_s between two geostationary satellites is determined as follows:

$$d_s = 84\,332 \sin \frac{\theta_g}{2} \quad (\text{km})$$

where:

θ_g : geocentric angular separation as defined in § 2.1.

ANNEX III

Radiation Patterns for Earth Station Antennae to Be Used When They Are Not Published

When neither measured data nor relevant CCIR Recommendations accepted by the administrations concerned are available then administrations should use the reference patterns as described below (dB):

a) for values of $\frac{D}{\lambda} \geq 100$ * (maximum gain ≥ 48 dB approx.):

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

$$G(\varphi) = G_1 \quad \text{for } \varphi_m \leq \varphi < \varphi_r$$

$$G(\varphi) = 32 - 25 \log \varphi \quad \text{for } \varphi_r \leq \varphi < 48^\circ$$

$$G(\varphi) = -10 \quad \text{for } 48^\circ \leq \varphi \leq 180^\circ$$

where:

$$\left. \begin{array}{l} D = \text{antenna diameter} \\ \lambda = \text{wavelength} \end{array} \right\} \text{ expressed in the same unit}$$

φ = off-axis angle of the antenna, in degrees, equal to θ_i or θ_g as applicable

$$G_1 = \text{gain of the first sidelobe} = 2 + 15 \log \frac{D}{\lambda}$$

$$\varphi_m = \frac{20\lambda}{D} \sqrt{G_{\max} - G_1} \quad (\text{degrees})$$

$$\varphi_r = 15.85 \left(\frac{D}{\lambda} \right)^{-0.6} \quad (\text{degrees})$$

b) for values of $\frac{D}{\lambda} < 100$ * (maximum gain < 48 dB approx.):

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

$$G(\varphi) = G_1 \quad \text{for } \varphi_m \leq \varphi < 100 \frac{\lambda}{D}$$

$$G(\varphi) = 52 - 10 \log \frac{D}{\lambda} - 25 \log \varphi \quad \text{for } 100 \frac{\lambda}{D} \leq \varphi < 48^\circ$$

$$G(\varphi) = 10 - 10 \log \frac{D}{\lambda} \quad \text{for } 48^\circ \leq \varphi \leq 180^\circ$$

The above patterns may be modified as appropriate to achieve a better representation of the actual antenna pattern.

* In cases where $\frac{D}{\lambda}$ is not given, it may be estimated from the expression $20 \log \frac{D}{\lambda} \approx G_{\max} - 7.7$, where $G_{\max}$ is the main lobe antenna gain in dB.

ANNEX IV

Example of an Application of Appendix 29**1. *General***

In this example of Case I (see § 2.2.1), two identical satellite networks each with a simple frequency-changing transponder and a global coverage antenna are assumed.

All topocentric angles θ_i are assumed to be equal to 5° .

For this angular separation and for an earth station antenna with $\frac{D}{\lambda}$ greater than 100, the reference radiation pattern ($32 - 25 \log \theta_i$) gives a gain of 14.5 dB in the direction of the satellite of the other network.

The input data are furnished in § 2 below and are expressed in dB values except for the parameters T and θ_i . In § 3 the calculations are performed in dB.

It may be noted that since both satellites use global beams there is practically no antenna discrimination between wanted and unwanted signals at the satellite, and that this constitutes a worst case.

2. *Input data*

The values of the network parameters given in the table below are derived from those published in accordance with Appendix 3 or 4.

	Symbol *	Value	Unit
Up-link at 6 175 MHz	P'_e	-37	dB (W/Hz)
	$G'_1 (\theta_r)$	14.5	dB
	$G_2 (\delta_{e'})$	15.5	dB
	L_u	200	dB
Down-link at 3 950 MHz	P'_s	-57	dB (W/Hz)
	$G'_3 (\eta_e)$	15.5	dB
	$G_4 (\theta_r)$	14.5	dB
	L_d	196	dB
	$10 \log \gamma$	-15	dB
	T	105	K
	θ_r	5	degrees

3. Calculation of $\frac{\Delta T}{T}$

From equation (1)

$$10 \log \Delta T_s = P'_e + G'_1 (\theta_r) + G_2 (\delta_{e'}) + 228.6 - L_u$$

$$= -37 + 14.5 + 15.5 + 228.6 - 200 = 21.6 \text{ dBK}$$

Therefore,

$$\Delta T_s = 145 \text{ K}$$

From equation (2)

$$10 \log \Delta T_e = P'_s + G'_3 (\eta_e) + G_4 (\theta_r) + 228.6 - L_d$$

$$= -57 + 15.5 + 14.5 + 228.6 - 196 = 5.6 \text{ dBK}$$

Therefore,

$$\Delta T_e = 3.6 \text{ K}$$

* All capital symbols, except T , refer to parameters given in logarithmic units.

From equation (3)

$$\begin{aligned}\Delta T &= \gamma \Delta T_s + \Delta T_e \\ &= 0.032 \times 145 + 3.6 = 8.2 \text{ K}\end{aligned}$$

Thus

$$\frac{\Delta T}{T} \times 100 = \frac{8.2 \times 100}{105} = 7.8\%$$

4. *Conclusion*

In the example shown, the percentage increase in equivalent satellite link noise temperature is 7.8%. Since it exceeds the threshold value of 4%, coordination between the two networks is required.

APPENDIX 30

**Provisions for All Services and Associated Plan
for the Broadcasting-Satellite Service in
Frequency Bands 11.7 - 12.2 GHz (in Regions 2 and 3)
and 11.7 - 12.5 GHz (in Region 1)¹**

(See Article 15)

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¹ The provisions and associated Plan contained in this Appendix entered into force on 1 January 1979 in accordance with Article 15 of the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

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* This Article is not reproduced in this Appendix; see the footnote to the title of this Appendix.

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ARTICLE 1

General Definitions

1.1 For the purposes of this Appendix the following terms shall have the meanings defined below:

Conference: World Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Frequency Bands 11.7 - 12.2 GHz (in Regions 2 and 3) and 11.7 - 12.5 GHz (in Region 1), called in short World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977;

Plan: The Plan for Regions 1 and 3 and its annexes;

Frequency assignment in accordance with the Plan: Any frequency assignment which appears in the Plan or for which the procedure of Article 4 of this Appendix has been successfully applied.

ARTICLE 2

Frequency Bands

2.1 The provisions of this Appendix apply to the broadcasting-satellite service in the frequency bands between 11.7 GHz and 12.5 GHz in Region 1 and between 11.7 GHz and 12.2 GHz in Regions 2 and 3 and to the other services to which these bands are allocated, so far as their relationship to the broadcasting-satellite service in these bands is concerned.

ARTICLE 3

Execution of the Provisions and Associated Plan

3.1 The Members of the Union in Regions 1 and 3 shall adopt, for their broadcasting-satellite space stations operating in the frequency bands

referred to in this Appendix, the characteristics specified in the Plan for those Regions.

3.2 The Members of the Union in Region 2 shall apply the interim provisions contained in Article 12 of this Appendix. These provisions will govern the broadcasting-satellite service in Region 2 until detailed plans for Region 2, drawn up by a future regional administrative radio conference, have entered into force.

3.3 The Members of the Union shall not change the characteristics specified in the Plan, or establish new broadcasting-satellite space stations or stations in the other services to which these frequency bands are allocated, except as provided for in the Radio Regulations and the appropriate Articles and Annexes of this Appendix.

ARTICLE 4

Procedure for Modifications to the Plan

4.1 When an administration intends to make a modification¹ to the Plan, i.e. either:

- to modify the characteristics of any of its frequency assignments to a space station² in the broadcasting-satellite service which are shown in the Plan, or for which the procedure in this Article has been successfully applied, whether or not the station has been brought into use; *or*

¹ The intention not to employ energy dispersal consistent with paragraph 3.18 of Annex 8 shall be treated as a modification and thus subject to the appropriate provisions of this Article.

² The expression "frequency assignment to a space station", wherever it appears in this Article, shall be understood to refer to a frequency assignment associated with a given orbital position. See Annex 10 for the orbital position limitations.

- to include in the Plan a new frequency assignment to a space station in the broadcasting-satellite service; *or*
- to cancel a frequency assignment to a space station in the broadcasting-satellite service;

the following procedure shall be applied before any notification of the frequency assignment is made to the International Frequency Registration Board (see Article 5 of this Appendix).

4.2 The term “frequency assignment in accordance with the Plan” used in this and the following Articles is defined in Article 1.

4.3 *Proposed modifications to a frequency assignment in accordance with the Plan or the inclusion in the Plan of a new frequency assignment*

4.3.1 An administration proposing a modification to the characteristics of a frequency assignment in accordance with the Plan or the inclusion of a new frequency assignment in the Plan shall seek the agreement of those administrations:

4.3.1.1 having a frequency assignment to a space station in the broadcasting-satellite service in the same channel or an adjacent channel, which is in accordance with the Plan or in respect of which modifications to the Plan have been published by the Board in accordance with the provision of this Article; *or*

4.3.1.2 having a frequency assignment to a space station in the broadcasting-satellite service in Region 2 with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment and which is recorded in the Master Register; *or*

- which has been coordinated or is being coordinated under the provisions of Resolution 33; *or*

- which appears in a Region 2 plan¹ to be adopted at a future regional administrative radio conference, taking account of modifications which may be introduced subsequently in accordance with the final acts of that conference; *or*

4.3.1.3 having no frequency assignment in the broadcasting-satellite service in the channel concerned but in whose territory the power flux-density value exceeds the prescribed limit as a result of the proposed modification; *or*

4.3.1.4 having a frequency assignment in the band 11.7 - 12.2 GHz to a space station in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. 1060 of the Radio Regulations; or those of paragraph 7.2.1 of this Appendix which are considered to be affected.

A frequency assignment is considered to be affected when the limits shown in Annex 1 are exceeded.

4.3.2 An administration intending to modify characteristics in the Plan shall send to the Board, not earlier than five years but not later than eighteen months before the date on which the assignment is to be brought into use, the relevant information listed in Annex 2. If the assignment is not brought into use by that date, the modification shall lapse.

4.3.2.1 Where as a result of the intended modification the limits defined in Annex 1 are not exceeded, this fact shall be indicated when submitting to the Board the information required by 4.3.2. The Board shall then publish this information in a special section of its weekly circular.

¹ The Region 2 plan to be adopted at a future regional administrative radio conference shall not degrade the protection afforded to the frequency assignments in the Plan below the limits specified in this Appendix.

4.3.2.2 In all other cases the administration shall notify the Board of the names of the administrations whose agreement it considers should be sought in order to arrive at the agreement referred to in 4.3.1 as well as of those with which agreement has already been reached.

4.3.3 The Board shall determine on the basis of Annex 1 the administrations whose frequency assignments are considered to be affected within the meaning of 4.3.1. The Board shall include the names of those administrations with the information received under 4.3.2.2 and shall publish the complete information in a special section of its weekly circular. The Board shall immediately send the results of its calculations to the administration proposing the modification to the Plan.

4.3.4 The Board shall send a telegram to the administrations listed in the special section of the weekly circular drawing their attention to the information it contains and shall send them the results of its calculations.

4.3.5 An administration which feels that it should have been included in the list of administrations whose services are considered to be affected may, giving the technical reasons for so doing, request the Board to include its name. The Board shall study this request on the basis of Annex 1 and shall send a copy of the request with an appropriate recommendation to the administration proposing the modification to the Plan.

4.3.6 Any modification to a frequency assignment which is in accordance with the Plan or any inclusion in the Plan of a new frequency assignment which would have the effect of exceeding the limits specified in Annex 1 shall be subject to the agreement of all affected administrations.

4.3.7 The administration seeking agreement or the administration with which agreement is sought may request any additional technical information it considers necessary. The administrations shall inform the Board of such requests.

4.3.8 Comments from administrations on the information published pursuant to 4.3.3 should be sent either directly to the administration proposing the modification or through the Board. In any event the Board shall be informed that comments have been made.

4.3.9 An administration which has not notified its comments either to the administration seeking agreement or to the Board within a period of one hundred and twenty days following the date of the weekly circular referred to in 4.3.2.1 or 4.3.3 shall be understood to have agreed to the proposed modification. This time-limit may be extended by eighty days for an administration which has requested additional information under 4.3.7 or for an administration which has requested the assistance of the Board under 4.3.17. In the latter case the Board shall inform the administrations concerned of this request.

4.3.10 If, in seeking agreement, an administration modifies its initial proposal, it shall again apply the provisions of 4.3.2 and the consequent procedure with respect to any other administration whose services might be affected as a result of modifications to the initial proposal.

4.3.11 If no comments have been received on the expiry of the periods specified in 4.3.9, or if agreement has been reached with the administrations which have made comments and with which agreement is necessary, the administration proposing the modification may continue with the appropriate procedure in Article 5 and shall inform the Board, indicating the final characteristics of the frequency assignment together with the names of the administrations with which agreement has been reached.

4.3.12 The agreement of the administrations affected may also be obtained in accordance with this Article, for a specified period.

4.3.13 When the proposed modification to the Plan involves developing countries, administrations shall seek all practicable solutions conducive to the economical development of the broadcasting-satellite systems of these countries.

4.3.14 The Board shall publish in a special section of its weekly circular the information received under 4.3.11 together with the names of any administrations with which the provisions of this Article have been successfully applied. The frequency assignment concerned shall enjoy the same status as those appearing in the Plan and will be considered as a frequency assignment in accordance with the Plan.

4.3.15 When an administration proposing to modify the characteristics of a frequency assignment or to make a new frequency assignment receives

notice of disagreement from an administration whose agreement it has sought, it should first endeavour to solve the problem by exploring all possible means of meeting its requirement. If the problem still cannot be solved by such means, the administration whose agreement has been sought should endeavour to overcome the difficulties as far as possible, and shall state the technical reasons for any disagreement if the administration seeking the agreement requests it to do so.

4.3.16 If no agreement is reached between the administrations concerned, the Board shall carry out any study that may be requested by these administrations; the Board shall inform them of the result of the study and shall make such recommendations as it may be able to offer for the solution of the problem.

4.3.17 An administration may at any stage in the procedure described, or before applying it, request the assistance of the Board, particularly in seeking the agreement of another administration.

4.3.18 The relevant provisions of Article 5 of this Appendix shall be applied when frequency assignments are notified to the Board.

4.4 *Cancellation of frequency assignments*

When a frequency assignment in accordance with the Plan is released, whether or not as a result of a modification, the administration concerned shall immediately so inform the Board. The Board shall publish this information in a special section of its weekly circular.

4.5 *Master copy of the Plan*

4.5.1 The Board shall maintain an up-to-date master copy of the Plan taking account of the application of the procedure specified in this Article. The Board shall prepare a document listing the amendments to be made to the Plan as a result of modifications made in accordance with the procedure in this Article.

4.5.2 The Secretary-General shall be informed by the Board of modifications made to the Plan and shall publish an up-to-date version of the Plan in an appropriate form when justified by the circumstances.

ARTICLE 5

Notification, Examination and Recording in the Master Register of Frequency Assignments to Space Stations in the Broadcasting-Satellite Service in Regions 1 and 3**5.1 *Notification***

5.1.1 Whenever an administration intends to bring into use a frequency assignment to a space station in the broadcasting satellite service, it shall notify this frequency assignment to the Board. For this purpose, the notifying administration shall apply the following provisions.

5.1.2 For any notification under 5.1.1, an individual notice for each frequency assignment shall be drawn up as prescribed in Annex 2, the various sections of which specify the basic characteristics to be provided as appropriate. It is recommended that the notifying administration should also apply any other data it may consider useful.

5.1.3 Each notice must reach the Board not earlier than three years before the date on which the frequency assignment is to be brought into use. In any case, the notice must reach the Board not later than ninety days before that date¹.

5.1.4 Any frequency assignment the notice of which reaches the Board after the applicable period specified in 5.1.3 shall, where it is to be recorded, bear a remark in the Master Register to indicate that it is not in conformity with 5.1.3.

5.1.5 Any notice made under 5.1.1 which does not contain the characteristics specified in Annex 2 shall be returned by the Board immediately by airmail to the notifying administration with the relevant reasons.

¹ Where appropriate, the notifying administration shall initiate the procedure for modifying the Plan in sufficient time to ensure that this limit is observed.

5.1.6 Upon receipt of a complete notice, the Board shall include its particulars, with the date of receipt, in its weekly circular which shall contain the particulars of all such notices received since the publication of the previous circular.

5.1.7 The circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

5.1.8 Complete notices shall be considered by the Board in order of receipt. The Board shall not postpone its finding unless it lacks sufficient data to reach a decision; moreover, the Board shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Board until it has reached a finding with respect to such earlier notice.

5.2 *Examination and recording*

5.2.1 The Board shall examine each notice:

- a) with respect to its conformity with the Convention and the relevant provisions of the Radio Regulations and Annex 1 of this Appendix (with the exception of those relating to conformity with the Plan);
- b) with respect to its conformity with the Plan.

5.2.2 Where the Board reaches a favourable finding with respect to 5.2.1, the frequency assignment of an administration shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d. In relations between administrations all frequency assignments brought into use in conformity with the Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments.

5.2.3 Whenever a frequency assignment is recorded in the Master Register, the finding reached by the Board shall be indicated by a symbol in Column 13a.

5.2.4 Where the Board reaches an unfavourable finding with respect to 5.2.1, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to a satisfactory solution of the problem.

5.2.5 Where the notifying administration resubmits the notice and the finding of the Board becomes favourable with respect to 5.2.1, the notice shall be treated as in 5.2.2.

5.2.6 If the notifying administration resubmits the notice without modification and insists on its reconsideration, and if the Board's finding with respect to 5.2.1 remains unfavourable, the notice is returned to the notifying administration in accordance with 5.2.4. In this case, the notifying administration undertakes not to bring into use the frequency assignment until the condition specified in 5.2.5 is fulfilled. The agreement of the administrations affected can also be obtained in accordance with Article 4 for a specified period. In that event the Board shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note indicating that the frequency assignment is valid only for the period specified. The notifying administration using the frequency assignment over a specified period shall not subsequently invoke this fact to justify the continued use of the frequency beyond the period specified unless it obtains the agreement of the administration(s) concerned.

5.2.7 If a frequency assignment notified in advance of bringing into use has received in conformity with 5.1.3 a favourable finding by the Board with respect to the provisions of paragraph 5.2.1, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

5.2.8 When the Board has received confirmation that the frequency assignment has been brought into use, the Board shall remove the symbol in the Master Register.

5.2.9 The date in Column 2c shall be the date of bringing into use notified by the administration concerned. It is given for information only.

5.3 *Cancellation of entries in the Master Register*

5.3.1 If an administration has not confirmed the bringing into use of a frequency assignment under 5.2.8, the Board will make inquiries of the administration not earlier than six months after the expiry of the period specified in 5.1.3. On receipt of the relevant information, the Board will either modify the date of coming into use or cancel the entry.

5.3.2 If the use of any recorded frequency assignment is permanently discontinued, the notifying administration shall so inform the Board within ninety days, whereupon the entry shall be removed from the Master Register.

ARTICLE 6

**Coordination, Notification and Recording in the Master
International Frequency Register of Frequency Assignments
to Terrestrial Stations Affecting Broadcasting-Satellite Frequency
Assignments in the Bands 11.7 - 12.2 GHz (in Regions 2 and 3)
and 11.7 - 12.5 GHz (in Region 1) ^{1, 2}**

Section I. Coordination Procedure to Be Applied

6.1.1 Before an administration notifies to the Board a frequency assignment to a terrestrial transmitting station, it shall initiate coordination with

¹ These procedures do not involve any dispensation from the procedures prescribed for terrestrial stations in Article 12 of the Radio Regulations where stations other than those of the broadcasting-satellite service are involved.

² The procedures for coordination, notification and recording of assignments to terrestrial stations affecting broadcasting-satellite stations in Region 2 are contained in Article 12 of the Radio Regulations, except that the need for the coordination referred to in Nos. 1148 to 1154 of the Radio Regulations shall be determined on the basis of Annex 3.

any other administration having a frequency assignment to a broadcasting-satellite station in conformity with the Plan if

- the necessary bandwidths of the two transmissions overlap;
and
- the power flux-density which would be produced by the proposed terrestrial transmitting station exceeds the value derived in accordance with Annex 3 at one or more points on the edge of the service area which is within the coverage area of the broadcasting-satellite station of that administration.

6.1.2 For the purpose of effecting coordination, the administration responsible for the terrestrial station shall send to the administrations concerned, by the fastest possible means, a copy of a diagram drawn to an appropriate scale indicating the location of the terrestrial station and all other data of the proposed frequency assignment and the approximate date on which it is planned to bring the station into use.

6.1.3 An administration with which coordination is sought shall acknowledge receipt of the coordination data immediately by telegram. If no acknowledgement is received within fifteen days of dispatch, the administration seeking coordination may dispatch a telegram requesting acknowledgement of receipt of the coordination data, to which the receiving administration shall reply. Upon receipt of the coordination data an administration with which coordination is sought shall promptly examine the matter with regard to interference¹ which would be caused to its frequency assignments in conformity with the Plan and shall, within an overall period of sixty days from dispatch of the coordination data, either notify the administration requesting coordination of its agreement to the proposals or, if this is not possible, indicate the reasons therefor and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem.

¹ The criteria to be employed in evaluating interference levels shall be based on the relevant CCIR Recommendations or, in the absence of such Recommendations, shall be agreed between the administrations concerned.

6.1.4 No coordination is required when an administration proposes to change the characteristics of an existing assignment in such a way as not to increase the level of interference to the service to be rendered by the broadcasting-satellite stations of other administrations, in conformity with the Plan.

6.1.5 An administration seeking coordination may request the Board to endeavour to effect coordination where:

- a) an administration with which coordination is sought fails to acknowledge receipt under paragraph 6.1.3 within thirty days of dispatch of the coordination data;
- b) an administration which has acknowledged receipt under paragraph 6.1.3 fails to give a decision within ninety days of dispatch of the coordination data;
- c) the administration seeking coordination and an administration with which coordination is sought disagree on the acceptable level of interference; *or*
- d) coordination between administrations is not possible for any other reason.

In so doing, it shall furnish the Board with the necessary information to enable it to endeavour to effect such coordination.

6.1.6 Either the administration seeking coordination or an administration with which coordination is sought, or the Board, may request any additional information which they may require to assess the level of interference to the services concerned.

6.1.7 Where the Board receives a request under paragraph 6.1.5 a), it shall forthwith send a telegram to the administration concerned requesting immediate acknowledgement.

6.1.8 Where the Board receives an acknowledgement following its action under paragraph 6.1.7 or where the Board receives a request under paragraph 6.1.5 b), it shall forthwith send a telegram to the administration concerned requesting an early decision in the matter.

6.1.9 Where the Board receives a request under paragraph 6.1.5 d), it shall endeavour to effect coordination in accordance with the provisions of paragraph 6.1.2. Where the Board receives no acknowledgement of its request for coordination within the period specified in paragraph 6.1.3, it shall act in accordance with paragraph 6.1.7.

6.1.10 Where an administration fails to reply within thirty days of dispatch of the Board's telegram sent under paragraph 6.1.7 requesting an acknowledgement or fails to give a decision on the matter within sixty days of dispatch of the Board's telegram of request sent under paragraph 6.1.8, the administration with which coordination was sought shall be considered to have undertaken that no complaint will be made in respect of any harmful interference which may be caused by the terrestrial station being coordinated to the service rendered or to be rendered by its satellite-broadcasting station.

6.1.11 Where necessary, as part of the procedure under paragraph 6.1.5, the Board shall assess the level of interference. In any case, the Board shall inform the administrations concerned of the results obtained.

6.1.12 In the event of continuing disagreement between one administration seeking to effect coordination and one with which coordination has been sought, the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

Section II. Notification Procedure for Frequency Assignments

6.2.1 Any frequency assignment to a fixed, land or broadcasting station shall be notified to the International Frequency Registration Board if the

use of the frequency concerned is capable of causing harmful interference to the service rendered or to be rendered by a broadcasting-satellite station of any other administration, or if it is desired to obtain international recognition of the use of the frequency ¹.

6.2.2 For this notification, an individual notice for each frequency assignment shall be drawn up as prescribed in Section A of Appendix 1 to the Radio Regulations, which specifies the basic characteristics to be furnished as required. It is recommended that the notifying administration should also supply the additional data called for in that Appendix, together with such further data as it may consider appropriate.

6.2.3 Whenever practicable, each notice should reach the Board before the date on which the assignment is brought into use. The notice made in accordance with paragraph 6.2.2 must reach the Board not earlier than three years and not later than ninety days before the date on which the assignment is to be brought into use.

6.2.4 Any frequency assignment, the notice of which reaches the Board less than ninety days before it is brought into use, shall, where it is to be recorded, bear a remark in the Master Register to indicate that it is not in conformity with paragraph 6.2.3.

Section III. Procedure for the Examination of Notices and the Recording of Frequency Assignments in the Master Register

6.3.1 Whatever the means of communication, including telegraph, by which a notice is transmitted to the Board, it shall be considered complete if it contains at least the appropriate basic characteristics specified in Section A of Appendix 1 to the Radio Regulations.

¹ The attention of administrations is specifically drawn to the provisions of Section I of this Article.

6.3.2 Complete notices shall be considered by the Board in the order of their receipt.

6.3.3 Any notice which is incomplete shall be returned by the Board immediately, by airmail, to the notifying administration with the reasons therefor.

6.3.4 Upon receipt of a complete notice, the Board shall include the particulars thereof, with the date of receipt, in its weekly circular; this circular shall contain the particulars of all such notices received since publication of the previous circular.

6.3.5 The circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

6.3.6 Complete notices shall be considered by the Board in the order specified in paragraph 6.3.2. The Board cannot postpone the formulation of a finding unless it lacks sufficient data to reach a decision; moreover, the Board shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Board until it has reached a finding with respect to such earlier notice.

6.3.7 The Board shall examine each notice:

6.3.8 a) with respect to its conformity with the Convention, the relevant provisions of the Radio Regulations and the provisions of this Appendix (with the exception of those relating to the coordination procedure and the probability of harmful interference);

6.3.9 b) with respect to its conformity with the provisions of paragraph 6.1.1 relating to coordination of the use of the frequency assignment with the other administrations concerned;

6.3.10 c) where appropriate, with respect to the probability of harmful interference to a broadcasting-satellite station whose frequency assignment is in accordance with the Plan.

6.3.11 Depending upon the findings of the Board subsequent to the examination prescribed in paragraphs 6.3.8, 6.3.9 and 6.3.10, further action shall be as follows:

6.3.12 *Finding unfavourable with respect to paragraph 6.3.8*

6.3.13 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations, it shall be examined immediately with respect to paragraphs 6.3.9 and 6.3.10.

6.3.14 If the finding is favourable with respect to paragraph 6.3.9 or 6.3.10, as appropriate, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

6.3.15 If the finding is unfavourable with respect to paragraph 6.3.9 or 6.3.10, as appropriate, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding. In those circumstances the notifying administration shall undertake not to bring into use the frequency assignment until the condition specified in paragraph 6.3.14 can be fulfilled. But the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

6.3.16 Where the notice does not include a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations, it shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

6.3.17 If the notifying administration resubmits the notice unchanged, it shall be treated in accordance with the provisions of paragraph 6.3.16.

6.3.18 If the notifying administration resubmits the notice with a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations, it shall be treated in accordance with the provisions of paragraphs 6.3.13 and 6.3.14 or 6.3.15, as appropriate.

6.3.19 If the notifying administration resubmits the notice with modifications which, after re-examination, result in a favourable finding by the Board with respect to paragraph 6.3.8, the notice shall be treated under the

provisions of paragraphs 6.3.20 to 6.3.32. However, in any subsequent recording of the assignment, the date of receipt by the Board of the resubmitted notice shall be entered in Column 2d.

6.3.20 *Finding favourable with respect to paragraph 6.3.8*

6.3.21 Where the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has been successfully completed with all administrations whose broadcasting-satellite services may be affected, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

6.3.22 Where the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has not been applied, and the notifying administration requests the Board to effect the required coordination, the Board shall take the appropriate action necessary and shall inform the administrations concerned of the results obtained. If the Board's efforts are successful, the notice shall be treated in accordance with paragraph 6.3.21. If the Board's efforts are unsuccessful, the notice shall be examined by the Board with respect to the provisions of paragraph 6.3.10.

6.3.23 Where the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has not been applied and the notifying administration does not request the Board to effect the required coordination, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this action and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

6.3.24 Where the notifying administration resubmits the notice and the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has been successfully completed with all administrations whose broadcasting-satellite services may be affected, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the original notice shall be entered in Column 2d. The date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

6.3.25 Where the notifying administration resubmits the notice with a request that the Board effect the required coordination, it shall be treated in accordance with the provisions of paragraph 6.3.22. However, in any subsequent recording of the assignment, the date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

6.3.26 Where the notifying administration resubmits the notice and states it has been unsuccessful in effecting the coordination, it shall be examined by the Board with respect to the provisions of paragraph 6.3.10. However, in any subsequent recording of the assignment, the date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

6.3.27 *Finding favourable with respect to paragraphs 6.3.8 and 6.3.10*

6.3.28 The assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

6.3.29 *Finding favourable with respect to paragraph 6.3.8 but unfavourable with respect to paragraph 6.3.10*

6.3.30 The notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

6.3.31 Should the notifying administration resubmit the notice with modifications which result, after re-examination, in a favourable finding by the Board with respect to paragraph 6.3.10, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the original notice shall be entered in Column 2d. The date of receipt by the Board of the resubmitted notice shall be indicated in the Remarks Column.

6.3.32 Should the notifying administration resubmit the notice, either unchanged or with modifications which decrease the probability of harmful

interference but not sufficiently to permit the provisions of paragraph 6.3.31 to be applied and should that administration insist upon reconsideration of the notice but the Board's finding remain unchanged, the notification shall again be returned to the notifying administration in accordance with paragraph 6.3.30. In those circumstances, the notifying administration shall undertake not to bring into use the proposed frequency assignment until the condition specified in paragraph 6.3.31 can be fulfilled. But the administrations concerned may explore the possibility of reaching an agreement on the use of the frequency assignment for a specified period. In that event the Board shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note indicating that the assignment is valid only for the specified period. The notifying administration using the frequency assignment during a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration or the administrations concerned.

6.3.33 *Change in the basic characteristics of assignments already recorded in the Master Register*

6.3.34 A notice of a change in the basic characteristics of an assignment already recorded, as specified in Appendix 1 to the Radio Regulations (except those entered in Columns 3 and 4a of the Master Register), shall be examined by the Board in accordance with paragraphs 6.3.8 and 6.3.9 and, where appropriate, paragraph 6.3.10 and paragraphs 6.3.12 to 6.3.32 inclusive applied. Where the change should be recorded, the original assignment shall be amended according to the notice.

6.3.35 However, in the case of a change in the basic characteristics of an assignment which is in conformity with paragraph 6.3.8, should the Board reach a favourable finding with respect to paragraph 6.3.9 and, if applicable, paragraph 6.3.10, or find that the change does not increase the probability of harmful interference to assignments already recorded, the

amended assignment shall retain the original date in Column 2d. In addition, the date of receipt by the Board of the notice relating to the change shall be entered in the Remarks Column.

6.3.36 In applying the provisions of this Section, any resubmitted notice which is received by the Board more than two years after the date of its return by the Board shall be considered as a new notice.

6.3.37 *Recording of frequency assignments notified before being brought into use*

6.3.38 If a frequency assignment notified in advance of bringing into use has received a favourable finding by the Board with respect to paragraphs 6.3.8 and 6.3.9, and, where appropriate, 6.3.10, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

6.3.39 If, within the period of thirty days after the projected date of bringing into use, the Board receives confirmation from the notifying administration of the date of bringing into use, the special symbol shall be deleted from the Remarks Column. If, in the light of a request from the notifying administration received before the end of the thirty-day period, the Board finds that exceptional circumstances warrant an extension of this period, the extension shall in no case exceed one hundred and fifty days.

6.3.40 If use by a terrestrial station of an assignment which is not in conformity with the foregoing causes harmful interference to the reception of emissions from a space station in the broadcasting-satellite service using an assignment in conformity with the Plan, the administration having jurisdiction over the terrestrial station shall, on being advised, take immediate measures to eliminate the interference.

ARTICLE 7

**Preliminary Procedures, Notification and Recording in the
Master International Frequency Register of Frequency
Assignments to Stations in the Fixed-Satellite Service in the
Frequency Band 11.7 - 12.2 GHz (in Region 2) When
Frequency Assignments to Broadcasting-Satellite Stations in
Accordance with the Plan Are Involved¹**

**Section I. Procedure for the Advance Publication of Information
on Planned Fixed-Satellite Systems**

7.1.1 An administration which intends to establish a fixed-satellite system shall, prior to the procedure in accordance with paragraph 7.2.1 where applicable, send to the International Frequency Registration Board, not earlier than five years before the date of bringing into service each satellite network of the planned system, the information listed in Appendix 4 to the Radio Regulations.

7.1.2 Any amendments to the information concerning a planned satellite system sent in accordance with paragraph 7.1.1 shall also be sent to the Board as soon as they become available.

7.1.3 The Board shall publish the information sent under paragraphs 7.1.1 and 7.1.2 in a special section of its weekly circular and shall also, when the weekly circular contains such information, so advise all administrations by circular telegram.

¹ These provisions do not replace the procedures prescribed in Articles 11 and 13 of the Radio Regulations when stations other than those of the broadcasting-satellite service having frequency assignments in conformity with the Plan are involved.

7.1.4 If, after studying the information published under paragraph 7.1.3, any administration is of the opinion that interference which may be unacceptable may be caused to its frequency assignments in conformity with the Plan, it shall, within ninety days after the date of the weekly circular publishing the information listed in Appendix 4 to the Radio Regulations, send its comments to the administration concerned. A copy of these comments shall also be sent to the Board. If no such comments are received from an administration within the period mentioned above, it may be assumed that that administration has no basic objections to the planned fixed-satellite network(s) of that system of which details have been published.

7.1.5 An administration receiving comments sent in accordance with paragraph 7.1.4 shall endeavour to resolve any difficulties that may arise without considering the possibility of adjustment to broadcasting-satellite stations of other administrations. If no such means can be found, the administration concerned is then free to apply to other administrations concerned in order to solve these difficulties, provided that any modifications which may result to the Plan are in accordance with Article 4.

7.1.6 In their attempts to resolve the difficulties mentioned above, administrations may seek the assistance of the Board.

7.1.7 In complying with the provisions of paragraphs 7.1.5 and 7.1.6, an administration responsible for a planned fixed-satellite system shall, if necessary, defer its commencement of the coordination procedure of paragraph 7.2.1 or, where this is not applicable, the sending of its notices to the Board until one hundred and fifty days after the date of the weekly circular containing the information listed in Appendix 4 to the Radio Regulations on the relevant satellite network. However, in respect of those administrations with which difficulties have been resolved or which have responded favourably, the coordination procedure, where applicable, may be commenced prior to the expiry of the one hundred and fifty days mentioned above.

7.1.8 An administration, on behalf of which details of planned fixed-satellite networks in its system have been published in accordance with the

provisions of paragraphs 7.1.1 to 7.1.3, shall periodically inform the Board whether or not comments have been received and of the progress made with other administrations in resolving any difficulties. The Board shall publish this information in a special section of its weekly circular and shall also, when the weekly circular contains such information, so inform all administrations by circular telegram.

Section II. Coordination Procedures to Be Applied in Appropriate Cases

7.2.1 Before an administration notifies to the Board or brings into use any frequency assignment to a space station in the fixed-satellite service, it shall seek the agreement of any other administration having a frequency assignment in conformity with the Plan, if

- any portion of the necessary bandwidth proposed for the space station in the fixed-satellite service falls within the necessary bandwidth associated with the frequency assignment to the broadcasting-satellite station; *and*
- the power flux-density which would be produced by the proposed fixed-satellite assignment exceeds the value specified in Annex 4.

For this purpose, the administration seeking agreement shall send to any other such administration the information listed in Appendix 3 to the Radio Regulations.

7.2.2 No additional agreement is necessary when an administration proposes to change the characteristics of an existing assignment in such a way as will, in respect of the broadcasting-satellite service of another administration, meet the requirements of paragraph 7.2.1 above, or when this assignment has previously been the subject of an agreement and when the change will not cause any increase in the interference potential specified in that agreement.

7.2.3 An administration seeking coordination under paragraph 7.2.1 shall at the same time send to the Board a copy of the request for coordination together with the information listed in Appendix 3 to the Radio Regulations and the name(s) of the administration(s) whose agreement is sought.

The Board shall determine on the basis of Annex 4 which frequency assignments in conformity with the Plan are considered to be affected. The Board shall include the names of those administrations with the information received from the administration seeking coordination and shall publish this information in a special section of its weekly circular, together with a reference to the weekly circular in which details of the satellite system were published in accordance with Section I of this Article. When the weekly circular contains such information, the Board shall so inform all administrations by circular telegram.

7.2.4 An administration believing that it should have been included in the procedure under paragraph 7.2.1 shall have the right to request that it be brought into the procedure.

7.2.5 An administration whose agreement is sought under paragraph 7.2.1 shall acknowledge receipt of the coordination data immediately by telegram. If no acknowledgement is received within thirty days after the date of the weekly circular publishing the information under paragraph 7.2.3, the administration seeking coordination shall dispatch a telegram requesting acknowledgement, to which the receiving administration shall reply within a further period of thirty days. Upon receipt of the coordination data, an administration shall, having regard to the proposed date of bringing into use of the assignment for which agreement was requested, promptly examine the matter with regard to interference¹ which would be caused to the service rendered by its stations in respect of which agreement is sought under paragraph 7.2.1, and shall, within ninety days from the date of the relevant weekly circular, notify its agreement to the requesting administration. If the administration with which coordination is

¹ The criteria to be employed in evaluating interference levels shall be based upon the technical information contained in this Appendix or upon relevant CCIR Recommendations and shall be agreed between the administrations concerned.

sought does not agree, it shall, within the same period, send to the administration seeking coordination the technical details upon which its disagreement is based, and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem. A copy of these comments shall also be sent to the Board.

7.2.6 An administration seeking coordination may request the Board to endeavour to effect coordination in those cases where:

- a) an administration whose agreement is sought under paragraph 7.2.1 fails to acknowledge receipt, under paragraph 7.2.5, within sixty days after the date of the weekly circular publishing the information relating to the request for coordination;
- b) an administration has acknowledged receipt under paragraph 7.2.5, but fails to give a decision within ninety days from the date of the relevant weekly circular;
- c) there is disagreement between the administration seeking coordination and an administration whose agreement is sought as to the acceptable level of interference;
- d) agreement between administrations is not possible for any other reason.

In so doing, it shall furnish the Board with the necessary information to enable it to endeavour to effect such coordination.

7.2.7 Either the administration seeking coordination or an administration whose agreement is sought, or the Board, may request additional information which they may require to assess the level of interference to the services concerned.

7.2.8 Where the Board receives a request under paragraph 7.2.6 a), it shall forthwith send a telegram to the administration whose agreement is sought requesting immediate acknowledgement.

7.2.9 Where the Board receives an acknowledgement following its action under paragraph 7.2.8, or where the Board receives a request under paragraph 7.2.6 *b*), it shall forthwith send a telegram to the administration whose agreement is sought requesting an early decision in the matter.

7.2.10 Where the Board receives a request under paragraph 7.2.6 *d*), it shall endeavour to effect coordination in accordance with the provisions of paragraph 7.2.1. The Board shall also, where appropriate, act in accordance with paragraph 7.2.3. Where the Board receives no acknowledgement to its request for coordination within the periods specified in paragraph 7.2.5, it shall act in accordance with paragraph 7.2.8.

7.2.11 Where an administration fails to reply within thirty days of dispatch of the Board's telegram requesting an acknowledgement sent under paragraph 7.2.8, or fails to give a decision in the matter within thirty days of dispatch of the Board's telegram of request under paragraph 7.2.9, it shall be deemed that the administration whose agreement was sought has undertaken:

- a*) that no complaint will be made in respect of any harmful interference which may be caused to the services rendered by its broadcasting-satellite stations by the use of the assignment for which coordination was requested;
- b*) that its broadcasting-satellite stations will not cause harmful interference to the use of the assignment for which coordination was requested.

7.2.12 Where necessary, as part of the procedure under paragraph 7.2.6, the Board shall assess the level of interference. In any case, the Board shall inform the administrations concerned of the results obtained.

7.2.13 In the event of continuing disagreement between one administration seeking to effect coordination and one whose agreement has been sought, provided that the assistance of the Board has been requested, the administration seeking coordination may, after one hundred and fifty days

from the date of the request for coordination, taking into consideration the provisions of paragraph 7.3.4, send its notice concerning the proposed assignment to the Board. In those circumstances the notifying administration shall undertake not to bring the frequency assignment into use until the condition in paragraph 7.4.11.2 can be fulfilled. But the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

Section III. Notification of Frequency Assignments

7.3.1 Any frequency assignment to a space station in the fixed satellite service shall be notified to the Board:

- a) if the use of the frequency concerned is capable of causing harmful interference to a frequency assignment of another administration which is in accordance with the Plan¹; or*
- b) if it is desired to obtain international recognition of the use of the frequency.*

7.3.2 Similar notice shall be given for any frequency to be used for reception by an earth station where one or more of the conditions specified in paragraph 7.3.1 are applicable.

7.3.3 For any notification under paragraph 7.3.1 or 7.3.2, an individual notice for each frequency assignment shall be drawn up as prescribed in Appendix 3 to the Radio Regulations, the various Sections of which specify the basic characteristics to be furnished according to the case. The notifying administration shall furnish such further data as it considers appropriate.

¹ The attention of administrations is specifically drawn to the application of paragraph 7.2.1 above.

7.3.4 Each notice must reach the Board not earlier than three years before the date on which the assignment is to be brought into use. The notice must reach the Board in any case not later than ninety days¹ before this date.

7.3.5 Any frequency assignment to an earth or space station, the notice of which reaches the Board after the applicable period specified in paragraph 7.3.4, shall, where it is to be recorded, bear a mark in the Master Register to indicate that it is not in conformity with paragraph 7.3.4.

Section IV. Procedure for the Examination of Notices and the Recording of Frequency Assignments in the Master Register

7.4.1 Any notice which does not contain at least those basic characteristics specified in Appendix 3 to the Radio Regulations shall be returned by the Board immediately, by airmail, to the notifying administration with the reasons therefor.

7.4.2 Upon receipt of a complete notice, the Board shall include the particulars thereof, with the date of receipt, in its weekly circular which shall contain the particulars of all such notices received since the publication of the previous circular.

7.4.3 The circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

7.4.4 Complete notices shall be considered by the Board in the order of their receipt. The Board shall not postpone the formulation of a finding unless it lacks sufficient data to render a decision in connection therewith; moreover, the Board shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Board, until it has reached a finding with respect to such earlier notice.

¹ The notifying administration shall take this limit into account when deciding, where appropriate, to initiate the coordination procedure(s).

7.4.5 The Board shall examine each notice:

7.4.5.1 with respect to its conformity with the Convention, the relevant provisions of the Radio Regulations and the provisions of this Appendix (with the exception of those relating to the coordination procedures and the probability of harmful interference);

7.4.5.2 where appropriate, with respect to its conformity with the provisions of paragraph 7.2.1, relating to the coordination of the use of the frequency assignment with the other administrations concerned having a frequency assignment in conformity with the Plan;

7.4.5.3 where appropriate, with respect to the probability of harmful interference to the service rendered or to be rendered by a broadcasting-satellite station whose frequency assignment is in conformity with the Plan.

7.4.6 Depending upon the findings of the Board subsequent to the examination prescribed in paragraphs 7.4.5.1, 7.4.5.2 and 7.4.5.3, as appropriate, further action shall be as follows:

7.4.7 *Finding favourable with respect to paragraph 7.4.5.1 in cases where the provisions of paragraph 7.4.5.2 are not applicable*

7.4.7.1 The assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

7.4.8 *Finding unfavourable with respect to paragraph 7.4.5.1*

7.4.8.1 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations and the finding is favourable with respect to paragraphs 7.4.5.2 and 7.4.5.3, as appropriate, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

7.4.8.2 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations and the finding is unfavourable with respect to

paragraph 7.4.5.2 or 7.4.5.3, as appropriate, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding. In those circumstances the notifying administration shall undertake not to bring into use the frequency assignment until the condition in paragraph 7.4.8.1 can be fulfilled. The agreement of the administrations affected can also be obtained in accordance with this Article for a specified period. In that event the Board shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note indicating that the frequency assignment is valid only for the period specified. The notifying administration using the frequency assignment over a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration(s) concerned. The date of receipt by the Board of the original notice shall be entered in Column 2d.

7.4.8.3 Where the notice does not include a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations, it shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

7.4.8.4 If the notifying administration resubmits the notice unchanged, it shall be treated in accordance with the provisions of paragraph 7.4.8.3. If it is resubmitted with a specific reference to the fact that the station will be operated in accordance with the provisions of No. 342 of the Radio Regulations, it shall be treated in accordance with the provisions of paragraph 7.4.8.1 or 7.4.8.2, as appropriate. If it is resubmitted with modifications which, after re-examination, result in a favourable finding by the Board with respect to paragraph 7.4.5.1, it shall be treated as a new notice.

7.4.9 *Finding favourable with respect to paragraph 7.4.5.1 in cases where the provisions of paragraph 7.4.5.2 are applicable*

7.4.9.1 Where the Board finds that the coordination procedures mentioned in paragraph 7.4.5.2 have been successfully completed with all administrations whose frequency assignments in accordance with the Plan may be

affected, the frequency assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

7.4.9.2 Where the Board finds that the coordination procedure mentioned in paragraph 7.4.5.2 has not been applied, and the notifying administration requests the Board to effect the required coordination, the Board shall take appropriate action and shall inform the administrations concerned of the results obtained. If the Board's efforts are successful, the notice shall be treated in accordance with paragraph 7.4.9.1. If the Board's efforts are unsuccessful, the notice shall be examined by the Board with respect to the provisions of paragraph 7.4.5.3.

7.4.9.3 Where the Board finds that the coordination procedure mentioned in paragraph 7.4.5.2 has not been applied, and the notifying administration does not request the Board to effect the required coordination, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this action and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

7.4.9.4 Where the notifying administration resubmits the notice and the Board finds that the coordination procedure mentioned in paragraph 7.4.5.2 has been successfully completed with all administrations whose frequency assignments in conformity with the Plan may be affected, the frequency assignment shall be recorded in the Master Register. The date of receipt by the Board of the original notice shall be entered in Column 2d. The date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

7.4.9.5 Where the notifying administration resubmits the notice with a request that the Board effect the required coordination under paragraph 7.2.1, it shall be treated in accordance with the provisions of paragraph 7.4.9.2. However, in any subsequent recording of the assignment, the date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

7.4.9.6 Where the notifying administration resubmits the notice and states it has been unsuccessful in effecting the coordination, the Board shall inform the administrations concerned thereof. The notice shall be examined by the Board with respect to the provisions of paragraph 7.4.5.3. However, in any subsequent recording of the assignment, the date of receipt by the Board of the resubmitted notice shall be entered in the Remarks Column.

7.4.10 Finding favourable with respect to paragraphs 7.4.5.1 and 7.4.5.3

7.4.10.1 The assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

7.4.11 Finding favourable with respect to paragraph 7.4.5.1, but unfavourable with respect to paragraph 7.4.5.3

7.4.11.1 The notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

7.4.11.2 Should the notifying administration resubmit the notice with modifications which result, after re-examination, in a favourable finding by the Board with respect to paragraph 7.4.5.3, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the original notice shall be entered in Column 2d. The date of receipt by the Board of the resubmitted notice shall be indicated in the Remarks Column.

7.4.11.3 Should the notifying administration resubmit the notice, either unchanged, or with modifications which decrease the probability of harmful interference, but not sufficiently to permit the provisions of paragraph 7.4.11.2 to be applied, and should that administration insist upon reconsideration of the notice, but should the Board's finding remain unchanged, the notification shall again be returned to the notifying administration in accordance with paragraph 7.4.11.1. In those circumstances, the notifying administration shall undertake not to bring into use the proposed

frequency assignment until the condition in paragraph 7.4.11.2 can be fulfilled. The agreement of the administrations affected can also be obtained in accordance with this Article for a specified period. In that event the Board shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note in the Remarks Column indicating that the assignment is valid only for the specified period. The notifying administration using the frequency assignment over a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration(s) concerned. The date of receipt by the Board of the original notice shall be entered in Column 2d.

7.4.12 *Change in the basic characteristics of assignments already recorded in the Master Register*

7.4.12.1 A notice of a change in the basic characteristics of an assignment in the fixed-satellite service already recorded, as specified in Appendix 3 to the Radio Regulations (except the name of the station or the name of the locality in which it is situated), shall be examined by the Board according to paragraph 7.4.5.1 and, where appropriate, paragraphs 7.4.5.2 and 7.4.5.3, and the provisions of paragraphs 7.4.7 to 7.4.11.3 inclusive shall apply. Where the change should be recorded, the original assignment shall be amended accordingly.

7.4.12.2 However, in the case of a change in the characteristics of an assignment which is in conformity with paragraph 7.4.5.1, should the Board reach a favourable finding with respect to paragraphs 7.4.5.2 and 7.4.5.3, where appropriate, or find that the changes do not increase the probability of harmful interference to frequency assignments in accordance with the Plan, the amended assignment shall retain the original date in Column 2d. The date of receipt by the Board of the notice relating to the change shall be entered in the Remarks Column.

7.4.12.3 In applying the provisions of this section, any resubmitted notice which is received by the Board more than two years after the date of its return by the Board shall be considered as a new notice.

7.4.13 *Recording of frequency assignments in the fixed-satellite service notified before being brought into use*

7.4.13.1 If a frequency assignment notified in advance of bringing into use has received a favourable finding by the Board with respect to paragraph 7.4.5.1 and, where appropriate, paragraphs 7.4.5.2 and 7.4.5.3, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

7.4.13.2 If, within thirty days after the projected date of bringing into use, the Board receives confirmation from the notifying administration of the date of putting into use, the special symbol shall be deleted from the Remarks Column. In the case where the Board, in the light of a request from the notifying administration received before the end of the thirty-day period, finds that exceptional circumstances warrant an extension of this period, the extension shall in no case exceed one hundred and fifty days.

7.4.13.3 If the Board does not receive this confirmation within the period referred to in paragraph 7.4.13.2, the entry concerned shall be cancelled. The Board shall advise the administration concerned before taking such action.

Section V. Recording of Findings in the Master Register

7.5 In any case where a frequency assignment is recorded in the Master Register, the finding reached by the Board shall be indicated by a symbol in Column 13a. In addition, a remark indicating the reasons for any unfavourable finding shall be inserted in the Remarks Column.

Section VI. Categories of Frequency Assignments

7.6.1 The date in Column 2c shall be the date of putting into use notified by the administration concerned. It is given for information only.

7.6.2 If harmful interference is actually caused to the reception of any broadcasting-satellite station whose frequency assignment is in accordance

with the Plan by the use of a frequency assignment to a space radiocommunication station subsequently recorded in the Master Register in accordance with the provisions of paragraph 7.4.11.3, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

7.6.3 If harmful interference to the reception of any broadcasting-satellite station whose frequency assignment is in accordance with the Plan is actually caused by the use of a frequency assignment which is not in conformity with paragraph 7.4.5.1, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

Section VII. Review of Findings

7.7.1 The review of a finding by the Board may be undertaken:

- at the request of the notifying administration;
- at the request of any other administration interested in the question, but only on the grounds of actual harmful interference;
- on the initiative of the Board itself when it considers this is justified.

7.7.2 The Board, in the light of all the data at its disposal, shall review the matter, taking into account paragraph 7.4.5.1 and, where appropriate, paragraphs 7.4.5.2 and 7.4.5.3, and shall render an appropriate finding, informing the notifying administration prior either to the promulgation of its finding or to any recording action.

7.7.3 If the finding of the Board is then favourable it shall enter in the Master Register the changes that are required so that the entry shall appear in the future as if the original finding had been favourable.

7.7.4 If the finding with regard to the probability of harmful interference remains unfavourable, no change shall be made in the original entry.

**Section VIII. Modification, Cancellation and Review of Entries
in the Master Register**

7.8.1 Where the use of a recorded assignment to a station in the fixed-satellite service is suspended for a period of eighteen months, the notifying administration shall, within this eighteen-month period, inform the Board of the date on which such use was suspended and of the date on which the assignment is to be brought back into regular use.

7.8.2 Whenever it appears to the Board, whether or not as a result of action under paragraph 7.8.1, that a recorded assignment to a space station in the fixed-satellite service has not been in regular use for more than eighteen months, the Board shall inquire of the notifying administration as to when the assignment is to be brought back into regular use.

7.8.3 If no reply is received within six months of action by the Board under paragraph 7.8.2, or if the reply does not confirm that the assignment to a space station in the fixed-satellite service is to be brought back into regular use within this six-month limit, a symbol should be entered against the entry in the Master Register.

7.8.4 In case of permanent discontinuance of the use of any recorded frequency assignment, the notifying administration shall inform the Board within ninety days of such discontinuance, whereupon the entry shall be removed from the Master Register.

7.8.5 Whenever it appears to the Board from the information available that a recorded assignment has not been brought into regular operation in accordance with the notified basic characteristics, or is not being used in accordance with those basic characteristics, the Board shall consult the notifying administration and, subject to its agreement, shall either cancel or suitably modify the entry.

7.8.6 If, in connection with an inquiry by the Board under paragraph 7.8.5 the notifying administration has failed to supply the Board within forty-five days with the necessary or pertinent information, the Board shall make suitable entries in the Remarks Column of the Master Register to indicate the situation.

ARTICLE 8

Miscellaneous Provisions Relating to the Procedures

8.1 If it is requested by any administration, and if the circumstances appear to warrant, the Board, using such means at its disposal as are appropriate in the circumstances, shall conduct a study of cases of alleged contravention or non-observance of these provisions or of harmful interference.

8.2 The Board shall thereupon prepare and forward to the administration concerned a report containing its findings and recommendations for the solution of the problem.

8.3 In a case where, as a result of a study, the Board submits to one or more administrations suggestions or recommendations for the solution of a problem, and where no answer has been received from one or more of these administrations within a period of ninety days, the Board shall consider that the suggestions or recommendations concerned are unacceptable to the administrations which did not answer. If it was the requesting administration which failed to answer within this period, the Board shall close the study.

8.4 If it is requested by any administration, particularly by an administration of a country in need of special assistance, and if the circumstances appear to warrant, the Board, using such means at its disposal as are appropriate in the circumstances, shall render the following assistance:

- a) computation necessary in the application of Annexes 1, 3 and 4;
- b) any other assistance of a technical nature for completion of the procedures in this Appendix.

ARTICLE 9

Power Flux-Density Limits Between 11.7 GHz and 12.2 GHz to Protect Terrestrial Services in Regions 1 and 3 from Interference from Region 2 Broadcasting-Satellite Space Stations

9.1 The power-flux density at the Earth's surface in Regions 1 and 3, produced by emissions from a space station in the broadcasting-satellite service in Region 2 for all conditions and for all methods of modulation shall not exceed the values given in Annex 5 on the territory of any country unless the administration of that country so agrees.

ARTICLE 10

Power Flux-Density Limits Between 11.7 GHz and 12.2 GHz to Protect Space Services in Region 2 from Interference from Broadcasting-Satellite Space Stations of Regions 1 and 3

10.1 Broadcasting-satellite space stations of Regions 1 and 3 shall employ transmitting antennae whose side-lobe characteristics fall within the reference antenna pattern given in Figure 6 of Annex 8. Therefore, the power flux-density falling on the territory of any administration of Region 2 in the band 11.7 - 12.2 GHz prior to any modifications to the Plan shall not exceed, under all conditions and methods of modulation, the values produced by broadcasting-satellite stations operating in accordance with the Plan on the date of its entry into force and using the technical characteristics specified in the Plan. The power flux-density values shall be calculated using the method described in Annex 11.

10.2 In particular, the power flux-densities at a reference test point (longitude 35° W, latitude 8° S) prior to any modifications to the Plan shall not exceed the values shown in Annex 11.

ARTICLE 11

**The Plan for the Broadcasting-Satellite Service in
the Frequency Bands 11.7 - 12.2 GHz in Region 3
and 11.7 - 12.5 GHz in Region 1**

11.1 COLUMN HEADINGS OF THE PLAN

- Col. 1. *Country symbol and IFRB Serial Number* (Column 1 contains the symbol designating the country or the geographical area taken from Table No. 1 of the Preface to the International Frequency List).
- Col. 2. *Nominal orbital position*, in degrees.
- Col. 3. *Channel number* (see table showing channel numbers and corresponding assigned frequencies).
- Col. 4. *Boresight* geographical coordinates, in degrees and tenths of a degree.
- Col. 5. *Antenna beamwidth*. This column contains two figures corresponding to the major axis and the minor axis respectively of the elliptical cross-section half-power beam, in degrees and tenths of a degree.
- Col. 6. *Orientation of the ellipse* determined as follows: in a plane normal to the beam axis, the direction of a major axis of the ellipse is specified as the angle measured anti-clockwise from a line parallel to the equatorial plane to the major axis of the ellipse to the nearest degree.
- Col. 7. *Polarization* (1 = direct, 2 = indirect)¹.
- Col. 8. *E.i.r.p.* in the direction of maximum radiation in dBW.
- Col. 9. *Remarks*.

¹ See Annex 8, paragraph 3.2.3.

1. The ΔG of this assignment is . . . dB.
2. To be dedicated to the Islamic programme envisaged in the Conference¹ documents.
3. This assignment results from a common requirement of the Administrations of Denmark and Iceland. The service area includes the Faeroe Islands and Iceland. The assignment may, after consultations between the two Administrations, be used by either of them.
4. IFB – IFRB. This assignment has been included in the Plan by the Conference.
5. Assignment intended to ensure coverage of Algeria, Libya, Morocco, Mauritania and Tunisia, with the agreement of the countries concerned. If required, this assignment may be used with the characteristics of the beam TUN 150.
6. Assignments appearing in the Plan for Somalia should be coordinated with each country concerned and in particular with Ethiopia.

¹ The World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

11.3

TABLE SHOWING CORRESPONDENCE
BETWEEN CHANNEL NUMBERS
AND ASSIGNED FREQUENCIES

Channel No.	Assigned frequency (MHz)	Channel No.	Assigned frequency (MHz)
1	11 727.48	21	12 111.08
2	11 746.66	22	12 130.26
3	11 765.84	23	12 149.44
4	11 785.02	24	12 168.62
5	11 804.20	25	12 187.80
6	11 823.38	26	12 206.98
7	11 842.56	27	12 226.16
8	11 861.74	28	12 245.34
9	11 880.92	29	12 264.52
10	11 900.10	30	12 283.70
11	11 919.28	31	12 302.88
12	11 938.46	32	12 322.06
13	11 957.64	33	12 341.24
14	11 976.82	34	12 360.42
15	11 996.00	35	12 379.60
16	12 015.18	36	12 398.78
17	12 034.36	37	12 417.96
18	12 053.54	38	12 437.14
19	12 072.72	39	12 456.32
20	12 091.90	40	12 475.50

11 727,48 MHz (1)

AP30-48

1		2	3	4		5		6	7	8	9
AFG	246A	50.0	1	64.5	33.1	1.44	1.40	21	1	63.4	1/1.6 1/0.9 1/0.8 1/1.7
AUS	005A	98.0	1	133.5	− 18.8	2.70	1.40	76	2	64.3	
CAR	338A	122.0	1	149.5	8.0	5.36	0.77	178	1	62.5	
CHN	155A	62.0	1	88.3	31.5	3.38	1.45	162	2	62.9	
CHN	162A	92.0	1	115.9	21.0	2.74	2.42	23	2	63.9	
CHN	163A	80.0	1	116.0	39.2	1.20	0.80	132	1	64.4	
CME	300A	− 13.0	1	12.7	6.2	2.54	1.68	87	1	63.4	
F	093A	− 19.0	1	2.6	45.9	2.50	0.98	160	1	63.8	
FJI	193A	152.0	1	179.4	− 17.9	1.04	0.98	67	1	63.7	
GUI	192A	− 37.0	1	− 11.0	10.2	1.58	1.04	147	2	63.4	
IND	039A	56.0	1	72.7	11.2	1.26	0.60	107	1	63.1	
IND	044A	68.0	1	79.5	22.3	2.19	1.42	146	1	63.3	
INS	035A	104.0	1	124.3	− 3.2	3.34	1.94	82	1	63.2	
J	111A	110.0	1	134.5	31.5	3.52	3.30	68	1	63.2	
LBY	280A	− 25.0	1	21.4	26.0	2.50	1.04	119	2	63.5	
MDG	236A	29.0	1	46.6	− 18.8	2.72	1.14	65	2	63.3	
NZL	055A	158.0	1	172.3	− 39.7	2.88	1.56	47	1	63.3	
PLM	337A	170.0	1	− 161.4	7.0	0.60	0.60	0	1	62.4	
POL	132A	− 1.0	1	19.3	51.8	1.46	0.64	162	2	64.1	
QAT	247A	17.0	1	51.1	25.3	0.60	0.60	0	1	61.8	
SMA	335A	170.0	1	− 170.1	− 14.2	0.60	0.60	0	2	61.1	
SMR	311A	− 37.0	1	12.6	43.7	0.60	0.60	0	1	62.4	
SWZ	313A	− 1.0	1	31.5	− 26.5	0.62	0.60	66	1	62.8	
THA	142A	74.0	1	100.7	13.2	2.82	1.54	106	2	63.6	
TUR	145A	5.0	1	34.4	38.9	2.68	1.04	168	1	63.7	
URS	064A	23.0	1	45.6	40.8	2.16	0.60	163	2	63.9	
URS	067A	44.0	1	62.4	58.5	3.20	1.52	169	1	66.3	
WAK	334A	140.0	1	166.5	19.2	0.60	0.60	0	1	63.6	
YMS	267A	11.0	1	48.8	15.2	1.76	1.54	176	2	62.8	

11 746,66 MHz (2)

ALG	251A	-25.0	2	4.2	33.2	2.45	1.25	172	1	63.4
ARS	275A	17.0	2	48.3	24.6	3.84	1.20	138	2	62.7
AUS	006A	98.0	2	135.4	-30.3	2.00	1.40	44	1	63.2
AUS	008A	128.0	2	145.9	-21.5	2.90	2.00	120	2	63.7
BOT	297A	-1.0	2	23.3	-22.2	2.13	1.50	36	2	63.7
CHN	154A	62.0	2	83.9	40.5	2.75	2.05	177	1	63.2
CHN	161A	92.0	2	118.1	31.1	2.49	1.69	117	1	64.4
CKH	052A	158.0	2	-161.0	-19.8	1.02	0.64	132	2	64.6
CLN	219A	50.0	2	80.6	7.7	1.18	0.60	106	1	63.6
D	087A	-19.0	2	9.6	49.9	1.62	0.72	147	2	65.5
FNL	103A	5.0	2	22.5	64.5	1.38	0.76	171	2	67.7
GNP	304A	-31.0	2	-15.0	12.0	0.90	0.60	172	2	63.1
GUM	331A	122.0	2	144.5	13.1	0.60	0.60	0	2	63.3
IND	037A	68.0	2	93.0	25.5	1.46	1.13	40	2	63.9
IND	045A	56.0	2	76.2	19.5	1.58	1.58	21	2	63.5
INS	028A	80.0	2	101.5	0.0	3.00	1.20	133	2	63.3
IRL	211A	-31.0	2	-8.2	53.2	0.84	0.60	162	1	64.2
KOR	112A	110.0	2	127.5	36.0	1.24	1.02	168	2	63.6
LAO	284A	74.0	2	103.7	18.1	2.16	0.78	133	1	63.8
MAU	242A	29.0	2	59.8	-18.9	1.62	1.24	55	1	64.0
MLA	228A	86.0	2	114.1	3.9	2.34	1.12	45	1	63.6
MLI	327A	-37.0	2	-2.0	19.0	2.66	1.26	127	1	63.2
MRL	333A	146.0	2	166.7	7.9	1.50	1.50	177	1	63.3
NCL	100A	140.0	2	166.0	-21.0	1.14	0.72	146	1	63.7
PAK	127A	38.0	2	69.6	29.5	2.30	2.16	14	1	63.9
PNG	131A	110.0	2	147.7	-6.3	2.50	2.18	169	1	64.4
ROU	136A	-1.0	2	25.0	45.7	1.38	0.66	155	1	63.8
TCD	143A	-13.0	2	18.1	15.5	3.40	1.72	107	2	64.0
TGO	226A	-25.0	2	0.8	8.6	1.52	0.60	105	2	63.4
WAL	102A	140.0	2	-176.8	-14.0	0.74	0.60	29	1	64.4
YEM	266A	11.0	2	44.3	15.1	1.14	0.70	109	1	62.6
ZAI	323A	-19.0	2	21.3	-6.8	2.80	1.52	149	1	64.6

1		2	3	4		5		6	7	8	9
AFG	245A	50.0	3	70.2	35.5	1.32	1.13	53	1	62.8	1/1.8 1/0.7 1/2.0
AUS	004A	98.0	3	121.8	-24.9	3.60	1.90	54	2	63.0	
AUS	009A	128.0	3	147.2	-32.0	2.10	1.40	15	1	64.1	
AZR	134A	-31.0	3	-23.4	36.1	2.56	0.70	158	2	63.0	
BEN	233A	-19.0	3	2.2	9.5	1.44	0.68	97	2	63.3	
CHN	157A	62.0	3	102.3	27.8	2.56	1.58	127	2	65.1	
CHN	160A	92.0	3	122.8	45.3	2.50	1.45	150	2	65.1	
COM	207A	29.0	3	44.1	-12.1	0.76	0.60	149	2	63.1	
GAB	260A	-13.0	3	11.8	-0.6	1.43	1.12	64	1	63.3	
GMB	302A	-37.0	3	-15.1	13.4	0.79	0.60	4	2	63.3	
GRC	105A	5.0	3	24.7	38.2	1.78	0.98	156	1	63.3	
IND	043A	56.0	3	77.8	11.1	1.36	1.28	172	1	63.3	
IND	047A	68.0	3	93.3	11.1	1.92	0.60	96	1	63.4	
INS	036A	104.0	3	135.2	-3.8	2.46	2.00	147	1	63.8	
IRN	109A	34.0	3	54.2	32.4	3.82	1.82	149	2	62.8	
J	111B	110.0	3	134.5	31.5	3.52	3.30	68	1	64.2	
LBN	279A	11.0	3	35.8	33.9	0.60	0.60	0	2	61.6	
LBR	244A	-31.0	3	-9.3	6.6	1.22	0.70	133	1	63.2	
LBY	321A	-25.0	3	13.1	27.2	2.36	1.12	129	2	63.0	
LIE	253A	-37.0	3	9.5	47.1	0.60	0.60	0	1	62.4	
LUX	114A	-19.0	3	6.0	49.8	0.60	0.60	0	1	62.9	
MRA	332A	122.0	3	145.9	16.9	1.20	0.60	76	1	63.5	
NHB	128A	140.0	3	168.0	-16.4	1.52	0.68	87	2	62.8	
NRU	309A	134.0	3	167.0	-0.5	0.60	0.60	0	2	62.5	
POR	133A	-31.0	3	-8.0	39.6	0.92	0.60	112	2	63.4	
SMO	057A	158.0	3	-172.3	-13.7	0.60	0.60	0	1	63.6	
SNG	151A	74.0	3	103.8	1.3	0.60	0.60	0	2	63.5	
SOM	312A	23.0	3	45.0	6.4	3.26	1.54	71	1	62.3	
TCH	144A	-1.0	3	17.3	49.3	1.47	0.60	170	2	63.8	
UGA	051A	11.0	3	32.3	1.2	1.46	1.12	60	1	63.2	
URS	061A	23.0	3	24.7	56.6	0.88	0.64	12	2	65.0	
URS	073A	44.0	3	54.3	63.5	1.58	0.66	3	1	66.9	
VTN	325A	86.0	3	105.3	16.1	3.03	1.40	116	2	63.4	
ZMB	314A	-1.0	3	27.5	-13.1	2.38	1.48	39	1	63.7	

11 785,02 MHz (4)

ALG	252A	-25.0	4	1.6	25.5	3.64	2.16	152	1	62.8	1/0.5
AND	341A	-37.0	4	1.6	42.5	0.60	0.60	0	2	61.5	
ARS	003A	17.0	4	41.1	23.8	3.52	1.68	134	2	62.7	
AUS	007A	128.0	4	145.0	-38.1	1.83	1.39	134	2	63.3	
AUT	016A	-19.0	4	12.2	47.5	1.14	0.63	166	2	64.1	
BUL	020A	-1.0	4	25.0	43.0	1.04	0.60	165	1	63.6	
CHN	156A	62.0	4	97.8	36.3	2.56	1.58	157	1	63.5	
CHN	161B	92.0	4	118.1	31.1	2.49	1.69	117	1	64.4	
CKN	053A	158.0	4	-163.0	-11.2	1.76	0.72	30	2	64.3	
CPV	301A	-31.0	4	-24.0	16.0	0.86	0.70	144	2	62.2	
EGY	026A	-7.0	4	29.7	26.8	2.33	1.72	136	2	63.1	
G	027A	-31.0	4	-3.5	53.8	1.84	0.72	142	1	65.0	
IND	040A	56.0	4	73.0	25.0	1.82	1.48	58	2	63.6	
IND	048A	68.0	4	86.2	25.0	1.56	0.90	120	2	63.7	
INS	028B	80.0	4	101.5	0.0	3.00	1.20	133	2	63.3	
KOR	112B	110.0	4	127.5	36.0	1.24	1.02	168	2	63.6	1/0.7
LAO	284B	74.0	4	103.7	18.1	2.16	0.78	133	1	63.8	
MAU	243A	29.0	4	56.8	-13.9	1.56	1.38	65	1	63.7	
MLA	228B	86.0	4	114.1	3.9	2.34	1.12	45	1	63.6	
MLI	328A	-37.0	4	-7.6	13.2	1.74	1.24	171	1	63.7	
MLT	147A	-13.0	4	14.3	35.9	0.60	0.60	0	1	61.0	
MOZ	307A	-1.0	4	34.0	-18.0	3.57	1.38	55	2	64.2	
OCE	101A	-160.0	4	-145.0	-16.3	4.34	3.54	4	2	63.5	
PAK	283A	38.0	4	74.7	33.9	1.34	1.13	160	1	64.3	
PNG	271A	128.0	4	148.0	-6.7	2.80	2.05	155	1	63.4	
RRW	310A	11.0	4	30.0	-2.1	0.66	0.60	42	2	64.8	
S	138A	5.0	4	16.2	61.0	1.04	0.98	14	2	67.1	
STP	241A	-13.0	4	7.0	0.8	0.60	0.60	0	2	61.4	1/1.3
TON	215A	170.0	4	-174.7	-18.0	1.41	0.68	85	1	63.3	
URS	060A	23.0	4	41.5	57.4	3.08	1.56	153	1	66.7	
ZAI	322A	-19.0	4	22.4	0.0	2.16	1.88	48	1	64.7	

11 804,20 MHz (5)

AP30-52

1		2	3	4		5		6	7	8	9
AFG	246B	50.0	5	64.5	33.1	1.44	1.40	21	1	63.4	1/1.6 1/0.9 1/0.8 1/1.7
AUS	005B	98.0	5	133.5	-18.8	2.70	1.40	76	2	64.3	
CAR	338B	122.0	5	149.5	8.0	5.36	0.77	178	1	62.5	
CHN	155B	62.0	5	88.3	31.5	3.38	1.45	162	2	62.9	
CHN	162B	92.0	5	115.9	21.0	2.74	2.42	23	2	64.0	
CHN	164A	80.0	5	112.2	37.4	1.06	0.76	111	1	64.2	
CME	300B	-13.0	5	12.7	6.2	2.54	1.68	87	1	63.5	
F	093B	-19.0	5	2.6	45.9	2.50	0.98	160	1	63.8	
FJI	193B	152.0	5	179.4	-17.9	1.04	0.98	67	1	63.7	
GUI	192B	-37.0	5	-11.0	10.2	1.58	1.04	147	2	63.5	
IND	039B	56.0	5	72.7	11.2	1.26	0.60	107	1	63.1	
IND	044B	68.0	5	79.5	22.3	2.19	1.42	146	1	63.4	
INS	035B	104.0	5	124.3	-3.2	3.34	1.94	82	1	63.2	
J	111C	110.0	5	134.5	31.5	3.52	3.30	68	1	64.2	
LBY	280B	-25.0	5	21.4	26.0	2.50	1.04	119	2	63.5	
MDG	236B	29.0	5	46.6	-18.8	2.72	1.14	65	2	63.4	
NZL	055B	158.0	5	172.3	-39.7	2.88	1.56	47	1	63.4	
PLM	337B	170.0	5	-161.4	7.0	0.60	0.60	0	1	62.4	
POL	132B	-1.0	5	19.3	51.8	1.46	0.64	162	2	64.2	
OAT	247B	17.0	5	51.1	25.3	0.60	0.60	0	1	61.8	
SMA	335B	170.0	5	-170.1	-14.2	0.60	0.60	0	2	61.2	
SMR	311B	-37.0	5	12.6	43.7	0.60	0.60	0	1	62.5	
SWZ	313B	-1.0	5	31.5	-26.5	0.62	0.60	66	1	62.8	
THA	142B	74.0	5	100.7	13.2	2.82	1.54	106	2	63.7	
TUR	145B	5.0	5	34.4	38.9	2.68	1.04	168	1	63.8	
URS	064B	23.0	5	45.6	40.8	2.16	0.60	163	2	63.9	
URS	067B	44.0	5	62.4	58.5	3.20	1.52	169	1	66.4	
WAK	334B	140.0	5	166.5	19.2	0.60	0.60	0	1	63.6	
YMS	267B	11.0	5	48.8	15.2	1.76	1.54	176	2	62.9	

11 823,38 MHz (6)

ALG	251B	-25.0	6	4.2	33.2	2.45	1.25	172	1	63.4
ARS	275B	17.0	6	48.3	24.6	3.84	1.20	138	2	62.8
AUS	006B	98.0	6	135.4	-30.3	2.00	1.40	44	1	63.3
AUS	008B	128.0	6	145.9	-21.5	2.90	2.00	120	2	63.7
BOT	297B	-1.0	6	23.3	-22.2	2.13	1.50	36	2	63.8
CHN	154B	62.0	6	83.9	40.5	2.75	2.05	177	1	63.3
CHN	161C	92.0	6	118.1	31.1	2.49	1.69	117	1	64.5
CKH	052B	158.0	6	-161.0	-19.8	1.02	0.64	132	2	64.6
CLN	219B	50.0	6	80.6	7.7	1.18	0.60	106	1	63.6
D	087B	-19.0	6	9.6	49.9	1.62	0.72	147	2	65.6
FNL	103B	5.0	6	22.5	64.5	1.38	0.76	171	2	67.8
GNP	304B	-31.0	6	-15.0	12.0	0.90	0.60	172	2	63.2
GUM	331B	122.0	6	144.5	13.1	0.60	0.60	0	2	63.4
IND	037B	68.0	6	93.0	25.5	1.46	1.13	40	2	64.0
IND	045B	56.0	6	76.2	19.5	1.58	1.58	21	2	63.6
INS	028C	80.0	6	101.5	0.0	3.00	1.20	133	2	63.3
IRL	211B	-31.0	6	-8.2	53.2	0.84	0.60	162	1	64.3
KOR	112C	110.0	6	127.5	36.0	1.24	1.02	168	2	63.6
LAO	284C	74.0	6	103.7	18.1	2.16	0.78	133	1	63.8
MAU	242B	29.0	6	59.8	-18.9	1.62	1.24	55	1	64.0
MLA	228C	86.0	6	114.1	3.9	2.34	1.12	45	1	63.6
MLI	327B	-37.0	6	-2.0	19.0	2.66	1.26	127	1	63.2
MRL	333B	146.0	6	166.7	7.9	1.50	1.50	177	1	63.3
NCL	100B	140.0	6	166.0	-21.0	1.14	0.72	146	1	63.8
PAK	127B	38.0	6	69.6	29.5	2.30	2.16	14	1	64.0
PNG	131B	110.0	6	147.7	-6.3	2.50	2.18	169	1	64.4
ROU	136B	-1.0	6	25.0	45.7	1.38	0.66	155	1	63.9
TCD	143B	-13.0	6	18.1	15.5	3.40	1.72	107	2	64.0
TGO	226B	-25.0	6	0.8	8.6	1.52	0.60	105	2	63.4
WAL	102B	140.0	6	-176.8	-14.0	0.74	0.60	29	1	64.4
YEM	266B	11.0	6	44.3	15.1	1.14	0.70	109	1	62.7
ZAI	323B	-19.0	6	21.3	-6.8	2.80	1.52	149	1	64.7

1		2	3	4		5		6	7	8	9
AFG	245B	50.0	7	70.2	35.5	1.32	1.13	53	1	62.9	1/1.8 1/0.7 1/2.0
AUS	004B	98.0	7	121.8	-24.9	3.60	1.90	54	2	63.1	
AUS	009B	128.0	7	147.2	-32.0	2.10	1.40	15	1	64.1	
AZR	134B	-31.0	7	-23.4	36.1	2.56	0.70	158	2	63.1	
BEN	233B	-19.0	7	2.2	9.5	1.44	0.68	97	2	63.3	
CHN	157B	62.0	7	102.3	27.8	2.56	1.58	127	2	65.1	
CHN	160B	92.0	7	122.8	45.3	2.50	1.45	150	2	65.1	
COM	207B	29.0	7	44.1	-12.1	0.76	0.60	149	2	63.1	
GAB	260B	-13.0	7	11.8	-0.6	1.43	1.12	64	1	63.4	
GMB	302B	-37.0	7	-15.1	13.4	0.79	0.60	4	2	63.4	
GRC	105B	5.0	7	24.7	38.2	1.78	0.98	156	1	63.4	
IND	043B	56.0	7	77.8	11.1	1.36	1.28	172	1	63.4	
IND	047B	68.0	7	93.3	11.1	1.92	0.60	96	1	63.5	
INS	036B	104.0	7	135.2	-3.8	2.46	2.00	147	1	63.8	
IRN	109B	34.0	7	54.2	32.4	3.82	1.82	149	2	62.8	
J	111D	110.0	7	134.5	31.5	3.52	3.30	68	1	64.2	
LBN	279B	11.0	7	35.8	33.9	0.60	0.60	0	2	61.7	
LBR	244B	-31.0	7	-9.3	6.6	1.22	0.70	133	1	63.3	
LBY	321B	-25.0	7	13.1	27.2	2.36	1.12	129	2	63.1	
LIE	253B	-37.0	7	9.5	47.1	0.60	0.60	0	1	62.5	
LUX	114B	-19.0	7	6.0	49.8	0.60	0.60	0	1	63.0	
MRA	332B	122.0	7	145.9	16.9	1.20	0.60	76	1	63.5	
NHB	128B	140.0	7	168.0	-16.4	1.52	0.68	87	2	62.9	
NRU	309B	134.0	7	167.0	-0.5	0.60	0.60	0	2	62.6	
POR	133B	-31.0	7	-8.0	39.6	0.92	0.60	112	2	63.4	
SMO	057B	158.0	7	-172.3	-13.7	0.60	0.60	0	1	63.7	
SNG	151B	74.0	7	103.8	1.3	0.60	0.60	0	2	63.6	
SOM	312B	23.0	7	45.0	6.4	3.26	1.54	71	1	62.4	
TCH	144B	-1.0	7	17.3	49.3	1.47	0.60	170	2	63.9	
UGA	051B	11.0	7	32.3	1.2	1.46	1.12	60	1	63.3	
URS	061B	23.0	7	24.7	56.6	0.88	0.64	12	2	65.1	
URS	072A	44.0	7	70.1	61.5	2.38	0.66	173	1	67.1	
VTN	325B	86.0	7	105.3	16.1	3.03	1.40	116	2	63.5	
ZMB	314B	-1.0	7	27.5	-13.1	2.38	1.48	39	1	63.8	

11 861,74 MHz (8)

ALG	252B	-25.0	8	1.6	25.5	3.64	2.16	152	1	62.8	1/0.5
AND	341B	-37.0	8	1.6	42.5	0.60	0.60	0	2	61.5	
ARS	003B	17.0	8	41.1	23.8	3.52	1.68	134	2	62.8	
AUS	007B	128.0	8	145.0	-38.1	1.83	1.39	134	2	63.4	
AUT	016B	-19.0	8	12.2	47.5	1.14	0.63	166	2	64.2	
BUL	020B	-1.0	8	25.0	43.0	1.04	0.60	165	1	63.7	
CHN	156B	62.0	8	97.8	36.3	2.56	1.58	157	1	63.5	
CHN	173A	92.0	8	115.7	27.4	1.14	0.94	99	1	64.0	
CKN	053B	158.0	8	-163.0	-11.2	1.76	0.72	30	2	64.3	
CPV	301B	-31.0	8	-24.0	16.0	0.86	0.70	144	2	62.2	
EGY	026B	-7.0	8	29.7	26.8	2.33	1.72	136	2	63.2	
G	027B	-31.0	8	-3.5	53.8	1.84	0.72	142	1	65.1	
IND	040B	56.0	8	73.0	25.0	1.82	1.48	58	2	63.7	
IND	048B	68.0	8	86.2	25.0	1.56	0.90	120	2	63.7	
INS	028D	80.0	8	101.5	0.0	3.00	1.20	133	2	63.4	
KOR	112D	110.0	8	127.5	36.0	1.24	1.02	168	2	63.7	
LAO	284D	74.0	8	103.7	18.1	2.16	0.78	133	1	63.8	1/0.7
MAU	243B	29.0	8	56.8	-13.9	1.56	1.38	65	1	63.8	
MLA	228D	86.0	8	114.1	3.9	2.34	1.12	45	1	63.7	
MLI	328B	-37.0	8	-7.6	13.2	1.74	1.24	171	1	63.8	
MLT	147B	-13.0	8	14.3	35.9	0.60	0.60	0	1	61.0	
MOZ	307B	-1.0	8	34.0	-18.0	3.57	1.38	55	2	64.2	
OCE	101B	-160.0	8	-145.0	-16.3	4.34	3.54	4	2	63.6	
PAK	283B	38.0	8	74.7	33.9	1.34	1.13	160	1	64.3	
PNG	271B	128.0	8	148.0	-6.7	2.80	2.05	155	1	63.4	
RRW	310B	11.0	8	30.0	-2.1	0.66	0.60	42	2	64.9	
S	138B	5.0	8	16.2	61.0	1.04	0.98	14	2	67.1	1/1.3
STP	241B	-13.0	8	7.0	0.8	0.60	0.60	0	2	61.5	
TON	215B	170.0	8	-174.7	-18.0	1.41	0.68	85	1	63.3	
URS	060B	23.0	8	41.5	57.4	3.08	1.56	153	1	66.8	
ZAI	322B	-19.0	8	22.4	0.0	2.16	1.88	48	1	64.8	

11 880,92 MHz (9)

AP30-56

1		2	3	4		5		6	7	8	9
AFG	246C	50.0	9	64.5	33.1	1.44	1.40	21	1	63.4	1/1.6 1/0.9 1/0.8 1/1.7
AUS	005C	98.0	9	133.5	-18.8	2.70	1.40	76	2	64.4	
CAR	338C	122.0	9	149.5	8.0	5.36	0.77	178	1	62.6	
CHN	155C	62.0	9	88.3	31.5	3.38	1.45	162	2	63.0	
CHN	162C	92.0	9	115.9	21.0	2.74	2.42	23	2	64.0	
CHN	165A	80.0	9	111.4	41.8	1.58	1.20	15	1	63.6	
CME	300C	-13.0	9	12.7	6.2	2.54	1.68	87	1	63.5	
F	093C	-19.0	9	2.6	45.9	2.50	0.98	160	1	63.9	
FJI	193C	152.0	9	179.4	-17.9	1.04	0.98	67	1	63.8	
GUI	192C	-37.0	9	-11.0	10.2	1.58	1.04	147	2	63.5	
IND	039C	56.0	9	72.7	11.2	1.26	0.60	107	1	63.2	
IND	044C	68.0	9	79.5	22.3	2.19	1.42	146	1	63.5	
INS	035C	104.0	9	124.3	-3.2	3.34	1.94	82	1	63.3	
J	111E	110.0	9	134.5	31.5	3.52	3.30	68	1	64.3	
LBY	280C	-25.0	9	21.4	26.0	2.50	1.04	119	2	63.6	
MDG	236C	29.0	9	46.6	-18.8	2.72	1.14	65	2	63.4	
NZL	055C	158.0	9	172.3	-39.7	2.88	1.56	47	1	63.4	
PLM	337C	170.0	9	-161.4	7.0	0.60	0.60	0	1	62.5	
POL	132C	-1.0	9	19.3	51.8	1.46	0.64	162	2	64.2	
QAT	247C	17.0	9	51.1	25.3	0.60	0.60	0	1	61.9	
SMA	335C	170.0	9	-170.1	-14.2	0.60	0.60	0	2	61.3	
SMR	311C	-37.0	9	12.6	43.7	0.60	0.60	0	1	62.5	
SWZ	313C	-1.0	9	31.5	-26.5	0.62	0.60	66	1	62.9	
THA	142C	74.0	9	100.7	13.2	2.82	1.54	106	2	63.7	
TUR	145C	5.0	9	34.4	38.9	2.68	1.04	168	1	63.8	
URS	064C	23.0	9	45.6	40.8	2.16	0.60	163	2	64.0	
URS	067C	44.0	9	62.4	58.5	3.20	1.52	169	1	66.4	
WAK	334C	140.0	9	166.5	19.2	0.60	0.60	0	1	63.7	
YMS	267C	11.0	9	48.8	15.2	1.76	1.54	176	2	62.9	

11 900,10 MHz (10)

ALG	251C	-25.0	10	4.2	33.2	2.45	1.25	172	1	63.5
ARS	275C	17.0	10	48.3	24.6	3.84	1.20	138	2	62.9
AUS	006C	98.0	10	135.4	-30.3	2.00	1.40	44	1	63.3
AUS	008C	128.0	10	145.9	-21.5	2.90	2.00	120	2	63.8
BOT	297C	-1.0	10	23.3	-22.2	2.13	1.50	36	2	63.9
CHN	154C	62.0	10	83.9	40.5	2.75	2.05	177	1	63.3
CHN	171A	92.0	10	117.2	32.0	1.20	0.74	126	1	64.2
CHN	187A	80.0	10	106.6	26.7	1.14	0.94	179	2	64.0
CKH	052C	158.0	10	-161.0	-19.8	1.02	0.64	132	2	64.7
CLN	219C	50.0	10	80.6	7.7	1.18	0.60	106	1	63.7
D	087C	-19.0	10	9.6	49.9	1.62	0.72	147	2	65.6
FNL	103C	5.0	10	22.5	64.5	1.38	0.76	171	2	67.9
GNP	304C	-31.0	10	-15.0	12.0	0.90	0.60	172	2	63.2
GUM	331C	122.0	10	144.5	13.1	0.60	0.60	0	2	63.4
IND	037C	68.0	10	93.0	25.5	1.46	1.13	40	2	64.0
IND	045C	56.0	10	76.2	19.5	1.58	1.58	21	2	63.6
IRL	211C	-31.0	10	-8.2	53.2	0.84	0.60	162	1	64.4
KOR	112E	110.0	10	127.5	36.0	1.24	1.02	168	2	63.7
LAO	284E	74.0	10	103.7	18.1	2.16	0.78	133	1	63.9
MAU	242C	29.0	10	59.8	-18.9	1.62	1.24	55	1	64.1
MLI	327C	-37.0	10	-2.0	19.0	2.66	1.26	127	1	63.2
MRL	333C	146.0	10	166.7	7.9	1.50	1.50	177	1	63.4
NCL	100C	140.0	10	166.0	-21.0	1.14	0.72	146	1	63.8
PAK	127C	38.0	10	69.6	29.5	2.30	2.16	14	1	64.0
PNG	131C	110.0	10	147.7	-6.3	2.50	2.18	169	1	64.5
ROU	136C	-1.0	10	25.0	45.7	1.38	0.66	155	1	63.9
TCD	143C	-13.0	10	18.1	15.5	3.40	1.72	107	2	64.1
TGO	226C	-25.0	10	0.8	8.6	1.52	0.60	105	2	63.5
WAL	102C	140.0	10	-176.8	-14.0	0.74	0.60	29	1	64.5
YEM	266C	11.0	10	44.3	15.1	1.14	0.70	109	1	62.7
ZAI	323C	-19.0	10	21.3	-6.8	2.80	1.52	149	1	64.7

1		2	3	4		5		6	7	8	9
AFG	245C	50.0	11	70.2	35.5	1.32	1.13	53	1	62.9	1/1.8 1/0.7 1/2.0
AUS	004C	98.0	11	121.8	-24.9	3.60	1.90	54	2	63.1	
AUS	009C	128.0	11	147.2	-32.0	2.10	1.40	15	1	64.2	
AZR	134C	-31.0	11	-23.4	36.1	2.56	0.70	158	2	63.1	
BEN	233C	-19.0	11	2.2	9.5	1.44	0.68	97	2	63.4	
CHN	157C	62.0	11	102.3	27.8	2.56	1.58	127	2	65.2	
CHN	160C	92.0	11	122.8	45.3	2.50	1.45	150	2	65.2	
COM	207C	29.0	11	44.1	-12.1	0.76	0.60	149	2	63.2	
GAB	260C	-13.0	11	11.8	-0.6	1.43	1.12	64	1	63.4	
GMB	302C	-37.0	11	-15.1	13.4	0.79	0.60	4	2	63.4	
GRC	105C	5.0	11	24.7	38.2	1.78	0.98	156	1	63.4	
IND	043C	56.0	11	77.8	11.1	1.36	1.28	172	1	63.5	
IND	047C	68.0	11	93.3	11.1	1.92	0.60	96	1	63.5	
INS	036C	104.0	11	135.2	-3.8	2.46	2.00	147	1	63.9	
IRN	109C	34.0	11	54.2	32.4	3.82	1.82	149	2	62.9	
J	111F	110.0	11	134.5	31.5	3.52	3.30	68	1	64.3	
LBN	279C	11.0	11	35.8	33.9	0.60	0.60	0	2	61.7	
LBR	244C	-31.0	11	-9.3	6.6	1.22	0.70	133	1	63.3	
LBY	321C	-25.0	11	13.1	27.2	2.36	1.12	129	2	63.1	
LIE	253C	-37.0	11	9.5	47.1	0.60	0.60	0	1	62.5	
LUX	114C	-19.0	11	6.0	49.8	0.60	0.60	0	1	63.0	
MRA	332C	122.0	11	145.9	16.9	1.20	0.60	76	1	63.6	
NHB	128C	140.0	11	168.0	-16.4	1.52	0.68	87	2	63.0	
NRU	309C	134.0	11	167.0	-0.5	0.60	0.60	0	2	62.6	
POR	133C	-31.0	11	-8.0	39.6	0.92	0.60	112	2	63.5	
SMO	057C	158.0	11	-172.3	-13.7	0.60	0.60	0	1	63.8	
SNG	151C	74.0	11	103.8	1.3	0.60	0.60	0	2	63.7	
SOM	312C	23.0	11	45.0	6.4	3.26	1.54	71	1	62.4	
TCH	144C	-1.0	11	17.3	49.3	1.47	0.60	170	2	63.9	
UGA	051C	11.0	11	32.3	1.2	1.46	1.12	60	1	63.3	
URS	061C	23.0	11	24.7	56.6	0.88	0.64	12	2	65.1	
VTN	325C	86.0	11	105.3	16.1	3.03	1.40	116	2	63.5	
ZMB	314C	-1.0	11	27.5	-13.1	2.38	1.48	39	1	63.8	

11 938,46 MHz (12)

ALG	252C	-25.0	12	1.6	25.5	3.64	2.16	152	1	62.9	1/0.5
AND	341C	-37.0	12	1.6	42.5	0.60	0.60	0	2	61.6	
ARS	003C	17.0	12	41.1	23.8	3.52	1.68	134	2	62.8	1/1.3
AUS	007C	128.0	12	145.0	-38.1	1.83	1.39	134	2	63.4	
AUT	016C	-19.0	12	12.2	47.5	1.14	0.63	166	2	64.2	1/1.3
BRU	330A	74.0	12	114.7	4.4	0.60	0.60	0	1	62.5	
BUL	020C	-1.0	12	25.0	43.0	1.04	0.60	165	1	63.8	1/0.7
CHN	156C	62.0	12	97.8	36.3	2.56	1.58	157	1	63.6	
CHN	170A	92.0	12	119.5	33.0	1.34	0.64	155	1	64.4	1/1.3
CHN	178A	80.0	12	111.5	27.4	1.22	0.86	130	2	64.4	
CKN	053C	158.0	12	-163.0	-11.2	1.76	0.72	30	2	64.4	1/0.7
CPV	301C	-31.0	12	-24.0	16.0	0.86	0.70	144	2	62.3	
DNK	089A	5.0	12	12.3	57.1	1.20	0.60	177	2	64.3	1/1.3
EGY	026C	-7.0	12	29.7	26.8	2.33	1.72	136	2	63.2	
G	027C	-31.0	12	-3.5	53.8	1.84	0.72	142	1	65.1	1/0.7
IND	040C	56.0	12	73.0	25.0	1.82	1.48	58	2	63.8	
IND	048C	68.0	12	86.2	25.0	1.56	0.90	120	2	63.8	1/1.3
KOR	112F	110.0	12	127.5	36.0	1.24	1.02	168	2	63.7	
MAU	243C	29.0	12	56.8	-13.9	1.56	1.38	65	1	63.8	1/0.7
MLD	306A	44.0	12	73.1	6.0	0.96	0.60	90	1	63.7	
MLI	328C	-37.0	12	-7.6	13.2	1.74	1.24	171	1	63.8	1/1.3
MLT	147C	-13.0	12	14.3	35.9	0.60	0.60	0	1	61.1	
MOZ	307C	-1.0	12	34.0	-18.0	3.57	1.38	55	2	64.3	1/0.7
OCE	101C	-160.0	12	-145.0	-16.3	4.34	3.54	4	2	63.6	
PAK	210A	38.0	12	72.1	30.8	1.16	0.72	90	1	63.5	1/1.3
PNG	271C	128.0	12	148.0	-6.7	2.80	2.05	155	1	63.5	
RRW	310C	11.0	12	30.0	-2.1	0.66	0.60	42	2	64.9	1/0.7
STP	241C	-13.0	12	7.0	0.8	0.60	0.60	0	2	61.5	
TON	215C	170.0	12	-174.7	-18.0	1.41	0.68	85	1	63.4	1/1.3
URS	060C	23.0	12	41.5	57.4	3.08	1.56	153	1	66.9	
URS	069A	44.0	12	70.8	38.5	1.36	0.74	161	2	64.1	1/0.7
ZAI	322C	-19.0	12	22.4	0.0	2.16	1.88	48	1	64.8	

11 957,64 MHz (13)

1		2	3	4		5		6	7	8	9
AFG	246D	50.0	13	64.5	33.1	1.44	1.40	21	1	63.4	1/1.6 1/0.9 1/0.8 1/1.7
AUS	005D	98.0	13	133.5	-18.8	2.70	1.40	76	2	64.4	
CAR	338D	122.0	13	149.5	8.0	5.36	0.77	178	1	62.6	
CHN	155D	62.0	13	88.3	31.5	3.38	1.45	162	2	63.0	
CHN	180A	92.0	13	113.7	12.9	3.76	2.18	72	2	63.6	
CME	300D	-13.0	13	12.7	6.2	2.54	1.68	87	1	63.6	
F	093D	-19.0	13	2.6	45.9	2.50	0.98	160	1	64.0	
GUI	192D	-37.0	13	-11.0	10.2	1.58	1.04	147	2	63.6	
IND	039D	56.0	13	72.7	11.2	1.26	0.60	107	1	63.3	
IND	044D	68.0	13	79.5	22.3	2.19	1.42	146	1	63.5	
INS	035D	104.0	13	124.3	-3.2	3.34	1.94	82	1	63.4	
J	111G	110.0	13	134.5	31.5	3.52	3.30	68	1	64.3	
LBY	280D	-25.0	13	21.4	26.0	2.50	1.04	119	2	63.6	
MDG	236D	29.0	13	46.6	-18.8	2.72	1.14	65	2	63.5	
NZL	055D	158.0	13	172.3	-39.7	2.88	1.56	47	1	63.5	
NZL	287A	128.0	13	173.0	-41.0	3.30	1.28	48	1	64.8	
PLM	337D	170.0	13	-161.4	7.0	0.60	0.60	0	1	62.6	
POL	132D	-1.0	13	19.3	51.8	1.46	0.64	162	2	64.3	
QAT	247D	17.0	13	51.1	25.3	0.60	0.60	0	1	62.0	
SMA	335D	170.0	13	-170.1	-14.2	0.60	0.60	0	2	61.3	
SMR	311D	-37.0	13	12.6	43.7	0.60	0.60	0	1	62.6	
SWZ	313D	-1.0	13	31.5	-26.5	0.62	0.60	66	1	63.0	
THA	142D	74.0	13	100.7	13.2	2.82	1.54	106	2	63.8	
TUR	145D	5.0	13	34.4	38.9	2.68	1.04	168	1	63.9	
URS	064D	23.0	13	45.6	40.8	2.16	0.60	163	2	64.1	
URS	067D	44.0	13	62.4	58.5	3.20	1.52	169	1	66.5	
WAK	334D	140.0	13	166.5	19.2	0.60	0.60	0	1	63.7	
YMS	267D	11.0	13	48.8	15.2	1.76	1.54	176	2	63.0	

11 976,82 MHz (14)

ALG	251D	-25.0	14	4.2	33.2	2.45	1.25	172	1	63.6	1/1.3
ARS	275D	17.0	14	48.3	24.6	3.84	1.20	138	2	63.0	
AUS	006D	98.0	14	135.4	-30.3	2.00	1.40	44	1	63.4	
AUS	008D	128.0	14	145.9	-21.5	2.90	2.00	120	2	63.9	
BOT	297D	-1.0	14	23.3	-22.2	2.13	1.50	36	2	63.9	
BRU	330B	74.0	14	114.7	4.4	0.60	0.60	0	1	62.6	
CHN	154D	62.0	14	83.9	40.5	2.75	2.05	177	1	63.4	
CHN	172A	92.0	14	120.4	29.1	0.96	0.84	123	1	64.3	
CHN	181A	80.0	14	108.5	23.8	1.41	1.08	153	2	64.1	
CKH	052D	158.0	14	-161.0	-19.8	1.02	0.64	132	2	64.8	
CLN	219D	50.0	14	80.6	7.7	1.18	0.60	106	1	63.8	
D	087D	-19.0	14	9.6	49.9	1.62	0.72	147	2	65.7	
GNP	304D	-31.0	14	-15.0	12.0	0.90	0.60	172	2	63.3	
GUM	331D	122.0	14	144.5	13.1	0.60	0.60	0	2	63.5	
IND	037D	68.0	14	93.0	25.5	1.46	1.13	40	2	64.1	
IND	045D	56.0	14	76.2	19.5	1.58	1.58	21	2	63.7	
IRL	211D	-31.0	14	-8.2	53.2	0.84	0.60	162	1	64.4	
KRE	286A	110.0	14	127.0	39.1	1.30	1.10	31	2	64.0	
MAU	242D	29.0	14	59.8	-18.9	1.62	1.24	55	1	64.1	
MLI	327D	-37.0	14	-2.0	19.0	2.66	1.26	127	1	63.2	
MRL	333D	146.0	14	166.7	7.9	1.50	1.50	177	1	63.5	
NCL	100D	140.0	14	166.0	-21.0	1.14	0.72	146	1	63.9	
NOR	120A	5.0	14	13.1	64.1	1.84	0.88	10	2	65.0	
PAK	210B	38.0	14	72.1	30.8	1.16	0.72	90	1	63.6	
PNG	131D	110.0	14	147.7	-6.3	2.50	2.18	169	1	64.6	
ROU	136D	-1.0	14	25.0	45.7	1.38	0.66	155	1	64.0	
TCD	143D	-13.0	14	18.1	15.5	3.40	1.72	107	2	64.1	
TGO	226D	-25.0	14	0.8	8.6	1.52	0.60	105	2	63.5	
WAL	102D	140.0	14	-176.8	-14.0	0.74	0.60	29	1	64.6	
YEM	266D	11.0	14	44.3	15.1	1.14	0.70	109	1	62.8	
ZAI	323D	-19.0	14	21.3	-6.8	2.80	1.52	149	1	64.8	

1		2	3	4		5		6	7	8	9
AFG	245D	50.0	15	70.2	35.5	1.32	1.13	53	1	63.0	1/1.8 1/0.7 1/2.0
AUS	004D	98.0	15	121.8	-24.9	3.60	1.90	54	2	63.2	
AUS	009D	128.0	15	147.2	-32.0	2.10	1.40	15	1	64.2	
AZR	134D	-31.0	15	-23.4	36.1	2.56	0.70	158	2	63.2	
BEN	233D	-19.0	15	2.2	9.5	1.44	0.68	97	2	63.4	
BGD	220A	74.0	15	90.3	23.6	1.46	0.84	135	1	63.7	
CHN	158A	80.0	15	111.8	38.0	2.60	1.74	124	1	64.9	
CHN	174A	92.0	15	118.1	25.9	1.02	0.84	82	2	64.1	
COM	207D	29.0	15	44.1	-12.1	0.76	0.60	149	2	63.3	
GAB	260D	-13.0	15	11.8	-0.6	1.43	1.12	64	1	63.5	
GMB	302D	-37.0	15	-15.1	13.4	0.79	0.60	4	2	63.5	
GRC	105D	5.0	15	24.7	38.2	1.78	0.98	156	1	63.5	
IND	043D	56.0	15	77.8	11.1	1.36	1.28	172	1	63.5	
IND	047D	68.0	15	93.3	11.1	1.92	0.60	96	1	63.6	
INS	036D	104.0	15	135.2	-3.8	2.46	2.00	147	1	63.9	
IRN	109D	34.0	15	54.2	32.4	3.82	1.82	149	2	63.0	
J	111H	110.0	15	134.5	31.5	3.52	3.30	68	1	64.4	
LBN	279D	11.0	15	35.8	33.9	0.60	0.60	0	2	61.8	
LBR	244D	-31.0	15	-9.3	6.6	1.22	0.70	133	1	63.4	
LBY	321D	-25.0	15	13.1	27.2	2.36	1.12	129	2	63.2	
LIE	253D	-37.0	15	9.5	47.1	0.60	0.60	0	1	62.6	
LUX	114D	-19.0	15	6.0	49.8	0.60	0.60	0	1	63.1	
MRA	332D	122.0	15	145.9	16.9	1.20	0.60	76	1	63.6	
NHB	128D	140.0	15	168.0	-16.4	1.52	0.68	87	2	63.0	
NRU	309D	134.0	15	167.0	-0.5	0.60	0.60	0	2	62.7	
POR	133D	-31.0	15	-8.0	39.6	0.92	0.60	112	2	63.6	
SMO	057D	158.0	15	-172.3	-13.7	0.60	0.60	0	1	63.8	
SNG	151D	74.0	15	103.8	1.3	0.60	0.60	0	2	63.7	
SOM	312D	23.0	15	45.0	6.4	3.26	1.54	71	1	62.5	
TCH	144D	-1.0	15	17.3	49.3	1.47	0.60	170	2	64.0	
UGA	051D	11.0	15	32.3	1.2	1.46	1.12	60	1	63.4	
URS	061D	23.0	15	24.7	56.6	0.88	0.64	12	2	65.2	
VTN	325D	86.0	15	105.3	16.1	3.03	1.40	116	2	63.6	
ZMB	314D	-1.0	15	27.5	-13.1	2.38	1.48	39	1	63.9	

12 015,18 MHz (16)

ALG	252D	-25.0	16	1.6	25.5	3.64	2.16	152	1	63.0	1/0.5
AND	341D	-37.0	16	1.6	42.5	0.60	0.60	0	2	61.6	
ARS	003D	17.0	16	41.1	23.8	3.52	1.68	134	2	62.8	
AUS	007D	128.0	16	145.0	-38.1	1.83	1.39	134	2	63.5	
AUT	016D	-19.0	16	12.2	47.5	1.14	0.63	166	2	64.3	
BUL	020D	-1.0	16	25.0	43.0	1.04	0.60	165	1	63.8	
CHN	169A	92.0	16	118.5	36.4	1.16	0.76	11	1	64.7	
CHN	186A	62.0	16	102.5	30.2	1.91	1.23	147	2	65.5	
CKN	053D	158.0	16	-163.0	-11.2	1.76	0.72	30	2	64.5	
CPV	301D	-31.0	16	-24.0	16.0	0.86	0.70	144	2	62.4	
DNK	089B	5.0	16	12.3	57.1	1.20	0.60	177	2	64.4	
EGY	026D	-7.0	16	29.7	26.8	2.33	1.72	136	2	63.3	
G	027D	-31.0	16	-3.5	53.8	1.84	0.72	142	1	65.2	
IND	040D	56.0	16	73.0	25.0	1.82	1.48	58	2	63.8	
IND	048D	68.0	16	86.2	25.0	1.56	0.90	120	2	65.5	
KRE	286B	110.0	16	127.0	39.1	1.30	1.10	31	2	64.0	
MAU	243D	29.0	16	56.8	-13.9	1.56	1.38	65	1	63.9	2
MLA	227A	86.0	16	102.1	4.1	1.62	0.82	135	1	63.2	
MLD	306B	44.0	16	73.1	6.0	0.96	0.60	90	1	63.7	
MLI	328D	-37.0	16	-7.6	13.2	1.74	1.24	171	1	63.9	
MLT	147D	-13.0	16	14.3	35.9	0.60	0.60	0	1	61.2	1/0.7
MOZ	307D	-1.0	16	34.0	-18.0	3.57	1.38	55	2	64.4	
OCE	101D	-160.0	16	-145.0	-16.3	4.34	3.54	4	2	63.7	1/1.3
PHL	285A	98.0	16	121.3	11.1	3.46	1.76	99	2	63.7	
RRW	310D	11.0	16	30.0	-2.1	0.66	0.60	42	2	65.0	
STP	241D	-13.0	16	7.0	0.8	0.60	0.60	0	2	61.6	
TON	215D	170.0	16	-174.7	-18.0	1.41	0.68	85	1	63.5	
URS	060D	23.0	16	41.5	57.4	3.08	1.56	153	1	66.9	
URS	069B	44.0	16	70.8	38.5	1.36	0.74	161	2	64.1	
ZAI	322D	-19.0	16	22.4	0.0	2.16	1.88	48	1	64.9	

12 034,36 MHz (17)

1		2	3	4		5		6	7	8	9
AUS	005E	98.0	17	133.5	-18.8	2.70	1.40	76	2	64.5	1/1.6 2 1/0.9 1/0.8 1/1.7
BRM	298A	74.0	17	97.1	19.1	3.58	1.48	104	2	63.9	
CAR	338E	122.0	17	149.5	8.0	5.36	0.77	178	1	62.7	
CHN	167A	92.0	17	124.3	43.7	1.98	0.72	156	2	64.7	
CHN	182A	80.0	17	108.7	35.1	1.42	0.88	109	1	64.2	
CME	300E	-13.0	17	12.7	6.2	2.54	1.68	87	1	63.6	
F	093E	-19.0	17	2.6	45.9	2.50	0.98	160	1	64.0	
GUI	192E	-37.0	17	-11.0	10.2	1.58	1.04	147	2	63.7	
IND	038A	56.0	17	75.9	33.4	1.52	1.08	33	1	64.3	
IND	046A	68.0	17	84.7	20.5	1.60	0.86	30	1	63.6	
INS	032A	80.0	17	112.3	-0.3	2.66	2.32	109	2	64.0	
LBV	280E	-25.0	17	21.4	26.0	2.50	1.04	119	2	63.7	
MDG	236E	29.0	17	46.6	-18.8	2.72	1.14	65	2	63.5	
NPL	122A	50.0	17	83.7	28.3	1.72	0.60	163	2	64.6	
NZL	287B	128.0	17	173.0	-41.0	3.30	1.28	48	1	64.8	
PLM	337E	170.0	17	-161.4	7.0	0.60	0.60	0	1	62.6	
POL	132E	-1.0	17	19.3	51.8	1.46	0.64	162	2	64.3	
QAT	247E	17.0	17	51.1	25.3	0.60	0.60	0	1	62.0	
SMA	335E	170.0	17	-170.1	-14.2	0.60	0.60	0	2	61.4	
SMR	311E	-37.0	17	12.6	43.7	0.60	0.60	0	1	62.7	
SWZ	313E	-1.0	17	31.5	-26.5	0.62	0.60	66	1	63.0	
TUR	145E	5.0	17	34.4	38.9	2.68	1.04	168	1	63.9	
URS	064E	23.0	17	45.6	40.8	2.16	0.60	163	2	64.1	
WAK	334E	140.0	17	166.5	19.2	0.60	0.60	0	1	63.8	
YMS	267E	11.0	17	48.8	15.2	1.76	1.54	176	2	63.0	

12 053.54 MHz (18)

ALG	251E	-25.0	18	4.2	33.2	2.45	1.25	172	1	63.6
ARS	275E	17.0	18	48.3	24.6	3.84	1.20	138	2	63.0
AUS	006E	98.0	18	135.4	-30.3	2.00	1.40	44	1	63.4
AUS	008E	128.0	18	145.9	-21.5	2.90	2.00	120	2	63.9
BGD	220B	74.0	18	90.3	23.6	1.46	0.84	135	1	63.7
BOT	297E	-1.0	18	23.3	-22.2	2.13	1.50	36	2	64.0
CBG	299A	68.0	18	105.0	12.7	1.01	0.90	110	1	64.3
CHN	159A	80.0	18	109.4	27.3	2.14	1.72	107	2	64.5
CHN	185A	62.0	18	95.7	35.4	2.10	1.14	156	1	63.4
D	087E	-19.0	18	9.6	49.9	1.62	0.72	147	2	65.7
GNP	304E	-31.0	18	-15.0	12.0	0.90	0.60	172	2	63.3
GUM	331E	122.0	18	144.5	13.1	0.60	0.60	0	2	63.5
IND	041A	56.0	18	78.4	16.0	2.08	1.38	35	2	63.8
IND	042A	68.0	18	79.3	27.7	2.14	1.16	147	2	63.8
INS	030A	80.0	18	112.3	-8.1	3.14	1.46	169	1	64.2
IRL	211E	-31.0	18	-8.2	53.2	0.84	0.60	162	1	64.5
KRE	286C	110.0	18	127.0	39.1	1.30	1.10	31	2	64.0
MAU	242E	29.0	18	59.8	-18.9	1.62	1.24	55	1	64.2
MLA	227B	86.0	18	102.1	4.1	1.62	0.82	135	1	63.3
MLI	327E	-37.0	18	-2.0	19.0	2.66	1.26	127	1	63.2
MRL	333E	146.0	18	166.7	7.9	1.50	1.50	177	1	63.5
NOR	120B	5.0	18	13.1	64.1	1.84	0.88	10	2	65.0
PAK	281A	38.0	18	65.2	27.9	1.52	1.42	28	1	63.0
PHL	285B	98.0	18	121.3	11.1	3.46	1.76	99	2	63.7
ROU	136E	-1.0	18	25.0	45.7	1.38	0.66	155	1	64.0
TCD	143E	-13.0	18	18.1	15.5	3.40	1.72	107	2	64.2
TGO	226E	-25.0	18	0.8	8.6	1.52	0.60	105	2	63.6
URS	070A	44.0	18	73.9	41.0	1.34	0.84	5	2	64.5
YEM	266E	11.0	18	44.3	15.1	1.14	0.70	109	1	62.8
ZAI	323E	-19.0	18	21.3	-6.8	2.80	1.52	149	1	64.9

12 072,72 MHz (19)

AP30-66

1		2	3	4		5		6	7	8	9
AUS	004E	98.0	19	121.8	-24.9	3.60	1.90	54	2	63.2	2 1/1.8 1/0.7 1/2.0
AUS	009E	128.0	19	147.2	-32.0	2.10	1.40	15	1	64.3	
AZR	134E	-31.0	19	-23.4	36.1	2.56	0.70	158	2	63.2	
BEN	233E	-19.0	19	2.2	9.5	1.44	0.68	97	2	63.5	
BRM	298B	74.0	19	97.1	19.1	3.58	1.48	104	2	63.9	
CHN	158B	80.0	19	111.8	38.0	2.60	1.74	124	1	64.9	
CHN	179A	92.0	19	112.2	21.9	1.84	1.22	37	2	63.8	
GAB	260E	-13.0	19	11.8	-0.6	1.43	1.12	64	1	63.6	
GMB	302E	-37.0	19	-15.1	13.4	0.79	0.60	4	2	63.5	
GRC	105E	5.0	19	24.7	38.2	1.78	0.98	156	1	63.5	
IND	038B	56.0	19	75.9	33.4	1.52	1.08	33	1	64.3	
IND	046B	68.0	19	84.7	20.5	1.60	0.86	30	1	63.6	
INS	032B	80.0	19	112.3	-0.3	2.66	2.32	109	2	64.1	
INS	036E	104.0	19	135.2	-3.8	2.46	2.00	147	1	64.0	
IRN	109E	34.0	19	54.2	32.4	3.82	1.82	149	2	63.0	
LBN	279E	11.0	19	35.8	33.9	0.60	0.60	0	2	61.8	
LBY	321E	-25.0	19	13.1	27.2	2.36	1.12	129	2	63.3	
LIE	253E	-37.0	19	9.5	47.1	0.60	0.60	0	1	62.6	
LUX	114E	-19.0	19	6.0	49.8	0.60	0.60	0	1	63.1	
MRA	332E	122.0	19	145.9	16.9	1.20	0.60	76	1	63.7	
NIU	054A	158.0	19	-169.8	-19.0	0.60	0.60	0	2	64.1	
NPL	122B	50.0	19	83.7	28.3	1.72	0.60	163	2	64.6	
POR	133E	-31.0	19	-8.0	39.6	0.92	0.60	112	2	63.6	
SOM	312E	23.0	19	45.0	6.4	3.26	1.54	71	1	62.6	
TCH	144E	-1.0	19	17.3	49.3	1.47	0.60	170	2	64.0	
UGA	051E	11.0	19	32.3	1.2	1.46	1.12	60	1	63.4	
URS	061E	23.0	19	24.7	56.6	0.88	0.64	12	2	65.2	
URS	077A	110.0	19	112.7	57.3	2.67	1.75	2	1	64.1	
ZMB	314E	-1.0	19	27.5	-13.1	2.38	1.48	39	1	63.9	

12 091,90 MHz (20)

ALG	252E	-25.0	20	1.6	25.5	3.64	2.16	152	1	63.0	1/0.5
AND	341E	-37.0	20	1.6	42.5	0.60	0.60	0	2	61.7	
ARS	003E	17.0	20	41.1	23.8	3.52	1.68	134	2	62.9	
AUS	007E	128.0	20	145.0	-38.1	1.83	1.39	134	2	63.5	
AUT	016E	-19.0	20	12.2	47.5	1.14	0.63	166	2	64.3	
BGD	220C	74.0	20	90.3	23.6	1.46	0.84	135	1	63.7	
BUL	020E	-1.0	20	25.0	43.0	1.04	0.60	165	1	63.9	
CBG	299B	68.0	20	105.0	12.7	1.01	0.90	110	1	64.3	
CHN	159B	80.0	20	109.4	27.3	2.14	1.72	107	2	64.6	
CHN	184A	62.0	20	101.0	37.9	2.78	0.82	144	1	63.7	
CPV	301E	-31.0	20	-24.0	16.0	0.86	0.70	144	2	62.4	
DNK	089C	5.0	20	12.3	57.1	1.20	0.60	177	2	64.4	
EGY	026E	-7.0	20	29.7	26.8	2.33	1.72	136	2	63.3	
G	027E	-31.0	20	-3.5	53.8	1.84	0.72	142	1	65.2	
IND	041B	56.0	20	78.4	16.0	2.08	1.38	35	2	63.8	
IND	042B	68.0	20	79.3	27.7	2.14	1.16	147	2	63.8	
INS	030B	80.0	20	112.3	-8.1	3.14	1.46	169	1	64.2	
KRE	286D	110.0	20	127.0	39.1	1.30	1.10	31	2	64.0	
MLA	227C	86.0	20	102.1	4.1	1.62	0.82	135	1	63.3	
MLI	328E	-37.0	20	-7.6	13.2	1.74	1.24	171	1	63.9	
MOZ	307E	-1.0	20	34.0	-18.0	3.57	1.38	55	2	64.4	
PAK	282A	38.0	20	68.5	25.8	1.32	0.62	133	1	63.3	1/1.3
PHL	285C	98.0	20	121.3	11.1	3.46	1.76	99	2	63.7	
RRW	310E	11.0	20	30.0	-2.1	0.66	0.60	42	2	65.0	
STP	241E	-13.0	20	7.0	0.8	0.60	0.60	0	2	61.7	
TKL	058A	158.0	20	-171.8	-8.9	0.70	0.60	35	1	63.8	
URS	065A	23.0	20	32.4	63.1	1.18	0.60	175	1	66.6	
URS	066A	44.0	20	64.3	44.6	4.56	2.48	169	2	65.4	
URS	079A	140.0	20	138.0	53.6	3.16	2.12	62	2	67.7	
ZAI	322E	-19.0	20	22.4	0.0	2.16	1.88	48	1	64.9	

12 111,08 MHz (21)

1		2	3	4		5		6	7	8	9
AFI	099A	23.0	21	42.5	11.6	0.60	0.60	0	1	62.5	4
AUS	005F	98.0	21	133.5	− 18.8	2.70	1.40	76	2	64.5	
BEL	018A	− 19.0	21	4.6	50.6	0.82	0.60	167	1	64.2	
BLR	062A	23.0	21	27.8	52.6	1.08	0.72	1	2	64.8	
BRM	298C	74.0	21	97.1	19.1	3.58	1.48	104	2	63.9	
CHN	175A	92.0	21	121.4	23.8	1.14	0.82	64	2	64.3	
CHN	176A	80.0	21	113.7	33.9	1.20	0.80	141	1	64.3	
CYP	086A	5.0	21	33.3	35.1	0.60	0.60	0	1	63.6	
DDR	216A	− 1.0	21	12.6	52.1	0.83	0.63	172	2	64.2	
HVO	107A	− 31.0	21	− 1.5	12.2	1.45	1.14	29	1	64.0	
IFB	021A	5.0	21	24.5	− 28.0	3.13	1.68	27	2	64.1	
IND	038C	56.0	21	75.9	33.4	1.52	1.08	33	1	64.4	
IND	046C	68.0	21	84.7	20.5	1.60	0.86	30	1	63.7	
INS	032C	80.0	21	112.3	− 0.3	2.66	2.32	109	2	64.1	
ISL	049A	− 31.0	21	− 19.0	64.9	1.00	0.60	177	2	65.8	
KEN	249A	11.0	21	37.9	1.1	2.29	1.56	94	1	63.7	
MCO	116A	− 37.0	21	7.4	43.7	0.60	0.60	0	1	62.4	
MRC	209A	− 25.0	21	− 9.0	29.2	2.72	1.47	43	2	63.3	
NPL	122C	50.0	21	83.7	28.3	1.72	0.60	163	2	64.6	
NZL	287C	128.0	21	173.0	− 41.0	3.30	1.28	48	1	64.9	2
SEN	222A	− 37.0	21	− 14.4	13.8	1.46	1.04	139	2	63.6	
UAE	274A	17.0	21	53.6	24.2	0.98	0.80	162	1	63.2	
YUG	148A	− 7.0	21	18.4	43.7	1.68	0.66	154	1	65.2	

12 130,26 MHz (22)

ALB	296A	-7.0	22	19.8	41.3	0.68	0.60	146	2	63.8	4
AUS	006F	98.0	22	135.4	-30.3	2.00	1.40	44	1	63.5	
AUS	008F	128.0	22	145.9	-21.5	2.90	2.00	120	2	64.0	
BDI	270A	11.0	22	29.9	-3.1	0.71	0.60	80	2	63.4	
BGD	220D	74.0	22	90.3	23.6	1.46	0.84	135	1	63.8	
CBG	299C	68.0	22	105.0	12.7	1.01	0.90	110	1	64.3	
CHN	159C	80.0	22	109.4	27.3	2.14	1.72	107	2	64.6	
CHN	168A	92.0	22	124.8	48.1	2.68	0.92	157	2	65.4	
CHN	183A	62.0	22	104.8	39.0	1.48	0.60	142	1	63.8	
COG	235A	-13.0	22	14.6	-0.7	2.02	1.18	59	2	63.8	
CTI	237A	-31.0	22	-5.6	7.5	1.60	1.22	108	2	63.7	
ETH	092A	23.0	22	39.7	9.1	3.50	2.40	124	2	63.4	
FNL	104A	5.0	22	17.0	61.5	2.00	1.00	10	2	67.7	
HNG	106A	-1.0	22	19.5	47.2	0.92	0.60	176	1	64.0	
IFB	135A	-1.0	22	29.6	-18.8	1.46	1.36	37	2	64.2	
IND	041C	56.0	22	78.4	16.0	2.08	1.38	35	2	63.8	
IND	042C	68.0	22	79.3	27.7	2.14	1.16	147	2	63.8	
INS	030C	80.0	22	112.3	-8.1	3.14	1.46	169	1	64.2	
KRE	286E	110.0	22	127.0	39.1	1.30	1.10	31	2	64.1	
KWT	113A	17.0	22	47.6	29.2	0.68	0.60	145	2	63.1	
MLA	227D	86.0	22	102.1	4.1	1.62	0.82	135	1	63.3	
MTN	223A	-37.0	22	-12.2	18.5	2.62	1.87	150	1	62.8	
NIG	119A	-19.0	22	7.8	9.4	2.16	2.02	45	1	63.9	
PAK	281B	38.0	22	65.2	27.9	1.52	1.42	28	1	63.1	
PHL	285D	98.0	22	121.3	11.1	3.46	1.76	99	2	63.7	
REU	097A	29.0	22	55.6	-19.2	1.56	0.78	96	1	63.9	
SDN	231A	-7.0	22	28.9	12.7	2.26	1.96	159	1	63.5	
SUI	140A	-19.0	22	8.2	46.6	0.98	0.70	171	2	64.1	
SYR	229A	11.0	22	38.3	34.9	1.04	0.90	7	1	63.2	
TUN	150A	-25.0	22	9.5	33.5	1.88	0.72	135	1	63.8	
URS	070B	44.0	22	73.9	41.0	1.34	0.84	5	2	64.6	
URS	081A	140.0	22	168.5	65.5	1.96	0.60	168	1	68.1	

12 149,44 MHz (23)

1	2	3	4		5		6	7	8	9
AGL 295A	-13.0	23	16.5	-12.0	3.09	2.26	84	1	64.1	1/1.5
ARS 340A	17.0	23	52.3	24.8	2.68	0.70	143	1	63.2	
AUS 004F	98.0	23	121.8	-24.9	3.60	1.90	54	2	63.3	
AUS 009F	128.0	23	147.2	-32.0	2.10	1.40	15	1	64.3	
BRM 298D	74.0	23	97.1	19.1	3.58	1.48	104	2	64.0	
CHN 158C	80.0	23	111.8	38.0	2.60	1.74	124	1	65.0	
CNR 130A	-31.0	23	-15.7	28.4	1.54	0.60	5	2	62.8	
CVA 085A	-37.0	23	10.8	41.5	2.00	0.60	138	1	63.6	
E 129A	-31.0	23	-3.1	39.9	2.10	1.14	154	2	63.9	
GHA 108A	-25.0	23	-1.2	7.9	1.48	1.06	102	1	63.6	
GNE 303A	-19.0	23	10.3	1.5	0.68	0.60	10	2	63.8	
HOL 213A	-19.0	23	5.4	52.0	0.76	0.60	171	1	64.4	
IND 038D	56.0	23	75.9	33.4	1.52	1.08	33	1	64.4	
IND 046D	68.0	23	84.7	20.5	1.60	0.86	30	1	63.7	
INS 032D	80.0	23	112.3	-0.3	2.66	2.32	109	2	64.1	3
ISL 050A	5.0	23	-19.5	61.0	2.20	0.80	4	1	66.3	
JOR 224A	11.0	23	35.8	31.4	0.84	0.78	114	2	63.1	
NIU 054B	158.0	23	-169.8	-19.0	0.60	0.60	0	2	64.1	
SDN 230A	-7.0	23	29.2	7.5	2.34	1.12	148	2	64.4	
SRL 259A	-31.0	23	-11.8	8.6	0.78	0.68	114	1	63.4	
TGK 225A	11.0	23	34.6	-6.2	2.41	1.72	129	1	63.7	
URS 061F	23.0	23	24.7	56.6	0.88	0.64	12	2	65.3	
URS 064F	23.0	23	45.6	40.8	2.16	0.60	163	1	64.2	
URS 077B	110.0	23	112.7	57.3	2.67	1.75	2	1	66.1	
YUG 149A	-7.0	23	18.4	43.7	1.68	0.66	154	1	65.2	

12 168,62 MHz (24)

AUS	007F	128.0	24	145.0	-38.1	1.83	1.39	134	2	63.6	2
BGD	220E	74.0	24	90.3	23.6	1.46	0.84	135	1	63.8	
CAF	258A	-13.0	24	21.0	6.3	2.25	1.68	31	2	64.3	
CBG	299D	68.0	24	105.0	12.7	1.01	0.90	110	1	64.3	
CHN	166A	92.0	24	121.1	41.7	1.52	0.78	154	2	64.5	
CHN	177A	80.0	24	111.8	30.8	1.42	0.82	160	2	64.7	
CHN	188A	62.0	24	101.5	25.1	1.86	1.08	132	2	65.0	
DNK	090A	5.0	24	17.0	61.5	2.00	1.00	10	2	67.5	
I	082A	-19.0	24	12.3	41.3	2.38	0.98	137	2	64.1	
IND	041D	56.0	24	78.4	16.0	2.08	1.38	35	2	63.9	
IND	042D	68.0	24	79.3	27.7	2.14	1.16	147	2	63.9	
INS	030D	80.0	24	112.3	-8.1	3.14	1.46	169	1	64.3	
IRQ	256A	11.0	24	43.6	32.8	1.88	0.96	143	1	63.3	
LSO	305A	5.0	24	27.8	-29.8	0.66	0.60	36	1	64.2	
MLA	227E	86.0	24	102.1	4.1	1.62	0.82	135	1	63.4	
MTN	288A	-37.0	24	-7.8	23.4	1.63	1.10	141	1	63.0	
MWI	308A	-1.0	24	34.1	-13.0	1.54	0.60	87	2	64.2	
MYT	098A	29.0	24	45.1	-12.8	0.60	0.60	0	1	63.4	
NGR	115A	-25.0	24	8.3	16.8	2.54	2.08	44	2	64.5	
OMA	123A	17.0	24	55.6	21.0	1.88	1.02	100	2	63.3	
PAK	282B	38.0	24	68.5	25.8	1.32	0.62	133	1	63.4	
PHL	285E	98.0	24	121.3	11.1	3.46	1.76	99	2	63.8	
SDN	232A	-7.0	24	30.4	19.0	2.44	1.52	176	1	63.3	
TKL	058B	158.0	24	-171.8	-8.9	0.70	0.60	35	1	63.9	
URS	066B	44.0	24	64.3	44.6	4.56	2.48	169	2	65.4	
URS	079B	140.0	24	138.0	53.6	3.16	2.12	62	2	67.8	

12 187,80 MHz (25)

1		2	3	4		5		6	7	8	9
AFI	099B	23.0	25	42.5	11.6	0.60	0.60	0	1	62.6	4 1/0.5
BEL	018B	-19.0	25	4.6	50.6	0.82	0.60	167	1	64.1	
BLR	062B	23.0	25	27.8	52.6	1.08	0.72	1	2	64.9	
CYP	086B	5.0	25	33.3	35.1	0.60	0.60	0	1	63.6	
DDR	216B	-1.0	25	12.6	52.1	0.83	0.63	172	2	64.3	
HVO	107B	-31.0	25	-1.5	12.2	1.45	1.14	29	1	64.0	
IFB	021B	5.0	25	24.5	-28.0	3.13	1.68	27	2	64.1	
ISL	049B	-31.0	25	-19.0	64.9	1.00	0.60	177	2	65.9	
ISR	110A	-13.0	25	34.9	31.4	0.94	0.60	117	2	63.8	
KEN	249B	11.0	25	37.9	1.1	2.29	1.56	94	1	63.8	
MCO	116B	-37.0	25	7.4	43.7	0.60	0.60	0	1	62.5	
MNG	248A	74.0	25	102.2	46.6	3.60	1.13	169	1	64.1	
MRC	209B	-25.0	25	-9.0	29.2	2.72	1.47	43	2	63.3	
NMB	025A	-19.0	25	17.5	-21.6	2.66	1.90	48	2	64.7	
SEN	222B	-37.0	25	-14.4	13.8	1.46	1.04	139	2	63.7	
UAE	274B	17.0	25	53.6	24.2	0.98	0.80	162	1	63.2	
URS	078A	110.0	25	108.2	53.4	2.16	0.78	10	1	65.0	
YUG	148B	-7.0	25	18.4	43.7	1.68	0.66	154	1	65.3	

12 206,98 MHz (26)

ALB	296B	-7.0	26	19.8	41.3	0.68	0.60	146	2	63.8	4
BDI	270B	11.0	26	29.9	-3.1	0.71	0.60	80	2	63.4	
COG	235B	-13.0	26	14.6	-0.7	2.02	1.18	59	2	63.8	
CTI	237B	-31.0	26	-5.6	7.5	1.60	1.22	108	2	63.7	
ETH	092B	23.0	26	39.7	9.1	3.50	2.40	124	2	63.5	
FNL	104B	5.0	26	17.0	61.5	2.00	1.00	10	2	67.5	
HNG	106B	-1.0	26	19.5	47.2	0.92	0.60	176	1	64.0	
IFB	135B	-1.0	26	29.6	-18.8	1.46	1.36	37	2	64.2	
KWT	113B	17.0	26	47.6	29.2	0.68	0.60	145	2	63.1	
MTN	223B	-37.0	26	-12.2	18.5	2.62	1.87	150	1	62.9	
NIG	119B	-19.0	26	7.8	9.4	2.16	2.02	45	1	63.9	
REU	097B	29.0	26	55.6	-19.2	1.56	0.78	96	1	64.0	
SDN	231B	-7.0	26	28.9	12.7	2.26	1.96	159	1	63.5	
SUI	140B	-19.0	26	8.2	46.6	0.98	0.70	171	2	64.1	
SYR	229B	11.0	26	38.3	34.9	1.04	0.90	7	1	63.3	
TUN	150B	-25.0	26	9.5	33.5	1.88	0.72	135	1	63.9	
URS	068A	44.0	26	59.0	38.8	2.24	1.00	164	2	64.0	
URS	074A	74.0	26	88.8	57.6	3.08	1.68	162	2	67.9	
URS	080A	140.0	26	155.3	55.4	2.90	2.36	35	1	67.9	

12 226,16 MHz (27)

1		2	3	4		5		6	7	8	9
AGL	295B	-13.0	27	18.5	-12.0	3.09	2.26	84	1	64.2	1/0.7 3
BHR	255A	17.0	27	50.5	28.1	0.60	0.60	0	1	60.8	
CNR	130B	-31.0	27	-15.7	28.4	1.54	0.60	5	2	62.8	
CVA	083A	-37.0	27	12.4	41.8	0.60	0.60	0	1	65.2	
DNK	091A	5.0	27	-19.5	61.0	2.20	0.80	4	1	66.2	
E	129B	-31.0	27	-3.1	39.9	2.10	1.14	154	2	64.0	
GHA	108B	-25.0	27	-1.2	7.9	1.48	1.06	102	1	63.7	
GNE	303B	-19.0	27	10.3	1.5	0.68	0.60	10	2	63.8	
HOL	213B	-19.0	27	5.4	52.0	0.76	0.60	171	1	64.5	
JOR	224B	11.0	27	35.8	31.4	0.84	0.78	114	2	63.1	
SDN	230B	-7.0	27	29.2	7.5	2.34	1.12	148	2	64.5	
SRL	259B	-31.0	27	-11.8	8.6	0.78	0.68	114	1	63.5	
TGK	225B	11.0	27	34.6	-6.2	2.41	1.72	129	1	63.8	
URS	059A	23.0	27	36.0	47.0	3.70	1.43	153	2	65.2	
URS	077C	110.0	27	112.7	57.3	2.67	1.75	2	1	67.2	
YUG	149B	-7.0	27	18.4	43.7	1.68	0.66	154	1	65.3	

12 245,34 MHz (28)

CAF	258B	-13.0	28	21.0	6.3	2.25	1.68	31	2	64.3	
I	082B	-19.0	28	12.3	41.3	2.38	0.98	137	2	64.2	
IRQ	256B	11.0	28	43.6	32.8	1.88	0.96	143	1	63.4	
LSO	305B	5.0	28	27.8	-29.8	0.66	0.60	36	1	64.2	
MTN	288B	-37.0	28	-7.8	23.4	1.63	1.10	141	1	63.0	
MWI	308B	-1.0	28	34.1	-13.0	1.54	0.60	87	2	64.3	
MYT	098B	29.0	28	45.1	-12.8	0.60	0.60	0	1	63.5	
NGR	115B	-25.0	28	8.3	16.8	2.54	2.08	44	2	64.5	
NOR	121A	5.0	28	17.0	61.5	2.00	1.00	10	2	66.8	
OMA	123B	17.0	28	55.6	21.0	1.88	1.02	100	2	63.3	
SDN	232B	-7.0	28	30.4	19.0	2.44	1.52	176	1	63.3	
URS	066C	44.0	28	64.3	44.6	4.56	2.48	169	2	65.5	
URS	076A	74.0	28	98.0	63.2	1.84	0.69	170	2	68.1	
URS	079C	140.0	28	138.0	53.6	3.16	2.12	62	2	67.8	

12 264,52 MHz (29)

1		2	3	4		5		6	7	8	9
AFI	099C	23.0	29	42.5	11.6	0.60	0.60	0	1	62.6	4 1/0.5
BEL	018C	-19.0	29	4.6	50.6	0.82	0.60	167	1	63.5	
CYP	086C	5.0	29	33.3	35.1	0.60	0.60	0	1	63.7	
DDR	216C	-1.0	29	12.6	52.1	0.83	0.63	172	2	64.3	
HVO	107C	-31.0	29	-1.5	12.2	1.45	1.14	29	1	64.1	
IFB	021C	5.0	29	24.5	-28.0	3.13	1.68	27	2	64.2	
ISL	049C	-31.0	29	-19.0	64.9	1.00	0.60	177	2	65.9	
ISR	110B	-13.0	29	34.9	31.4	0.94	0.60	117	2	63.9	
KEN	249C	11.0	29	37.9	1.1	2.29	1.56	94	1	63.8	
MCO	116C	-37.0	29	7.4	43.7	0.60	0.60	0	1	62.5	
MNG	248B	74.0	29	102.2	46.6	3.60	1.13	169	1	64.2	
MRC	209C	-25.0	29	-9.0	29.2	2.72	1.47	43	2	63.4	
NMB	025B	-19.0	29	17.5	-21.6	2.66	1.90	48	2	64.8	
SEN	222C	-37.0	29	-14.4	13.8	1.46	1.04	139	2	63.7	
UAE	274C	17.0	29	53.6	24.2	0.98	0.80	162	1	63.3	
UKR	063A	23.0	29	31.2	48.4	2.32	0.96	172	2	64.6	
YUG	148C	-7.0	29	18.4	43.7	1.68	0.66	154	1	65.3	

12 283,70 MHz (30)

ALB	296C	-7.0	30	19.8	41.3	0.68	0.60	146	2	63.9	4
BDI	270C	11.0	30	29.9	-3.1	0.71	0.60	80	2	63.5	
COG	235C	-13.0	30	14.6	-0.7	2.02	1.18	59	2	63.9	
CTI	237C	-31.0	30	-5.6	7.5	1.60	1.22	108	2	63.8	
ETH	092C	23.0	30	39.7	9.1	3.50	2.40	124	2	63.6	
HNG	106C	-1.0	30	19.5	47.2	0.92	0.60	176	1	64.1	
IFB	135C	-1.0	30	29.6	-18.8	1.46	1.36	37	2	64.3	
KWT	113C	17.0	30	47.6	29.2	0.68	0.60	145	2	63.2	
MTN	223C	-37.0	30	-12.2	18.5	2.62	1.87	150	1	62.9	
NIG	119C	-19.0	30	7.8	9.4	2.16	2.02	45	1	64.0	
REU	097C	29.0	30	55.6	-19.2	1.56	0.78	96	1	64.1	
S	139A	5.0	30	17.0	61.5	2.00	1.00	10	2	67.1	
SDN	231C	-7.0	30	28.9	12.7	2.26	1.96	159	1	63.6	
SUI	140C	-19.0	30	8.2	46.6	0.98	0.70	171	2	64.2	
SYR	229C	11.0	30	38.3	34.9	1.04	0.90	7	1	63.3	
TUN	150C	-25.0	30	9.5	33.5	1.88	0.72	135	1	63.9	
URS	068B	44.0	30	59.0	38.8	2.24	1.00	164	2	64.1	
URS	074B	74.0	30	88.8	57.6	3.08	1.68	162	2	68.0	
URS	080B	140.0	30	155.3	55.4	2.90	2.36	35	1	67.9	

12 302,88 MHz (31)

1		2	3	4		5		6	7	8	9
AGL	295C	- 13.0	31	16.5	- 12.0	3.09	2.26	84	1	64.2	1/0.7
BHR	255B	17.0	31	50.5	26.1	0.60	0.60	0	1	60.9	
CNR	130C	- 31.0	31	- 15.7	28.4	1.54	0.60	5	2	62.9	
CVA	083B	- 37.0	31	12.4	41.8	0.60	0.60	0	1	65.3	
E	129C	- 31.0	31	- 3.1	39.9	2.10	1.14	154	2	64.0	
GHA	108C	- 25.0	31	- 1.2	7.9	1.48	1.06	102	1	63.7	
GNE	303C	- 19.0	31	10.3	1.5	0.68	0.60	10	2	63.9	
HOL	213C	- 19.0	31	5.4	52.0	0.76	0.60	171	1	64.6	
ISL	050B	5.0	31	- 19.5	61.0	2.20	0.80	4	1	66.4	
JOR	224C	11.0	31	35.8	31.4	0.84	0.78	114	2	63.2	3
SDN	230C	- 7.0	31	29.2	7.5	2.34	1.12	148	2	64.5	
SRL	259C	- 31.0	31	- 11.8	8.6	0.78	0.68	114	1	63.6	
TGK	225C	11.0	31	34.6	- 6.2	2.41	1.72	129	1	63.8	
URS	059B	23.0	31	36.0	47.0	3.70	1.43	153	2	65.2	
URS	077D	110.0	31	112.7	57.3	2.67	1.75	2	1	67.2	
YUG	149C	- 7.0	31	18.4	43.7	1.68	0.66	154	1	65.4	

12 322,06 MHz (32)

CAF	258C	-13.0	32	21.0	6.3	2.25	1.68	31	2	64.4	
I	082C	-19.0	32	12.3	41.3	2.38	0.98	137	2	64.2	
IRQ	256C	11.0	32	43.6	32.8	1.88	0.96	143	1	63.4	
LSO	305C	5.0	32	27.8	-29.8	0.66	0.60	36	1	64.3	
MTN	288C	-37.0	32	-7.8	23.4	1.63	1.10	141	1	63.1	
MWI	308C	-1.0	32	34.1	-13.0	1.54	0.60	87	2	64.4	
MYT	098C	29.0	32	45.1	-12.8	0.60	0.60	0	1	63.5	
NGR	115C	-25.0	32	8.3	16.8	2.54	2.08	44	2	64.6	
NOR	121B	5.0	32	17.0	61.5	2.00	1.00	10	2	66.9	
OMA	123C	17.0	32	55.6	21.0	1.88	1.02	100	2	63.4	
SDN	232C	-7.0	32	30.4	19.0	2.44	1.52	176	1	63.4	
URS	066D	44.0	32	64.3	44.6	4.56	2.48	169	2	65.5	
URS	075A	74.0	32	94.0	51.7	1.52	0.60	172	2	65.1	
URS	079D	140.0	32	138.0	53.6	3.16	2.12	62	2	67.9	

12 341,24 MHz (33)

1		2	3	4		5		6	7	8	9
AFI	099D	23.0	33	42.5	11.6	0.60	0.60	0	1	62.7	4 1/0.5
BEL	018D	- 19.0	33	4.6	50.6	0.82	0.60	167	1	63.9	
CYP	086D	5.0	33	33.3	35.1	0.60	0.60	0	1	63.7	
DDR	216D	- 1.0	33	12.6	52.1	0.83	0.63	172	2	64.4	
HVO	107D	- 31.0	33	- 1.5	12.2	1.45	1.14	29	1	64.1	
IFB	021D	5.0	33	24.5	- 28.0	3.13	1.68	27	2	64.2	
ISL	049D	- 31.0	33	- 19.0	64.9	1.00	0.60	177	2	66.0	
ISR	110C	- 13.0	33	34.9	31.4	0.94	0.60	117	2	63.9	
KEN	249D	11.0	33	37.9	1.1	2.29	1.56	94	1	63.9	
MCO	116D	- 37.0	33	7.4	43.7	0.60	0.60	0	1	62.6	
MNG	248C	74.0	33	102.2	46.6	3.60	1.13	169	1	64.2	
MRC	209D	- 25.0	33	- 9.0	29.2	2.72	1.47	43	2	63.4	
NMB	025C	- 19.0	33	17.5	- 21.6	2.66	1.90	48	2	64.8	
SEN	222D	- 37.0	33	- 14.4	13.8	1.46	1.04	139	2	63.8	
UAE	274D	17.0	33	53.6	24.2	0.98	0.80	162	1	63.3	
UKR	063B	23.0	33	31.2	48.4	2.32	0.96	172	2	64.7	
YUG	148D	- 7.0	33	18.4	43.7	1.68	0.66	154	1	65.4	

12 360,42 MHz (34)

ALB	296D	-7.0	34	19.8	41.3	0.68	0.60	146	2	63.9	4
BDI	270D	11.0	34	29.9	-3.1	0.71	0.60	80	2	63.5	
COG	235D	-13.0	34	14.6	-0.7	2.02	1.18	59	2	63.9	
CTI	237D	-31.0	34	-5.6	7.5	1.60	1.22	108	2	63.9	
ETH	092D	23.0	34	39.7	9.1	3.50	2.40	124	2	63.6	
HNG	106D	-1.0	34	19.5	47.2	0.92	0.60	176	1	64.1	
IFB	135D	-1.0	34	29.6	-18.8	1.46	1.36	37	2	64.3	
KWT	113D	17.0	34	47.6	29.2	0.68	0.60	145	2	63.2	
MTN	223D	-37.0	34	-12.2	18.5	2.62	1.87	150	1	63.0	
NIG	119D	-19.0	34	7.8	9.4	2.16	2.02	45	1	64.1	
REU	097D	29.0	34	55.6	-19.2	1.56	0.78	96	1	64.1	
S	138C	5.0	34	16.2	61.0	1.04	0.98	14	2	67.4	
SDN	231D	-7.0	34	28.9	12.7	2.26	1.96	159	1	63.6	
SUI	140D	-19.0	34	8.2	46.6	0.98	0.70	171	2	64.3	
SYR	229D	11.0	34	38.3	34.9	1.04	0.90	7	1	63.4	
TUN	150D	-25.0	34	9.5	33.5	1.88	0.72	135	1	64.0	
URS	071A	44.0	34	63.1	42.0	2.64	0.84	170	2	64.4	
URS	074C	74.0	34	88.8	57.6	3.08	1.68	162	2	68.0	
URS	080C	140.0	34	155.3	55.4	2.90	2.36	35	1	68.0	

12 379,60 MHz (35)

1		2	3	4		5		6	7	8	9
AGL	295D	-13.0	35	16.5	-12.0	3.09	2.26	84	1	64.3	1/0.7 3
BHR	255C	17.0	35	50.5	26.1	0.60	0.60	0	1	61.0	
CNR	130D	-31.0	35	-15.7	28.4	1.54	0.60	5	2	63.0	
CVA	083C	-37.0	35	12.4	41.8	0.60	0.60	0	1	65.3	
DNK	091B	5.0	35	-19.5	61.0	2.20	0.80	4	1	66.3	
E	129D	-31.0	35	-3.1	39.9	2.10	1.14	154	2	64.1	
GHA	108D	-25.0	35	-1.2	7.9	1.48	1.06	102	1	63.8	
GNE	303D	-19.0	35	10.3	1.5	0.68	0.60	10	2	63.9	
HOL	213D	-19.0	35	5.4	52.0	0.76	0.60	171	1	64.6	
JOR	224D	11.0	35	35.8	31.4	0.84	0.78	114	2	63.2	
SDN	230D	-7.0	35	29.2	7.5	2.34	1.12	148	2	64.6	
SRL	259D	-31.0	35	-11.8	8.6	0.78	0.68	114	1	63.6	
TGK	225D	11.0	35	34.6	-6.2	2.41	1.72	129	1	63.9	
URS	059C	23.0	35	36.0	47.0	3.70	1.43	153	2	65.3	
URS	077E	110.0	35	112.7	57.3	2.67	1.75	2	1	67.3	
YUG	149D	-7.0	35	18.4	43.7	1.68	0.66	154	1	65.4	

12 398,78 MHz (36)

CAF	258D	- 13.0	36	21.0	6.3	2.25	1.68	31	2	64.4
DNK	090B	5.0	36	17.0	61.5	2.00	1.00	10	2	68.2
I	082D	- 19.0	36	12.3	41.3	2.38	0.98	137	2	64.3
IRQ	256D	11.0	36	43.6	32.8	1.88	0.96	143	1	63.5
LSO	305D	5.0	36	27.8	- 29.8	0.66	0.60	36	1	64.3
MTN	288D	- 37.0	36	- 7.8	23.4	1.63	1.10	141	1	63.1
MWI	308D	- 1.0	36	34.1	- 13.0	1.54	0.60	87	2	64.4
MYT	098D	29.0	36	45.1	- 12.8	0.60	0.60	0	1	63.6
NGR	115D	- 25.0	36	8.3	16.8	2.54	2.08	44	2	64.7
OMA	123D	17.0	36	55.6	21.0	1.88	1.02	100	2	63.4
SDN	232D	- 7.0	36	30.4	19.0	2.44	1.52	176	1	63.4
URS	066E	44.0	36	64.3	44.6	4.56	2.48	169	2	65.6
URS	079E	140.0	36	138.0	53.6	3.16	2.12	62	2	68.0

12 417,96 MHz (37)

1		2	3	4		5		6	7	8	9
AFI	099E	23.0	37	42.5	11.6	0.60	0.60	0	1	62.7	4 1/0.5
BEL	018E	-19.0	37	4.6	50.6	0.82	0.60	167	1	64.4	
CYP	086E	5.0	37	33.3	35.1	0.60	0.60	0	1	63.8	
DDR	216E	-1.0	37	12.6	52.1	0.83	0.63	172	2	64.4	
HVO	107E	-31.0	37	-1.5	12.2	1.45	1.14	29	1	64.2	
IFB	021E	5.0	37	24.5	-28.0	3.13	1.68	27	2	64.3	
ISL	049E	-31.0	37	-19.0	64.9	1.00	0.60	177	2	66.0	
ISR	110D	-13.0	37	34.9	31.4	0.94	0.60	117	2	64.0	
KEN	249E	11.0	37	37.9	1.1	2.29	1.56	94	1	63.9	
MCO	116E	-37.0	37	7.4	43.7	0.60	0.60	0	1	62.6	
MNG	248D	74.0	37	102.2	46.6	3.60	1.13	169	1	64.3	
MRC	209E	-25.0	37	-9.0	29.2	2.72	1.47	43	2	63.5	
NMB	025D	-19.0	37	17.5	-21.6	2.66	1.90	48	2	64.9	
SEN	222E	-37.0	37	-14.4	13.8	1.46	1.04	139	2	63.9	
UAE	274E	17.0	37	53.6	24.2	0.98	0.80	162	1	63.4	
UKR	063C	23.0	37	31.2	48.4	2.32	0.96	172	2	64.7	
YUG	148E	-7.0	37	18.4	43.7	1.68	0.66	154	1	65.4	

12 437,14 MHz (38)

ALB	296E	-7.0	38	19.8	41.3	0.68	0.60	146	2	64.0	4
BDI	270E	11.0	38	29.9	-3.1	0.71	0.60	80	2	63.6	
COG	235E	-13.0	38	14.6	-0.7	2.02	1.18	59	2	64.0	
CTI	237E	-31.0	38	-5.6	7.5	1.60	1.22	108	2	63.9	
ETH	092E	23.0	38	39.7	9.1	3.50	2.40	124	2	63.7	
HNG	106E	-1.0	38	19.5	47.2	0.92	0.60	176	1	64.2	
IFB	135E	-1.0	38	29.6	-18.8	1.46	1.36	37	2	64.4	
KWT	113E	17.0	38	47.6	29.2	0.68	0.60	145	2	63.3	
MTN	223E	-37.0	38	-12.2	18.5	2.62	1.87	150	1	63.0	
NIG	119E	-19.0	38	7.8	9.4	2.16	2.02	45	1	64.1	
NOR	120C	5.0	38	13.1	64.1	1.84	0.88	10	2	67.0	
REU	097E	29.0	38	55.6	-19.2	1.56	0.78	96	1	64.2	
SDN	231E	-7.0	38	28.9	12.7	2.26	1.96	159	1	63.7	
SUI	140E	-19.0	38	8.2	46.6	0.98	0.70	171	2	64.3	
SYR	339A	11.0	38	37.6	34.2	1.32	0.88	74	1	63.4	
TUN	272A	-25.0	38	2.5	32.0	3.59	1.75	175	1	61.9	2 5
URS	071B	44.0	38	63.1	42.0	2.64	0.84	170	2	64.5	
URS	074D	74.0	38	88.8	57.6	3.08	1.68	162	2	68.1	
URS	080D	140.0	38	155.3	55.4	2.90	2.36	35	1	68.1	

12 456,32 MHz (39)

1		2	3	4		5		6	7	8	9
AGL	295E	-13.0	39	16.5	-12.0	3.09	2.26	84	1	64.4	1/0.7
BHR	255D	17.0	39	50.5	26.1	0.60	0.60	0	1	61.0	
CNR	130E	-31.0	39	-15.7	28.4	1.54	0.60	5	2	63.0	
CVA	083D	-37.0	39	12.4	41.8	0.60	0.60	0	1	65.4	
E	129E	-31.0	39	-3.1	39.9	2.10	1.14	154	2	64.2	
GHA	108E	-25.0	39	-1.2	7.9	1.48	1.06	102	1	63.8	
GNE	303E	-19.0	39	10.3	1.5	0.68	0.60	10	2	64.0	
HOL	213E	-19.0	39	5.4	52.0	0.76	0.60	171	1	64.7	
ISL	050C	5.0	39	-19.5	61.0	2.20	0.80	4	1	66.5	
JOR	224E	11.0	39	35.8	31.4	0.84	0.78	114	2	63.3	
MNG	248E	74.0	39	102.2	46.6	3.60	1.13	169	1	64.3	3
SDN	230E	-7.0	39	29.2	7.5	2.34	1.12	148	2	64.6	
SRL	259E	-31.0	39	-11.8	8.6	0.78	0.68	114	1	63.7	
TGK	225E	11.0	39	34.6	-6.2	2.41	1.72	129	1	63.9	
URS	059D	23.0	39	36.0	47.0	3.70	1.43	153	2	65.3	
URS	077F	110.0	39	112.7	57.3	2.67	1.75	2	1	67.4	
YUG	149E	-7.0	39	18.4	43.7	1.68	0.66	154	1	65.5	

12 475,50 MHz (40)

CAF	258E	-13.0	40	21.0	6.3	2.25	1.68	31	2	64.5
I	082E	-19.0	40	12.3	41.3	2.38	0.98	137	2	64.3
IRQ	256E	11.0	40	43.6	32.8	1.88	0.96	143	1	63.5
LSO	305E	5.0	40	27.8	-29.8	0.66	0.60	36	1	64.4
MTN	288E	-37.0	40	-7.8	23.4	1.63	1.10	141	1	63.2
MWI	308E	-1.0	40	34.1	-13.0	1.54	0.60	87	2	64.5
MYT	098E	29.0	40	45.1	-12.8	0.60	0.60	0	1	63.6
NGR	115E	-25.0	40	8.3	16.8	2.54	2.08	44	2	64.7
OMA	123E	17.0	40	55.6	21.0	1.88	1.02	100	2	63.5
S	139B	5.0	40	17.0	61.5	2.00	1.00	10	2	68.2
SDN	232E	-7.0	40	30.4	19.0	2.44	1.52	176	1	63.5
URS	066F	44.0	40	64.3	44.6	4.56	2.48	169	2	65.6
URS	079F	140.0	40	138.0	53.6	3.16	2.12	62	2	68.0

ARTICLE 12

Provisions Governing the Broadcasting-Satellite Service in Region 2 Pending the Establishment of a Detailed Plan

12.1 In accordance with the principles set forth in Annex 6, the following interim provisions shall apply pending the establishment of a detailed plan for the broadcasting-satellite service for Region 2 in the frequency band 11.7 - 12.2 GHz under the terms of paragraphs 12.9 to 12.12 below.

12.2 Space stations in the broadcasting-satellite service shall be located in the following portions of the orbit:

- 75° W to 100° W longitude (however, for service to Canada, the USA and Mexico, the relevant portion shall be only between 75° W and 95° W longitude);
- 140° W to 170° W longitude.

12.2.1 Space stations in the broadcasting-satellite service may also be located in the remaining portions of the orbit, in which case they shall be operated in accordance with the provisions of Nos. 420 to 423 of the Radio Regulations. As an exception, it is accepted that, for Greenland, a position in the geostationary-satellite orbit between 55° W and 60° W may be used for the broadcasting-satellite service as a primary service. The administrations concerned should make every effort to allow for the sharing of this portion of the orbital arc by a broadcasting satellite for Greenland and space stations in the fixed-satellite service of other administrations in Region 2.

12.3 Space stations in the fixed-satellite service shall be located in portions of the orbit other than those referred to in paragraph 12.2 above. Such space stations may also be located in the portions of the orbit referred to in paragraph 12.2 above; they shall then be operated in accordance with the provisions of Nos. 420 to 423 of the Radio Regulations.

12.3.1 Space stations in the broadcasting-satellite service located in the portions of the orbit referred to in paragraph 12.2 and space stations in the fixed-satellite service located in the remaining portions of the orbit shall be operated in such a way that no unacceptable interference is caused by stations of one service to stations of other services. The level of unacceptable interference shall be determined by agreement between the administrations concerned, taking the latest CCIR Recommendations and Annexes 8 and 9 of this Appendix as a guide. Notwithstanding the above, broadcasting-satellite space stations may be located up to the edge of the portion of the orbit referred to in paragraph 12.2, provided that such stations are operated in accordance with the relevant technical characteristics for Region 2 outlined in Annex 8.

12.4 Prior to the regional administrative radio conference, referred to in paragraph 12.9 below, systems in the broadcasting-satellite service shall be regarded as experimental and shall be operated in accordance with the sharing criteria and technical characteristics contained in Annexes 8 and 9.

12.5 Administrations may implement systems which utilize values for the technical characteristics different from the values in Annex 8 of this Appendix provided that such action does not result in interference to operational or planned systems of other administrations in excess of that determined in accordance with Annex 9.

12.6 Systems in the fixed-satellite service shall be introduced in accordance with the relevant provisions of the Radio Regulations, particularly with those of Articles 11 and 13 and, where appropriate, with the provisions of Article 7 of this Appendix.

12.7 Space systems in the frequency band 11.7 - 12.2 GHz shall use, to the maximum extent technically and economically practicable, available techniques in order to make the most efficient use of the geostationary orbit and the frequency spectrum. Examples of such techniques are described in Annex 7.

12.8 The provisions of Resolution 33 shall continue to apply to the broadcasting-satellite service in the frequency band 11.7 - 12.2 GHz in Region 2 until such time as a detailed plan may be adopted for the broadcasting-satellite service.

12.9 A regional administrative radio conference is to be held not later than 1982 for the purpose of carrying out detailed planning for the broadcasting-satellite and fixed-satellite services, in accordance with the following terms.

12.9.1 The said regional administrative radio conference shall draw up a detailed plan for the orbit/spectrum resource available for the broadcasting-satellite service in the 11.7 - 12.2 GHz band. The plan shall provide for the detailed assignment of the orbital positions and frequency channels available, ensuring that the broadcasting-satellite service requirements submitted by the various administrations are met in an equitable manner satisfactory to all the countries concerned. It should be laid down as a matter of principle that each administration in the Region should be guaranteed a minimum number of channels (4) for the operation of the broadcasting-satellite service. Above this minimum, the special characteristics of the countries (size, time zones, language differences, etc.) shall be taken into account.

12.9.2 Planning shall be based on individual reception, but each administration may use the reception system which best meets its requirements, namely, individual or community reception, or both. Account shall also be taken of the decisions of the 1977 and 1979 World Administrative Radio Conferences and of the latest CCIR Recommendations in the case of parameters covered by its studies and research.

12.9.3 When planning the broadcasting-satellite service, it shall be borne in mind that systems should be designed with a view to reducing to a minimum technical differences and incompatibilities with the systems of other Regions.

12.9.4 The conference shall also take into account the need to make equitable provision for the requirements of the fixed-satellite service to which this frequency band is also allocated in Region 2.

12.10 All administrations in Region 2 shall submit their broadcasting-satellite service requirements to the IFRB not later than one year before the start of the regional administrative radio conference responsible for planning this service in Region 2. Each administration may update these requirements as it considers necessary. "Requirements" are understood to include the number and boundaries of service areas and the number of

channels requested for each of them. Six months before the deadline for submitting requirements, the IFRB shall remind administrations of the need to submit them by means of a circular letter and/or telegram.

12.11 No systems existing or planned prior to the implementation of any detailed plan such as that referred to above shall cause interference to any systems operating in accordance with such a plan.

12.12 Existing or previously planned broadcasting-satellite systems will not necessarily be taken into account in the establishment of the detailed plan for the broadcasting-satellite service in the 11.7 - 12.2 GHz band in Region 2. Consequently, the installation or planning of such systems by an administration prior to the establishment of the said plan shall not confer upon that system any rights or recognition.

ARTICLE 13

Relationship to Resolution 507

13.1 The provisions and associated Plan of this Appendix shall be regarded as including a world agreement and associated Plan for Regions 1 and 3 in accordance with *resolves* 1 of Resolution 507, which requires the stations in the broadcasting-satellite service to be established and operated in accordance with such agreements and associated plans.

ARTICLE 14

Interference

14.1 The Members of the Union shall endeavour to agree on the action required to reduce harmful interference which might be caused by the application of these provisions and the associated Plan.

ARTICLE 15¹

Entry into Force of the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977

ARTICLE 16

Period of Validity of the Provisions and Associated Plan

16.1 The provisions and associated Plan have been prepared in order to meet the requirements of the broadcasting-satellite service in the bands concerned for a period of at least fifteen years from 1 January 1979.

16.2 In any event, the provisions and associated Plan shall remain in force until their revision by a competent administrative radio conference convened in accordance with the relevant provisions of the Convention in force.

¹ This Article is not reproduced in this Appendix; see the footnote to the title of this Appendix.

ANNEX 1

**Limits for Determining Whether a Service
of an Administration is Considered to Be Affected
by a Proposed Modification to the Plan
(Article 4, paragraph 4.3.1) ¹**

1. *Limits on the change in the wanted-to-interfering signal ratio with respect to frequency assignments in accordance with the Plan*

With respect to paragraph 4.3.1.1, an administration shall be considered as being affected if the effect of the proposed modification to the Plan would result in the wanted-to-interfering signal ratio at any point within the service area associated with any of its frequency assignments in the Plan falling below either 30 dB or the value resulting from the frequency assignments in the Plan at the date of entry into force of the Final Acts ², whichever is the lower.

Note: In performing the calculation, the effect at the receiver input of all the co-channel and adjacent-channel signals is expressed in terms of one equivalent co-channel interfering signal. This value is usually expressed in decibels.

2. *Limits on the change in the power flux-density to protect the broadcasting-satellite service in the band 11.7 - 12.2 GHz in Region 2*

With respect to paragraph 4.3.1.2, an administration in Region 2 shall be considered as being affected if the proposed modification to the

¹ The limits specified in this Annex relate to the power flux-densities which would be obtained assuming free-space propagation conditions.

² Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, which entered into force on 1 January 1979.

Plan would result in exceeding the following power flux-densities at any point in the service area affected:

- 147 dB(W/m ² /27 MHz)	$0^\circ \leq \theta < 0.48^\circ$
- 139 + 25 log θ dB(W/m ² /27 MHz)	$0.48^\circ \leq \theta < 27.25^\circ$
- 103 dB(W/m ² /27 MHz)	$\theta \geq 27.25^\circ$

where θ is the difference in degrees between the longitudes of the broadcasting-satellite space station in Region 1 or 3 and the broadcasting-satellite space station affected in Region 2.

3. *Limits on the change in the power flux-density to protect the terrestrial services of other administrations*

With respect to paragraph 4.3.1.3, an administration in Region 1 or 3 shall be considered as being affected if the consequence of the proposed modification to the Plan is to increase the power flux-density arriving on any part of the territory of that administration by more than 0.25 dB over that resulting from the frequency assignments in the Plan at the time of entry into force of the Final Acts ¹.

The same administration shall be considered as not being affected if the value of the power flux-density anywhere in its territory does not exceed the limits expressed in Annex 5.

An administration in Region 2 shall be considered as being affected if the proposed modification to the Plan would result in exceeding a power flux-density, for any angle of arrival, at any point on its territories, of

¹ Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, which entered into force on 1 January 1979.

– 125 dB(W/m²/4 kHz) when the broadcasting-satellite station uses circular polarization and – 128 dB(W/m²/4 kHz) when the broadcasting-satellite station uses linear polarization.

4. *Limits on the change in the power flux-density to protect the fixed-satellite service in the band 11.7 - 12.2 GHz in Region 2*

With respect to paragraph 4.3.1.4, an administration in Region 2 shall be considered as being affected if the proposed modification to the Plan would result in an increase in the power flux-density on its territory of 0.25 dB or more above that resulting from the frequency assignments in the Plan at the time of entry into force of the Final Acts ¹.

However, where an assignment in the Plan or its subsequent modification gives a power flux-density of less than – 138 dB(W/m²/27 MHz) anywhere in the territory of an administration of Region 2, that administration shall be considered as not affected.

ANNEX 2

Basic Characteristics to Be Furnished in Notices Relating to Space Stations in the Broadcasting-Satellite Service

1. Country and IFRB number.
2. Nominal orbital position (in degrees from the Greenwich meridian).
3. Assigned frequency or channel number.

¹ Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, which entered into force on 1 January 1979.

4. Date of bringing into use.
5. Identity of the space station.
6. Service area (if necessary, the service area may be defined by a number of "test points").
7. Geographical coordinates of the intersection of the antenna beam axis with the Earth.
8. Rain-climatic zone.
9. Class of station.
10. Class of emission and necessary bandwidth.
11. Power supplied to the antenna (dBW).
12. Antenna characteristics:
 - gain of the antenna referred to an isotropic radiator;
 - shape of the beam (elliptical or circular);
 - major axis (degrees) at -3 dB points;
 - minor axis (degrees) at -3 dB points;
 - orientation of the ellipse;
 - ΔG (difference between the maximum gain and the gain in the direction of the point in the service area at which the power flux-density is at a minimum);
 - pointing accuracy;
 - type of polarization;
 - sense of polarization;
 - radiation pattern and cross-polar characteristics.
13. Station keeping accuracy.
14. Modulation characteristics:
 - type of modulation;
 - pre-emphasis characteristics;
 - TV system;
 - sound broadcasting characteristics;
 - frequency deviation;
 - composition of the baseband;
 - type of multiplexing of the video and sound signals;
 - energy dispersal characteristics.

15. Minimum angle of elevation in the service area.
16. Type of reception (individual or community).
17. Hours of operation (UTC).
18. Coordination.
19. Agreements.
20. Other information.
21. Operating administration or company.

ANNEX 3

**Method for Determining the Limiting Interfering Power
Flux-Density at the Edge of a Broadcasting-Satellite Service
Area in the Bands 11.7 - 12.2 GHz (in Regions 2 and 3)
and 11.7 - 12.5 GHz (in Region 1) and for Predicting
the Power Flux-Density Produced There
by a Terrestrial Station**

1. *General*

1.1 This Annex describes a method of assessing the interference potential from terrestrial transmitters to broadcasting-satellite receivers in the band 11.7 - 12.2 GHz (11.7 - 12.5 GHz in Region 1).

1.2 The method is in two parts:

- a) the calculation of the maximum permissible interfering power flux-density at the edge of the broadcasting-satellite service area concerned;
- b) the calculation of the likely power flux-density produced at any point on the edge of the service area by the terrestrial transmitter of another administration.

1.3 The interference potential of the terrestrial transmitters must be considered case by case; the power flux-density produced by each terrestrial transmitter is compared to the limiting power flux-density at any point on the edge of the service area of a broadcasting-satellite station of another administration. If, for a given transmitter, the value of the power flux-density produced is lower than the value of the limiting power flux-density at any point on the edge of the service area, the interference caused to the broadcasting-satellite service by this transmitter is considered to be lower than the permissible value and no coordination is required between administrations before the terrestrial service is brought into use. Where this is not the case, coordination and further, more precise calculations derived from a mutually agreed basis are necessary.

1.4 It is emphasized that, should the calculation described in this Annex indicate that the maximum permissible power flux-density is exceeded, it does not necessarily preclude the introduction of the terrestrial service since the calculations are necessarily based on worst-case assumptions for:

- a) the nature of the terrain of the interference path;
- b) the off-beam discrimination of the broadcasting-satellite receiving installations;
- c) the necessary protection ratios for the broadcasting-satellite service;
- d) the type of reception in the broadcasting-satellite service, i.e., assuming individual reception, this being more critical than community reception for the angles of elevation concerned;
- e) the value of power flux-density to be protected in the broadcasting-satellite service;
- f) the propagation conditions between the terrestrial station and the broadcasting-satellite service area.

2. *Limit of power flux-density*

2.1 *General*

The limiting power flux-density not to be exceeded at the edge of the service area in order to protect the broadcasting-satellite service of an administration is given by the formula:

$$F = F_o - R + D + P \quad (1)$$

where:

- F = the maximum permissible interfering power flux-density (dB(W/m²)) in the broadcasting-satellite necessary band-width;
- F_o = the wanted power flux-density (dB(W/m²)) at the edge of the service area;
- R = the protection ratio (dB) between the wanted and interfering signals;
- D = angular discrimination (dB) provided by the radiation pattern of the satellite broadcasting receiver antenna;
- P = polarization discrimination (dB) between the wanted and interfering signals.

2.2 *Wanted power flux-density (F_o)*

The value of F_o is equal to:

- a) -103 dB(W/m²) for service areas in Regions 1 and 3;
- b) -105 dB(W/m²) for service areas in Region 2.

2.3 *Protection ratio (R)*

2.3.1 The single entry protection ratio against all types of terrestrial transmissions, with the exception of amplitude-modulation multichannel television systems, is 35 dB for carrier frequency differences between the

wanted and interfering signals of up to ± 10 MHz, decreasing linearly from 35 dB to 0 dB for carrier frequency differences between 10 MHz and 35 MHz, and is 0 dB for frequency differences in excess of 35 MHz (see Fig. 1).

2.3.2 The carrier frequency difference should be determined by reference to the frequency assignments in the broadcasting-satellite Plan or, in the case of assignments not contained within a plan, by reference to the description of the characteristics of the proposed or operational system. For amplitude-modulation multichannel television systems which produce peaks of high power flux-density spread over a wide range of their necessary bandwidth, the protection ratio R is 35 dB and is independent of the carrier frequency difference.

2.3.3 A signal from a terrestrial station should be considered only if its necessary bandwidth overlaps the necessary bandwidth of the broadcasting-satellite assignment.

2.4 *Angular discrimination (D)*

2.4.1 *Broadcasting-satellite service areas in Regions 1 and 3*

Where the angle of elevation φ selected for the proposed or operational broadcasting-satellite system for the broadcasting-satellite service area concerned is equal to or greater than 19° , the value of D to be assumed in expression (1) is 33 dB. When φ is less than 19° , D should be derived from the expression (2.a) below.

Note: If more than one value of φ is specified for a particular service area, the appropriate value of φ should be used for each section of the edge of the service area under consideration.

$$\begin{array}{ll}
 D = 0 & \text{for } 0^\circ \leq \varphi \leq 0.5^\circ \\
 D = 3 \varphi^2 & \text{for } 0.5^\circ < \varphi \leq 1.41^\circ \\
 D = 3 + 20 \log_{10} \varphi & \text{for } 1.41^\circ < \varphi \leq 2.52^\circ \\
 D = 1 + 25 \log_{10} \varphi & \text{for } 2.52^\circ < \varphi \leq 19^\circ
 \end{array} \tag{2.a}$$

Note: For the graphical determination of D see Fig. 2.

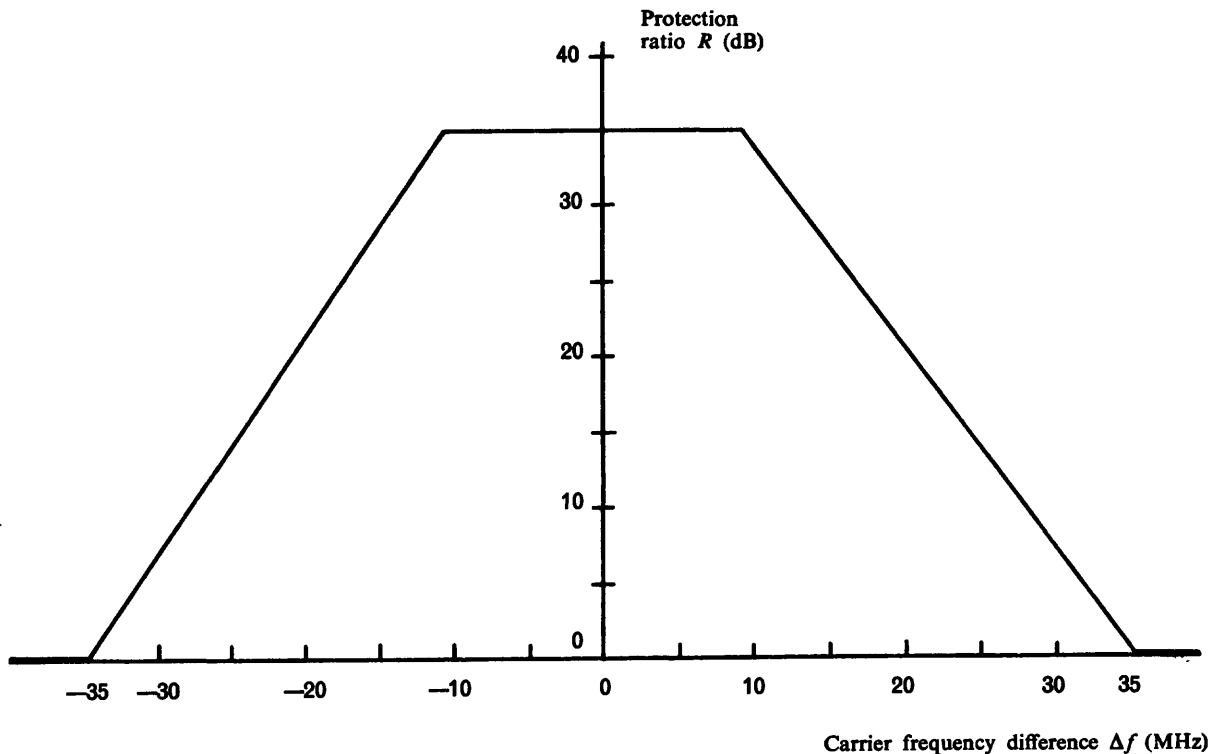


FIGURE 1

Protection ratio R (dB) for a broadcasting-satellite signal against a single entry of interference from a terrestrial service (except for AM multichannel TV systems)

2.4.2 *Broadcasting-satellite service areas in Region 2*

Where the angle of elevation φ selected for the proposed or operational broadcasting-satellite system for the broadcasting-satellite service area concerned is equal to or greater than 27° , the value of D to be assumed in expression (1) is 38 dB. When φ is less than 27° , D should be derived from the expression (2.b) below.

Note: If more than one value of φ is specified for a particular service area, the appropriate value of φ should be used for each section of the edge of the service area under consideration.

$$\begin{aligned}
 D &= 0 && \text{for } 0^\circ \leq \varphi \leq 0.45^\circ \\
 D &= 3.7 \varphi^2 && \text{for } 0.45^\circ < \varphi \leq 1.27^\circ \\
 D &= 3.9 + 20 \log_{10} \varphi && \text{for } 1.27^\circ < \varphi \leq 2.27^\circ \\
 D &= 2.1 + 25 \log_{10} \varphi && \text{for } 2.27^\circ < \varphi \leq 27^\circ
 \end{aligned} \tag{2.b}$$

Note: For the graphical determination of D see Fig. 2.

2.5 *Polarization discrimination (P)*

The value of P is equal to:

- a) 3 dB when the interfering terrestrial service uses linear polarization and the broadcasting-satellite service uses circular polarization or vice versa;
- b) 0 dB when the interfering terrestrial service and the broadcasting-satellite service both use circular or both use linear polarization.

3. *Power flux-density produced by a terrestrial station (F_p)*

The power flux-density F_p (in $\text{dB(W/m}^2\text{)})$ produced at any point on the edge of the service area by the terrestrial station is determined from the following formula:

$$F_p = E - A + 43 \tag{3}$$

where:

- E = the equivalent isotropically radiated power (dBW) of the terrestrial station in the direction of the point on the edge of the service area concerned;
- A = the total path loss in dB.

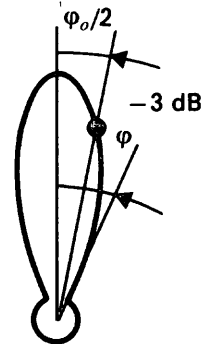
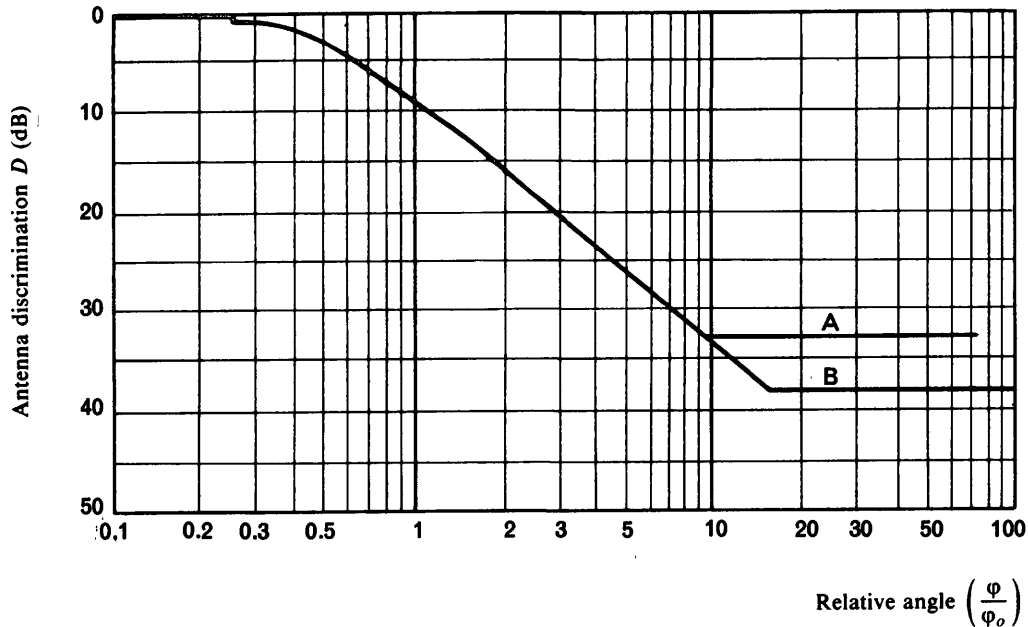


FIGURE 2

*Discrimination D (dB) of broadcasting-satellite receiver antenna
as a function of satellite elevation angle*

For service areas in Regions 1 and 3, $\phi_o = 2^\circ$ and Curve A applies.

For service areas in Region 2, $\phi_o = 1.8^\circ$ and Curve B applies.

3.1 *Evaluation of path loss A for a terrestrial station at a distance greater than 100 km from the edge of the service area of the broadcasting satellite*

For path lengths greater than 100 km, A is given by:

$$A = 137.6 + 0.2324 d_l + 0.0814 d_m \quad (4)$$

where:

d_l and d_m are the overland and overseas path lengths respectively, in kilometres.

3.2 *Evaluation of path loss A for a terrestrial station at a distance equal to or less than 100 km from the edge of the service area of the broadcasting satellite*

For path lengths equal to or less than 100 km, A is calculated using equations (4) and (5) and the lower value obtained is substituted in formula (3) to calculate the power flux-density produced at the point on the edge of the service area:

$$A = 109.5 + 20 \log (d_l + d_m) \quad (5)$$

The variation in A for different path lengths and percentage of overseas path is shown in Fig. 3.

3.3 *Distance beyond which the method need not be applied*

The method need not be applied and coordination is unnecessary when the distance between the terrestrial station and the service area of the broadcasting satellite is greater than:

- a) 400 km in the case of all overland paths; or
- b) 1 200 km in the case of all overseas or mixed paths.

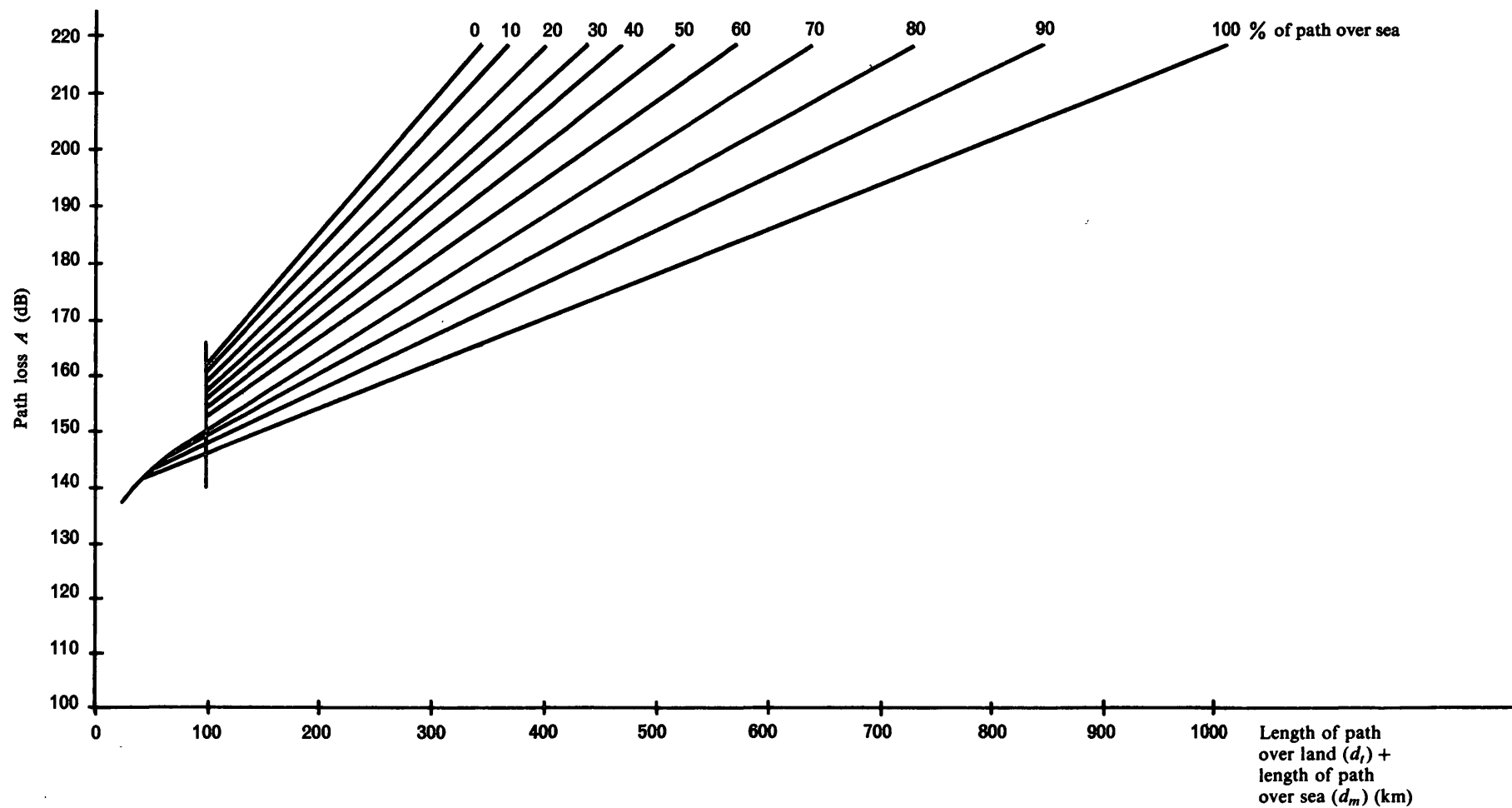


FIGURE 3
 Total path loss A (dB) versus total path length $(d_l + d_m)$ (km) and
 percentage of overseas path

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ANNEX 4

**Need for Coordination of a Fixed-Satellite Space Station
or a Broadcasting-Satellite Space Station in Region 2
with Respect to the Plan (Article 7)**

With respect to paragraph 7.2.1, coordination of a space station in the fixed-satellite service or the broadcasting-satellite service of Region 2 is required when, under assumed free-space propagation conditions, the power flux-density on the territory of an administration in Region 1 or Region 3 exceeds the value derived from the following expressions:

– 147 dB(W/m ² /27 MHz)	for $0^\circ \leq \theta < 0.44^\circ$
– 138 + 25 log θ dB(W/m ² /27 MHz)	for $0.44^\circ \leq \theta < 19.1^\circ$
– 106 dB(W/m ² /27 MHz)	for $19.1^\circ \leq \theta$

θ = the difference in degrees between the longitude of the interfering broadcasting-satellite or fixed-satellite space station in Region 2 and the longitude of the affected broadcasting-satellite space station in Regions 1 and 3.

ANNEX 5

**Power Flux-Density Limits Between 11.7 GHz and 12.2 GHz
to Protect the Terrestrial Services in Regions 1 and 3
from Interference from Region 2 Broadcasting-Satellite
Space Stations (Article 9)**

The power flux-density limits are as follows:

- 1) for all the territories of administrations in Regions 1 and 3:

– 125 dB(W/m ² /4 kHz)	for broadcasting-satellite space stations using circular polarization;
– 128 dB(W/m ² /4 kHz)	for broadcasting-satellite space stations using linear polarization;

for all angles of arrival; *and*

2) for territories of administrations in Region 3 and those in the western part of Region 1, west of longitude 30° E:

– 132 dB(W/m ² /5 MHz)	for angles of arrival between 0° and 10° above the horizontal plane;
– 132 + 4.2(γ – 10) dB(W/m ² /5 MHz)	for angles of arrival γ (in degrees) between 10° and 15° above the horizontal plane;
– 111 dB(W/m ² /5 MHz)	for angles of arrival between 15° and 90° above the horizontal plane.

ANNEX 6

Planning Principles in Region 2

The following principles have been applied in drawing up the provisions governing the introduction of space services in the frequency band 11.7 - 12.2 GHz in Region 2:

1. *Equality for allocated services in Region 2*

Under Article 8 of the Radio Regulations, the 11.7 - 12.2 GHz band is allocated to the broadcasting-satellite, fixed-satellite and terrestrial services on an equal, primary basis. Each administration in Region 2 has the right to decide for itself which of these services are to be implemented within its own territory.

2. *Equal rights for services in the various Regions*

In accordance with No. 346 of the Radio Regulations, the principle of equal rights for different services in the same category to operate in all the Regions is recognized, provided that no harmful interference is caused to services in the other Regions.

3. *Recognition of national requirements*

All administrations in Region 2 shall take into consideration the national requirements which have been presented or will be presented in the future.

4. *Equitable rights of access to the geostationary orbit/spectrum resource*

Subject to the provisions of the Convention, the Radio Regulations and the Resolutions in force, it is recognized that all administrations have the right of access to the geostationary orbit/spectrum resource in order to fulfil their requirements.

5. *Flexible planning approach*¹

The plan adopted for Region 2 must be sufficiently flexible to allow for future technical developments, the identification of future

¹ Paragraph 5 does not imply recognition of systems existing prior to the implementation of the plan.

requirements, changes in existing or stated requirements, requirements by administrations not represented at the Conference¹, further information on propagation data and various system design approaches. The plan may be modified only by a competent administrative radio conference.

6. *Efficient use of the geostationary orbit and the spectrum*

The plan for Region 2 shall use, to the maximum extent technically and economically practicable, the techniques available so as to make the most efficient use of the geostationary orbit and the frequency spectrum to fulfil the requirements both of the Region as a whole and of the individual administrations.

7. *Consultations among administrations*

Administrations planning to bring into operation systems in the 11.7 - 12.2 GHz band shall consult all the other administrations affected or concerned.

8. *Reception*

The plan for Region 2 shall have as a basis individual reception, although each administration may choose the reception system that it finds most suited to its requirements, namely, individual or community reception, or both.

¹ The World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

ANNEX 7

Use of the Spectrum/Orbit Resource

Since the equal sharing of the spectrum/orbit resource between the broadcasting-satellite service and the fixed-satellite service in Region 2 is inherently difficult and may impose some restrictions on both services, it is important that the technical parameters be chosen, and the techniques for efficient use of the spectrum/orbit resource be applied in such a way that both space services will benefit as much as possible.

The following techniques are among those identified as leading to a more efficient use of the spectrum/orbit resource and should therefore be applied to the maximum extent technically and economically practicable consistent with the capability of systems to fulfil the requirements for which they were designed.

1. *Clustering*

Extensive analyses have shown that orbit utilization is improved when satellites are grouped according to the sensitivity to interference and the potential for generating interference of the system of which they are a part. In most cases, this means that space stations of similar characteristics should be grouped in the same part of the orbit.

2. *Cross-polarization*

The proper use of cross-polarization can significantly improve the use of the spectrum/orbit resource by providing additional isolation between potentially interfering systems.

3. *Crossed-beam geometry*

The principle of crossed-beam geometry is that adjacent satellites should not serve adjacent service areas. In that way, discrimination from

both the satellite and the earth station antennae can be used to achieve maximum isolation between systems.

4. *Paired service areas*

The principle of crossed-beam geometry can be extended: if service areas are far enough apart, then the satellite antenna discrimination alone may be sufficient to permit satellites serving these widely separated service areas to be co-located in the orbit, leading to practical doubling of the orbit capacity.

5. *Frequency interleaving*

The mutual interference between channels in different systems is usually a maximum when the two carrier frequencies coincide. When channelling design is such that frequencies are interleaved, or, more generally, such that coincidence of carrier frequencies is avoided, mutual interference can in many cases be greatly reduced.

6. *Minimum space station spacings*

It is obvious that, for maximum orbit utilization, space stations should be placed as close to each other as is consistent with keeping the mutual interference to acceptable levels.

7. *Space station antenna discrimination*

The discrimination in the side-lobes of the space station antenna determines how much isolation exists between beams serving non-overlapping or non-adjacent service areas. To achieve maximum isolation, every effort should be made to improve the discrimination by technological advances in antenna design.

8. *Earth station antenna discrimination*

The side-lobe discrimination of the earth station antenna determines how much isolation is obtained from satellite spacing. To achieve maximum isolation, every effort should be made to improve the discrimination by taking advantage of technological advances in antenna design.

9. *Minimizing e.i.r.p. differences*

The interference caused by relatively high-power space stations (space stations in the broadcasting-satellite service or certain types of space stations in the fixed-satellite service) to the earth station receivers of relatively low-power satellite systems is directly proportional to the difference between their e.i.r.p. Sharing among such systems is greatly facilitated if this difference is kept as small as is consistent with the requirements.

10. *Realistic quality and reliability objectives*

The quality and reliability objectives have a significant effect on the use of the spectrum/orbit resource. If the objectives are set unnecessarily high, the capacity of the orbit is reduced. Quality and reliability objectives should be set no higher than absolutely necessary.

ANNEX 8

Technical Data Used in Establishing the Provisions and Associated Plan and Which Should Be Used for their Application

1. DEFINITIONS

1.1 *Service area*

The area on the surface of the Earth in which the administration responsible for the service has the right to demand that the agreed protection conditions be provided.

Note: In the definition of service area, it is made clear that within the service area the agreed protection conditions can be demanded. This is the area where there should be at least the wanted power flux-density and protection against interference based on the agreed protection ratio for the agreed percentage of time.

1.2 *Coverage area*

The area on the surface of the Earth delineated by a contour of a constant given value of power flux-density which would permit the wanted quality of reception in the absence of interference.

Note 1: In accordance with the provisions of No. 2674 of the Radio Regulations, the coverage area must be the smallest area which encompasses the service area.

Note 2: The coverage area, which will normally encompass the entire service area, will result from the intersection of the antenna beam (elliptical or circular) with the surface of the Earth, and will be defined by a given value of power flux-density. For example, in the case of a Region 1 or 3 country with a service planned for individual reception, it would be the area delineated by the contour corresponding to a level of $-103 \text{ dB(W/m}^2\text{)}$ for 99% of the worst month. There will usually be an area outside the service area but within the coverage area in which the power flux-density will be at least equivalent to the minimum specified value; however, protection against interference will not be provided in this area.

1.3 *Beam area*

The area delineated by the intersection of the half-power beam of the satellite transmitting antenna with the surface of the Earth.

Note: The beam area is simply that area on the Earth's surface corresponding to the -3 dB points on the satellite antenna radiation pattern. In many cases the beam area would almost coincide with the coverage area, the discrepancy being accounted for by the permanent difference in path lengths from the satellite throughout the beam area, and also by the permanent variations, if any, in propagation factors across the area. However, for a service area where the maximum dimension as seen from the

satellite position is less than 0.6° (the agreed minimum practicable satellite antenna half-power beamwidth), there could be a significant difference between the beam area and the coverage area.

1.4 *Nominal orbital position*

The longitude of a position in the geostationary-satellite orbit associated with a frequency assignment to a space station in a space radiocommunication service. The position is given in degrees from the Greenwich meridian.

2. RADIO PROPAGATION FACTORS

2.1 The propagation loss on the space-to-Earth path is equal to the free space path loss plus the attenuation exceeded for not more than 1% of the worst month, the latter being given in Fig. 1 for the five rain-climatic zones shown in Fig. 2.

2.2 In using the curves of Fig. 1, the difference between clear weather attenuation and the attenuation for 99% of the worst month should be limited to a maximum of 2 dB by appropriate choice of angle of elevation.

2.3 In planning the broadcasting-satellite service, for emissions applying circular polarization, the level of the depolarized component relative to the level of the co-polar component should be taken as:

- 27 dB for rain-climatic zones 1 and 2;
- 30 dB for rain-climatic zones 3, 4 and 5.

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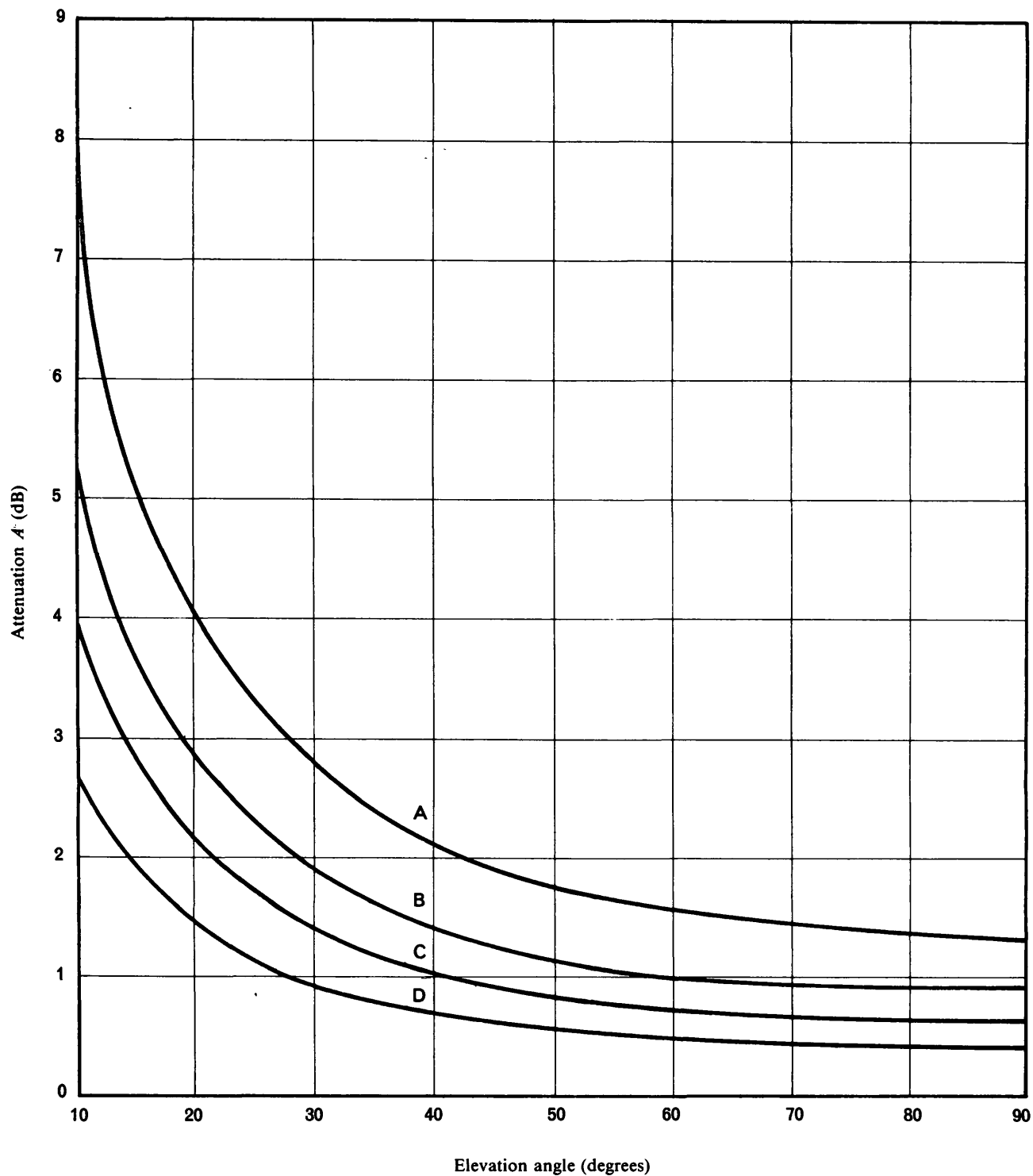


FIGURE 1

Predicted attenuation values exceeded for not more than 1% of the worst month (0.25% of the time) at 12 GHz in the rain-climatic zones indicated in Figure 2

A: Rain-climatic zone 1	C: Rain-climatic zones 3 and 4
B: Rain-climatic zone 2	D: Rain-climatic zone 5

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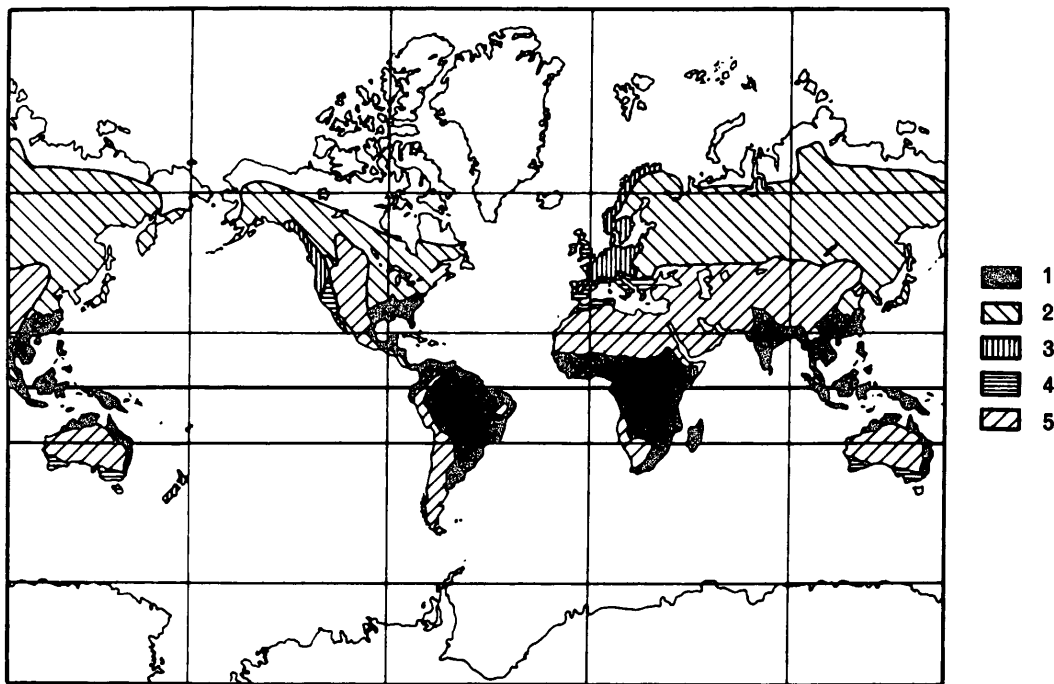


FIGURE 2

Rain-climatic zones

It should be noted that extensive measurements of attenuation due to rainfall have not been carried out in the tropical countries, especially in the African region.

3. BASIC TECHNICAL CHARACTERISTICS

3.1 *Type of modulation*

Planning of the broadcasting-satellite service is based on the use of a signal consisting of a video signal with an associated carrier, frequency-modulated by a sound signal, both frequency-modulating a carrier in the 12 GHz band, with a pre-emphasis characteristic in accordance with Fig. 3 (from CCIR Recommendation 405).

This does not preclude the use of other modulating signals having different characteristics (e.g. modulation with sound channels frequency-multiplexed within the bandwidth of a television channel, digital modulation of sound and television signals, or other pre-emphasis characteristics), provided that the use of such characteristics does not cause greater interference than that caused by the system considered in the Plan.

3.2 *Polarization*

3.2.1 For the planning of the broadcasting-satellite service, circular polarization shall be used in Regions 1, 2 and 3¹.

3.2.2 If possible, the polarization of different beams intended to serve the same area should be the same.

¹ The Administration of the United States of America expressed concern regarding the adoption of circular polarization for Region 2 and indicated that the very probable adoption of linear polarization by the fixed-satellite service would preclude the use of cross-polarization to facilitate sharing between the two space services and would affect orbit and spectrum utilization within the Region.

The Administration of Iran expressed a reservation regarding the adoption of circular polarization for planning the broadcasting-satellite service in Region 3 and stated its intention to use linear polarization.

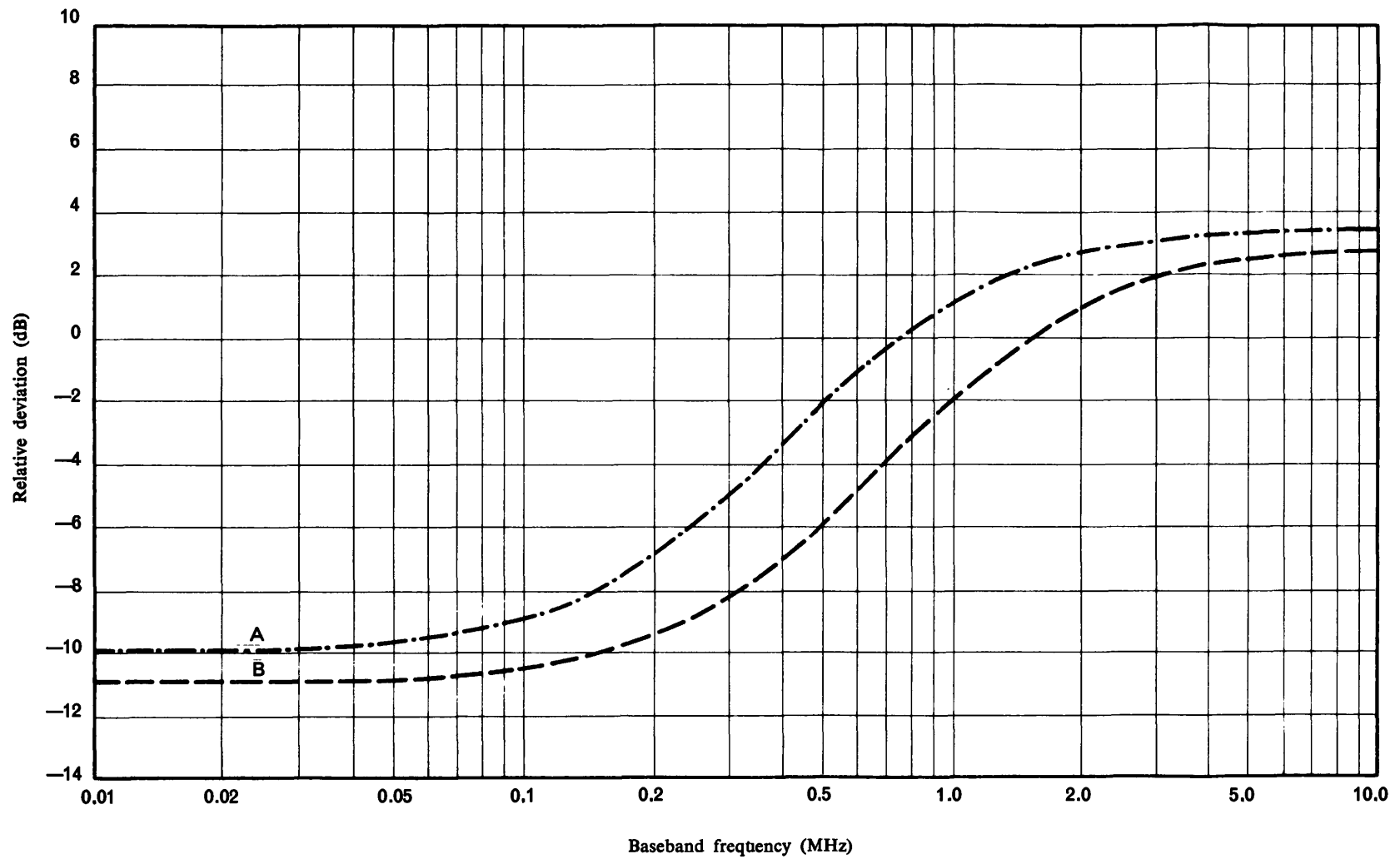


FIGURE 3

Pre-emphasis characteristic for television on 525- and 625-line systems

Curve A: 525-line system

Curve B: 625-line system

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3.2.3 The terms “direct” and “indirect” used in the Plan to indicate the direction of rotation of circularly-polarized waves correspond to right-hand (clockwise) and left-hand (anti-clockwise) polarization respectively according to the following definitions:

Direct polarization (right-hand or clockwise polarization)

An elliptically or circularly-polarized wave, in which the electric field-intensity vector, observed in any *fixed plane*, normal to the direction of propagation, whilst looking in (i.e., not against) the direction of propagation, rotates *with time* in a *right-hand* or clockwise direction.

Note: For circularly-polarized plane waves, the ends of the electric vectors drawn from any points along a straight line normal to the plane of the wave front form, *at any instant*, a *left-hand* helix.

Indirect polarization (left-hand or anti-clockwise polarization)

An elliptically or circularly-polarized wave, in which the electric field-intensity vector, observed in any *fixed plane*, normal to the direction of propagation, whilst looking in (i.e., not against) the direction of propagation, rotates *with time* in a *left-hand* or anti-clockwise direction.

Note: For circularly-polarized plane waves, the ends of the electric vectors drawn from any points along a straight line normal to the plane of the wave front form, *at any instant*, a *right-hand* helix.

3.3 *Carrier-to-noise ratio*

For the purpose of planning the broadcasting-satellite service, the carrier-to-noise ratio is equal to 14 dB for 99% of the worst month.

The reduction in quality in the down-link due to thermal noise in the up-link is taken as equivalent to a degradation in the down-link carrier-to-noise ratio not exceeding 0.5 dB for 99% of the worst month.

3.4 *Protection ratio between two FM television signals*

For planning in Regions 1 and 3 the following protection ratios have been adopted for the purpose of calculating equivalent protection margins¹:

- 31 dB for co-channel signals;
- 15 dB for adjacent-channel signals.

3.5 *Channel spacing*

3.5.1 *Channel spacing in the Plan*

The spacing between the assigned frequencies of two adjacent channels is 19.18 MHz. The Plan gives the assigned frequencies for each channel.

¹ The equivalent protection margin M is given in dB by the formula

$$M = -10 \log [10^{-M_1/10} + 10^{-M_2/10} + 10^{-M_3/10}]$$

where M_1 is the value in dB of the protection margin for the same channel. This is defined in the following expression where the powers are evaluated at the receiver input:

$$\frac{\text{wanted power}}{\text{sum of the co-channel interfering powers}} \text{ (dB)} - \text{co-channel protection ratio (dB)}$$

M_2 and M_3 are the values in dB of the upper and lower adjacent-channel protection margins.

The definition of the adjacent-channel protection margin is similar to that for the co-channel case except that the adjacent-channel protection ratio and the sum of the interfering powers due to transmissions in the adjacent channel are considered.

3.5.2 *Grouping of channels in the same beam*

Planning in Region 1 has been carried out by trying to group all the channels radiated within a single antenna beam within a frequency range of 400 MHz, in order to simplify receiver construction.

3.5.3 *Spacing between channels feeding a common antenna*

Owing to technical difficulties in the output circuit of a satellite transmitter, spacing between the assigned frequencies of two channels feeding a common antenna must be greater than 40 MHz.

3.6 *Figure of merit (G/T) of a receiving installation in the broadcasting-satellite service*

In planning the broadcasting-satellite service, the value of the figure of merit G/T used is:

6 dB/K for individual reception;
14 dB/K for community reception.

The values are calculated from the following formula which allows for pointing error, polarization effects, and ageing:

$$G/T = \frac{\alpha \beta G_r}{\alpha T_a + (1 - \alpha) T_0 + (n - 1) T_0}$$

where:

- α = the total coupling losses, expressed as a power ratio;
- β = the total losses due to the pointing error, polarization effects and ageing, expressed as a power ratio;

G_r = the effective gain of the receiving antenna, expressed as a power ratio and taking account of the method of feeding and the efficiency;

T_a = the effective temperature of the antenna;

T_0 = the reference temperature = 290 K;

n = the overall noise factor of the receiver, expressed as a power ratio.

See also CCIR Report 473-1 (Annex 1).

3.7 *Receiving antennae*

3.7.1 *Minimum diameter of receiving antennae*

For planning the broadcasting-satellite service the minimum diameter of receiving antennae considered is such that the half-power beamwidth ϕ_0 is:

- a) for individual reception: 2° in Regions 1 and 3, 1.8° in Region 2;
- b) for community reception: 1° in all Regions.

3.7.2 *Receiving antenna reference patterns*

The co-polar and cross-polar reference patterns of receiving antennae are given in Figs. 4 and 5.

- a) The relative antenna gain (dB) is given by the curves in Fig. 4 for:
 - individual reception in Regions 1 and 3:
 - Curve A for the co-polar component;
 - Curve B for the cross-polar component;

- community reception:
 - in all Regions, Curve A' up to the intersection with Curve C, then Curve C, for the co-polar component;
 - in Regions 1 and 3, Curve B for the cross-polar component.
- b) For Region 2, the relative antenna gain (dB) is given by the curves in Fig. 5 for:
 - individual reception, for which use should be made of:
 - Curve A for the co-polar component;
 - Curve B for the cross-polar component;
 - community reception for which Curve B should be used for the cross-polar component (the co-polar component being given in Fig. 4).

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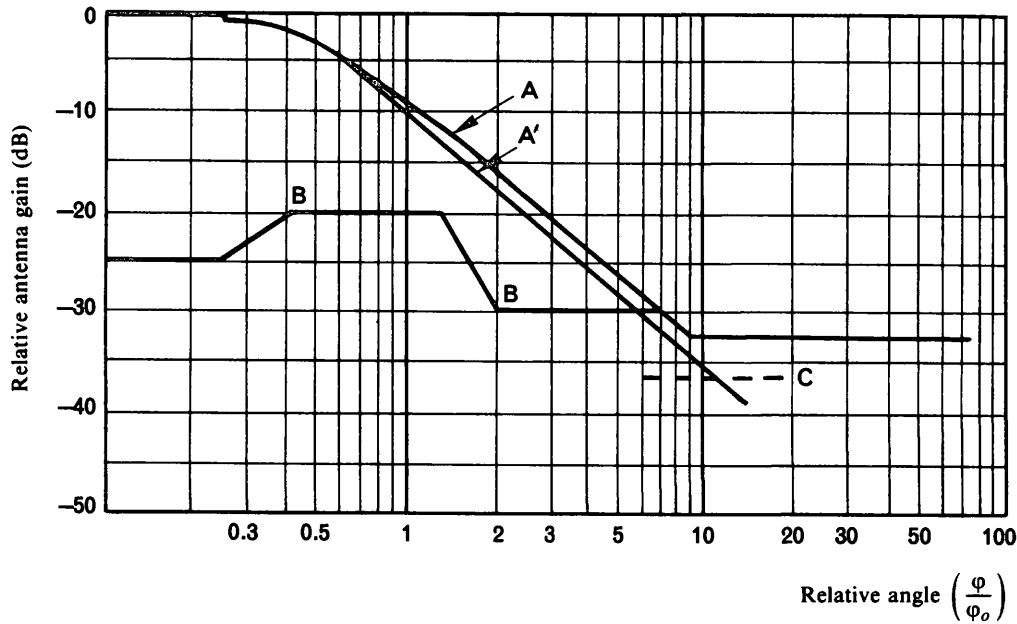


FIGURE 4

Co-polar and cross-polar reference patterns for receiving antennae

Curve A: Co-polar component for individual reception without side-lobe suppression

$$\begin{aligned}
 &0 && \text{for } 0 \leq \varphi \leq 0.25 \varphi_o \\
 &-12 \left(\frac{\varphi}{\varphi_o} \right)^2 && \text{for } 0.25 \varphi_o < \varphi \leq 0.707 \varphi_o \\
 &-\left[9.0 + 20 \log_{10} \left(\frac{\varphi}{\varphi_o} \right) \right] && \text{for } 0.707 \varphi_o < \varphi \leq 1.26 \varphi_o \\
 &-\left[8.5 + 25 \log_{10} \left(\frac{\varphi}{\varphi_o} \right) \right] && \text{for } 1.26 \varphi_o < \varphi \leq 9.55 \varphi_o \\
 &-33 && \text{for } 9.55 \varphi_o < \varphi
 \end{aligned}$$

Curve A': Co-polar component for community reception without side-lobe suppression

$$\begin{aligned}
 &0 && \text{for } 0 \leq \varphi \leq 0.25 \varphi_o \\
 &-12 \left(\frac{\varphi}{\varphi_o} \right)^2 && \text{for } 0.25 \varphi_o < \varphi \leq 0.86 \varphi_o \\
 &-\left[10.5 + 25 \log_{10} \left(\frac{\varphi}{\varphi_o} \right) \right] && \text{for } 0.86 \varphi_o < \varphi \text{ up to intersection with Curve C (then Curve C)}
 \end{aligned}$$

Curve B: Cross-polar component for both types of reception

$$\begin{aligned}
 &-25 && \text{for } 0 \leq \varphi \leq 0.25 \varphi_o \\
 &-\left(30 + 40 \log_{10} \left| \frac{\varphi}{\varphi_o} - 1 \right| \right) && \text{for } 0.25 \varphi_o < \varphi \leq 0.44 \varphi_o \\
 &-20 && \text{for } 0.44 \varphi_o < \varphi \leq 1.4 \varphi_o \\
 &-\left(30 + 25 \log_{10} \left| \frac{\varphi}{\varphi_o} - 1 \right| \right) && \text{for } 1.4 \varphi_o < \varphi \leq 2 \varphi_o \\
 &-30 \text{ until intersection with co-polar component curve; then as for co-polar component}
 \end{aligned}$$

Curve C: Minus the on-axis gain

Note: For values of φ_o see 3.7.1.

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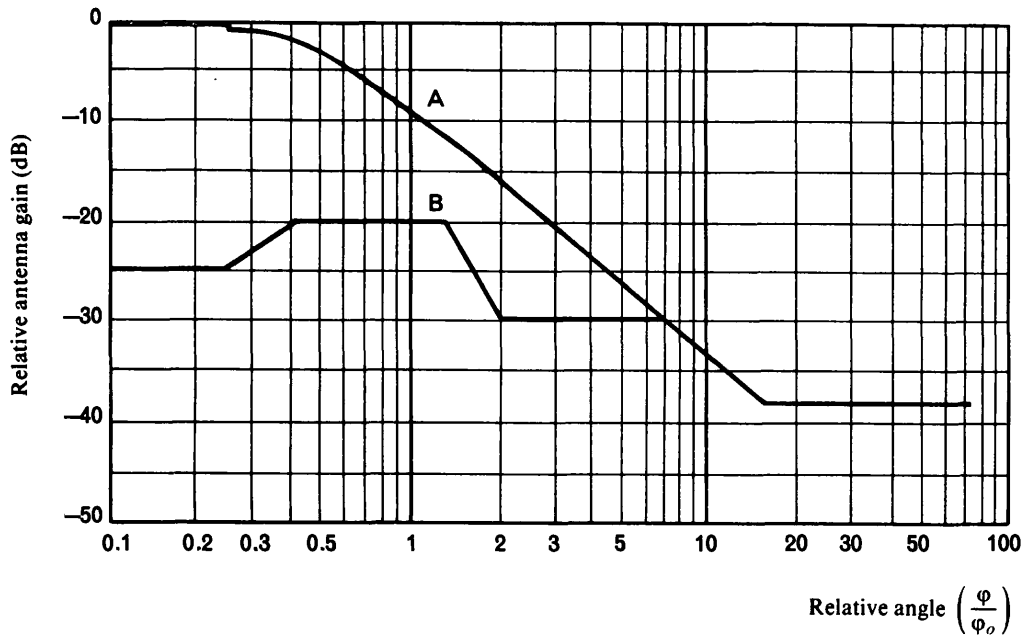


FIGURE 5

*Reference patterns for co-polar and cross-polar components
for receiving antennae for individual reception in Region 2*

Curve A: Co-polar component without side-lobe suppression

0	for $0 \leq \phi \leq 0.25 \phi_0$
$-12 \left(\frac{\phi}{\phi_0} \right)^2$	for $0.25 \phi_0 < \phi \leq 0.707 \phi_0$
$- \left[9.0 + 20 \log_{10} \left(\frac{\phi}{\phi_0} \right) \right]$	for $0.707 \phi_0 < \phi \leq 1.26 \phi_0$
$- \left[8.5 + 25 \log_{10} \left(\frac{\phi}{\phi_0} \right) \right]$	for $1.26 \phi_0 < \phi \leq 15.14 \phi_0$
-38 dB	for $\phi > 15.14 \phi_0$

Curve B: Cross-polar component

-25	for $0 \leq \phi \leq 0.25 \phi_0$
$- \left(30 + 40 \log_{10} \left \frac{\phi}{\phi_0} - 1 \right \right)$	for $0.25 \phi_0 < \phi \leq 0.44 \phi_0$
-20	for $0.44 \phi_0 < \phi \leq 1.4 \phi_0$
$- \left(30 + 25 \log_{10} \left \frac{\phi}{\phi_0} - 1 \right \right)$	for $1.4 \phi_0 < \phi \leq 2 \phi_0$
-30 until intersection with co-polar component curve; then as for co-polar component	

Note: For values of ϕ_0 see 3.7.1.

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3.8 *Necessary bandwidth*

The necessary bandwidths considered are as follows for:

- 625-line systems: 27 MHz;
- 525-line systems in Region 3: 27 MHz;
- 525-line system M of Region 2: 18 MHz and 23 MHz.

3.9 *Guardbands*

3.9.1 A guardband is defined as the portion of the frequency spectrum between the edge of the allocated band and the edge of the necessary bandwidth of the emission in the nearest channel.

3.9.2 For the planning of the broadcasting-satellite service, the guardbands necessary to protect the services in adjacent frequency bands are shown in the table below.

Regions	Guardband at the lower edge of the band (11.7 GHz)	Guardband at the upper edge of the band (12.2/12.5 GHz)
1	14 MHz	11 MHz
2	12 MHz	9 MHz
3	14 MHz	11 MHz

These guardbands assume maximum beam centre e.i.r.p. values of 67 dBW for Regions 1 and 3 and 63 dBW for Region 2 (values relating to individual reception), and a filter roll off of 2 dB/MHz. If smaller e.i.r.p. values are assumed, the guardbands can be reduced in width by 0.5 MHz for each decibel decrease in e.i.r.p.

3.9.3 Since developments in technology or the choice of lower e.i.r.p. values than those given above are likely to permit a reduction in the necessary guardbands, it is recommended that, for purposes other than *a priori* planning at this Conference¹, the latest CCIR Recommendations concerning spurious emissions from broadcasting satellites should be followed.

3.10 *Orbital spacing*

The Plan for Regions 1 and 3 has been based generally on nominal orbital positions spaced uniformly at intervals of 6°.

3.11 *Satellite station keeping*

Space stations in the broadcasting-satellite service must be maintained in position with an accuracy of better than $\pm 0.1^\circ$ in both the N-S and E-W directions. (These tolerances lead to a maximum excursion of $\pm 0.14^\circ$ from the nominal satellite position.)

3.12 *Elevation angle of receiving antennae*

The Plan has been based on the consideration of a minimum angle of elevation of 20° to minimize the required e.i.r.p. of the satellite and to reduce the effects of shadowing and the possibility of interference from terrestrial services. However, for areas situated in latitudes above about 60°, the angle of elevation is of necessity less than 20°. Attention is also directed to paragraph 2.2.

For mountainous areas where an angle of 20° may not suffice, an angle of at least 30° has been provided where possible to provide an acceptable service. An angle of elevation of at least 40° has been considered for service areas subject to high precipitation (e.g., rain-climatic zone 1).

¹ The World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

Some dry, non-mountainous areas may be given an acceptable service at angles of elevation less than 20° .

In areas with small angles of elevation, the shadowing effect of tall buildings may have to be taken into account.

In choosing a satellite position designed to give the maximum angle of elevation at the ground, the influence of such a position on the eclipse period has been borne in mind.

3.13 *Transmitting antennae*

3.13.1 *Cross-section of transmitted beam*

Planning has been based on the use of transmitting antennae with beams of elliptical or circular cross-section.

If the cross-section of the transmitted beam is elliptical, the effective beamwidth ϕ_o is a function of the angle of rotation q between the plane containing the satellite and the major axis of the beam cross-section and the plane in which the beamwidth is required.

The relationship between the maximum gain of an antenna and the half-power beamwidth can be derived from the expression:

$$G_m = 27\,843/ab$$

or

$$G_m(\text{dB}) = 44.44 - 10 \log_{10} a - 10 \log_{10} b$$

where:

a and b are the angles (in degrees) subtended at the satellite by the major and minor axes of the elliptical cross-section of the beam.

An antenna efficiency of 55% is assumed.

3.13.2 *Minimum beamwidth of transmitting antenna*

A minimum value of 0.6° for the half-power beamwidth of a transmitting antenna has been agreed on for planning.

3.13.3 *Transmitting antenna reference patterns*

The reference patterns for the co-polar and cross-polar components of satellite transmitting antennae used in preparing the Plan are given in Fig. 6.

3.14 *Pointing accuracy of satellite antennae*

3.14.1 The deviation of the antenna beam from its nominal pointing direction must not exceed a limit of 0.1° in any direction. Moreover, the angular rotation of a transmitting beam about its axis must not exceed a limit of $\pm 2^\circ$; this latter limit is not necessary for beams of circular cross-section using circular polarization.

3.14.2 The following factors contribute to the total variation in the area on the surface of the Earth illuminated by the satellite beam:

- variations in satellite station-keeping;
- the variations caused by the pointing tolerances, which become more significant for coverage areas with low angles of elevation;
- the effect of the yaw error increases as the beam ellipse lengthens.

3.14.3 The effect of these possible variations should be assessed on a case-by-case basis, since their total effect on the area covered will vary as the geometry of the satellite beam varies, and it would not be reasonable to indicate a single value of shift in the area covered for all situations.

3.14.4 If linear polarization is used for an emission, yaw error makes a significant contribution to increasing the transmitted cross-polarized component; this increases the interference with other carriers which were originally cross-polarized with the emission in question.

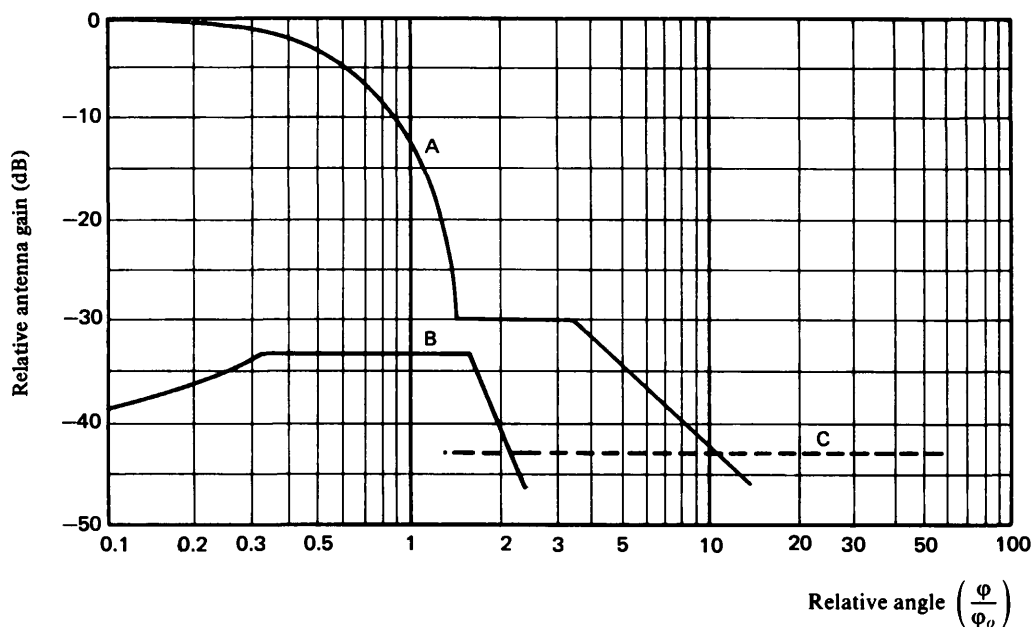


FIGURE 6

*Reference patterns for co-polar and cross-polar components
for satellite transmitting antennae*

Curve A: Co-polar component

$$\begin{aligned}
 & -12 \left(\frac{\varphi}{\varphi_o} \right)^2 && \text{for } 0 \leq \varphi \leq 1.58 \varphi_o \\
 & -30 && \text{for } 1.58 \varphi_o < \varphi \leq 3.16 \varphi_o \\
 & - \left[17.5 + 25 \log_{10} \left(\frac{\varphi}{\varphi_o} \right) \right] && \text{for } 3.16 \varphi_o < \varphi
 \end{aligned}$$

after intersection with Curve C: as Curve C

Curve B: Cross-polar component

$$\begin{aligned}
 & - \left(40 + 40 \log_{10} \left| \frac{\varphi}{\varphi_o} - 1 \right| \right) && \text{for } 0 \leq \varphi \leq 0.33 \varphi_o \\
 & -33 && \text{for } 0.33 \varphi_o < \varphi \leq 1.67 \varphi_o \\
 & - \left(40 + 40 \log_{10} \left| \frac{\varphi}{\varphi_o} - 1 \right| \right) && \text{for } 1.67 \varphi_o < \varphi
 \end{aligned}$$

after intersection with Curve C: as Curve C

Curve C: Minus the on-axis gain.

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3.15 *Limitation of output power in the satellite transmitter*

The output power of a space station in the broadcasting-satellite service must not rise by more than 0.25 dB relative to its nominal value throughout the life of the satellite.

3.16 *Power flux-density at edge of coverage area*

The value of the power flux-density at the edge of the coverage area for 99% of the worst month is:

- 103 dB(W/m²) for individual reception in Regions 1 and 3;
- 105 dB(W/m²) for individual reception in Region 2;
- 111 dB(W/m²) for community reception in all Regions.

3.17 *Difference between the e.i.r.p. directed towards the edge of the coverage area and that on the axis of the beam*

For planning, the absolute value of the difference between the e.i.r.p. directed towards the edge of the coverage area and that on the axis of the beam should preferably be 3 dB.

If the beam area is larger than the coverage area, the value will be less than 3 dB.

3.18 *Use of energy dispersal*

For planning, an energy dispersal value has been adopted which reduces by 22 dB the spectral power flux-density measured in a 4 kHz bandwidth in relation to that measured in the entire bandwidth; this reduction corresponds to a peak-to-peak deviation of 600 kHz.

ANNEX 9

Criteria for Sharing Between Services

1. *Protection requirements for sharing between services in the 12 GHz band*

1.1 The establishment of sharing criteria for the different services using the 12 GHz band should be based on the protection requirements listed in the table below.

1.2 The values given as "total acceptable" are those necessary to protect the wanted signal. The "single entry" values are those which should be used as a guide for determining sharing criteria. The total interference from all sources must be calculated, since satisfying the "single entry" criteria for each source may not guarantee that the total interference meets the above protection requirements. A "single entry" is defined as the aggregate of emissions from any one station entering any receiver in the wanted service within the channel to be protected.

1.3 The term C/I refers to the ratio of the wanted-to-interfering power at the interfered-with ground station. The value given shall be exceeded for all but 20% of the worst month for the fixed-satellite service (FSS), and for all but 1% of the worst month for the broadcasting service (BS) and the broadcasting-satellite service (BSS).

1.4 The term N refers to the post-demodulation noise power at a point of 0 dBm0 relative test tone level in any voice channel of an FDM/FM telephony system. The value given shall not be exceeded for more than 20% of the worst month.

1.5 The specified values of protection ratio (i.e., the carrier-to-interference power ratio corresponding to a specified picture quality) are applicable, for planning purposes, to television signals of any of the several television standards.

Wanted service ¹	Wanted signal ¹	Interfering service ¹	Interfering signal ¹	Protection requirements ²	
				Total acceptable ³	Single entry
BSS	TV/FM	BSS, FSS, FS, BS	TV/FM	$C/I = 30 \text{ dB}^{4,7}$	$C/I = 35 \text{ dB}^4$
FSS	FDM/FM	BSS	TV/FM	$N = 500 \text{ pW0p}^8$	$N = 300 \text{ pW0p}$
FSS	TV/FM	BSS, FSS	TV/FM	$C/I = 32 \text{ dB}^5$	$C/I = 37 \text{ dB}^5$
FSS	4 Φ -PSK	BSS, FSS	TV/FM	$C/I = 30 \text{ dB}$	$C/I = 35 \text{ dB}$
FSS	FDM/FM	FSS	FDM/FM	$N = 1000 \text{ pW0p}$	$N = 400 \text{ pW0p}$
FS	FDM/FM	BSS	TV/FM	$N = 1000 \text{ pW0p}$	$-125 \text{ dB (W/m}^2/4 \text{ kHz)}^6$
BS	TV/VSB	BSS	TV/FM	$C/I = 50 \text{ dB}$	not applicable

Notes: ¹ BSS = broadcasting-satellite service
FSS = fixed-satellite service
BS = broadcasting service
FS = fixed service
TV = television
FM = frequency modulation
FDM = frequency division multiplex
4 Φ -PSK = four-level phase shift keying
VSB = vestigial sideband.

² These limits include both up-link and down-link contributions. They are expressed:
— in dB for carrier-to-interference ratio;
— in pW0p for noise;
— in dB(W/m²/4 kHz) for power flux-density in a 4 kHz band.

³ Values in dB are protection ratios for the sum of interfering signals. Values in pW0p represent interference noise in the worst telephone channels caused by the sum of interfering signals.

⁴ For BSS satellites located at the interfaces of Regions 1/3 and Region 2, the C/I ratios should be 1 dB higher.

⁵ See CCIR Recommendation 483.

⁶ This value may be suitably modified for tropical regions to take account of rain attenuation. Allowance may also be made for polarization discrimination.

⁷ C/I = ratio of carrier-to-interfering signal.

⁸ N = noise power.

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1.6 For BSS systems with FM/TV as the wanted signal, the protection ratios are given for particular reference conditions, the most important of which are:

- a) frequency deviation of the wanted signal (12 MHz peak-to-peak);
- b) quality of the wanted service (grade 4.5)¹;
- c) co-channel carriers (no carrier-frequency offset).

1.7 If system design is based on conditions other than a) and b) above, the FM/TV protection ratio is given by:

$$R = 12.5 - 20 \log (D_v/12) - Q + 1.1 Q^2 \text{ (dB)}$$

where:

D_v = nominal peak-to-peak frequency deviation (MHz);

Q = the impairment grade, concerning the interference only.

1.8 When carriers are offset in frequency, condition c) does not apply and the adjacent channel protection ratios should be adjusted according to the frequency offset as shown in Fig. 1. For example, at a frequency offset of 20 MHz, the total acceptable ratio of protection against interference to an FM/TV signal from another FM/TV signal is 13 dB. The corresponding "single entry" value is 18 dB.

¹ Impairment grade on a 5-point scale as defined in CCIR Recommendation 500.

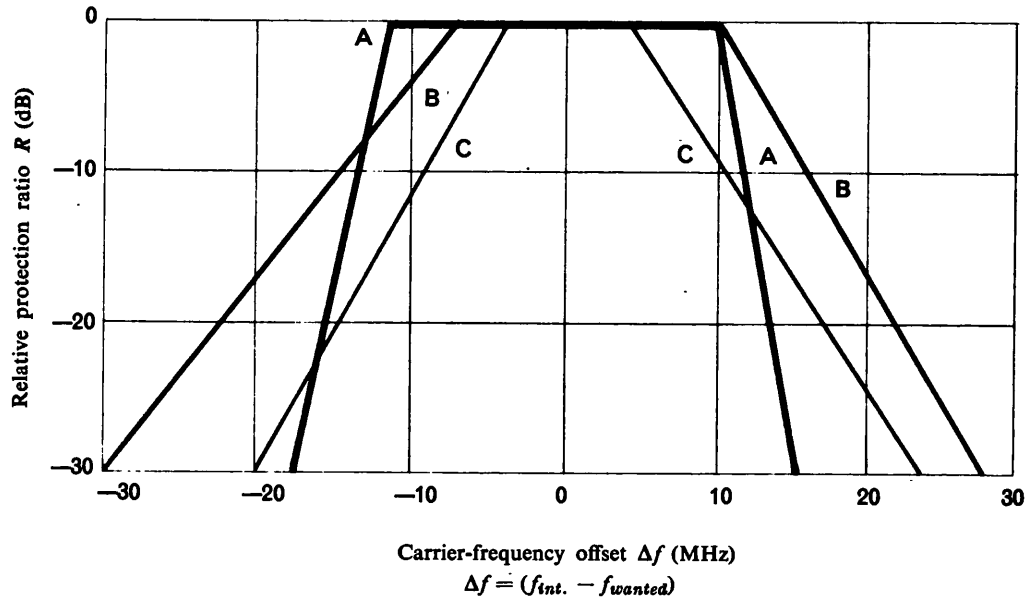


FIGURE 1

Reference case protection ratios relative to co-channel values

Curve A: TV/VSB-wanted, TV/FM interfering

Curve B: TV/FM-wanted, TV/FM interfering

Curve C: TV/FM-wanted, TV/VSB interfering

2. *Reference antenna diameter for a fixed-satellite earth station to be used in calculating interference from space stations in the broadcasting-satellite service*

2.1 For antennae larger than 100λ (2.5 m) in the fixed-satellite service, the gain of the side-lobes is given by the equation $32 - 25 \log \theta$, where θ is the angle from the boresight (CCIR Recommendation 465). The side-lobe gain is independent of antenna diameter.

2.2 However, in the case of transmitting earth stations, the level of interference radiated into the up-link of other satellite systems would be inversely proportional to the square of the antenna diameter. In this case, the interference decreases with increasing antenna diameter. Since the 11.7 - 12.2 GHz band is only assigned in the space-to-Earth direction in the fixed-satellite service, this point is not of direct concern to the broadcasting-satellite service.

2.3 Hence it does not appear appropriate, for antenna diameters greater than 100λ , to specify a minimum antenna diameter for receiving earth stations in the fixed-satellite service sharing the band 11.7 - 12.2 GHz. It may be useful to consider a 4.5 m antenna having an efficiency of 60% and an on-axis gain of 53 dB as typical for the purpose of planning the sharing of this band; however, it should be noted that administrations in Region 2 are considering the use of antennae 3 m to 10 m in diameter.

3. *Use of energy dispersal in the broadcasting-satellite service*

3.1 Artificial energy dispersal is useful in promoting sharing between the broadcasting-satellite service and the other services to which the band is also allocated.

3.2 Such energy dispersal is achieved by the addition at baseband of a triangular waveform to the video signal to form a composite baseband which, in turn, is used to frequency-modulate the up-link carrier. The frequency of the triangular waveform is usually synchronized at a sub-multiple of the television frame frequency. Typical frequencies range from 12.5 Hz to 30 Hz.

3.3 The table below gives the relative reduction in spectral power flux-density in a 4 kHz bandwidth as a function of the peak-to-peak deviation due to the energy dispersal signal. This table is based on the following equation:

$$\left. \begin{array}{l} \text{Relative reduction (in dB)} \\ \text{in a 4 kHz band} \end{array} \right\} = 10 \log \frac{\Delta F_{pp} + \delta f_{rms}}{4}$$

where:

ΔF_{pp} = peak-to-peak deviation due to the energy dispersal signal (kHz);

δf_{rms} = rms deviation due to "natural" energy dispersal (kHz).

In compiling the table below, a value of 40 kHz has been assumed for δf_{rms} , on the basis of the value of 10 dB for "natural" dispersion given in Table 4 of CCIR draft Report 631 (Rev. 76).

Reduction of spectral power flux-density relative to a 4 kHz bandwidth

Peak-to-peak deviation (kHz)	Relative reduction (dB)
0	10
100	15.44
200	17.78
300	19.29
400	20.41
500	21.30
600	22.04
700	22.67
800	23.22
900	23.71
1 000	24.15

3.4 The value of energy dispersal for the broadcasting-satellite service has been determined such that the spectral power flux-density measured in a 4 kHz bandwidth is reduced by 22 dB relative to that measured in the entire bandwidth; this reduction corresponds to a peak-to-peak deviation of 600 kHz.

ANNEX 10

Orbital Position Limitations

In applying the procedure of Article 4 for modifications to the Plan, administrations shall observe the following criteria:

- 1) No broadcasting-satellite serving an area in Region 1 and using a frequency in the band 11.7 - 12.2 GHz shall occupy a nominal orbital position further west than 37° W or further east than 146° E.
- 2) Any new orbital position in the Plan in the range of the orbital arc between 37° W and 10° E associated with a new assignment, or resulting from a modification of an assignment in the Plan, shall be coincident with, or within 1° to the east of, a nominal orbital position in the Plan at the date of entry into force of the Final Acts ¹.

¹ Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, which entered into force on 1 January 1979.

In the event of a modification to an assignment in the Plan, the use of a new nominal orbital position not coincident with any nominal orbital position in the Plan at the date of entry into force of the Final Acts¹ shall be associated with an 8 dB reduction in the e.i.r.p. compared to that appearing in the Plan for the assignment before modification.

ANNEX 11

Method of Calculating the Power Flux-Density Produced in the Territories of Region 2 by Space Stations in the Broadcasting-Satellite Service in Regions 1 and 3

Method of calculation

1. The power flux-density produced, under conditions of free-space propagation, at a given point P on the surface of the Earth, by a satellite in the geostationary orbit, can be calculated from the following data:
 - 1.1 nominal orbital position;
 - 1.2 e.i.r.p., in dBW;
 - 1.3 characteristics of the antenna beam at half-power points (i.e. the major and minor axes together with the orientation of the corresponding ellipse);
 - 1.4 geographical coordinates of the boresight (B);
 - 1.5 geographical coordinates of the point P.

¹ Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, which entered into force on 1 January 1979.

2. The values relevant to items 1.1 to 1.4 are indicated in the Plan. The point P can be chosen with reference to the objective of calculation. For the calculations which follow, the coordinates of point P have been taken as 35° W and 8° S.

3. To obtain the power flux-density [dB(W/m²)] produced at P, calculate:

- the distance, d (m), between the satellite and the point P;
- the spreading attenuation, A for the distance d :

$$A = 10 \log \frac{1}{4 \pi d^2}$$

- the angle ϕ , as seen from the satellite, between points B and P;
- ϕ_o , the half-power beamwidth, in the direction of P (in the case of a circular beam ϕ_o will be independent of direction);
- the relative antenna gain, δG in dB, for the calculated values of ϕ and ϕ_o using the reference pattern for the co-polar component of the satellite transmitting antenna.

Then apply the expression:

$$pfd \text{ [dB(W/m}^2\text{)]} = \text{e.i.r.p.} + \delta G + A$$

to obtain the power flux-density produced at P.

Note: In this expression, e.i.r.p. refers to boresight. The relative antenna gain δG is with respect to boresight antenna gain, therefore δG is negative.

Results

The power flux-densities produced at the coordinates 35° W, 8° S from broadcasting space stations of Regions 1 and 3, to which orbital positions from 37° W to 5° E and channels 1 to 25 have been assigned in the Plan, are given in the following table:

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Densité surfacique de puissance (DSP) produite dans la Région 2, au point: longitude = 35° Ouest, latitude = 8° Sud

Power flux-density (PFD) produced in Region 2 at a point having: longitude = 35° W, latitude = 8° S

Densidad de flujo de potencia (DFP) producida en la Región 2 en el punto correspondiente a las siguientes coordenadas: longitud = 35° Oeste, latitud = 8° Sur

Position nominale sur l'orbite Nominal orbital position Posición orbital nominal -37,0			Position nominale sur l'orbite Nominal orbital position Posición orbital nominal -31,0			Position nominale sur l'orbite Nominal orbital position Posición orbital nominal -25,0			Position nominale sur l'orbite Nominal orbital position Posición orbital nominal -19,0		
N° IFRB IFRB No. N.º de la IFRB	Canaux N°s Channel Nos. N.ºs de los canales	DSP PFD DFP dB(W/m²)	N° IFRB IFRB No. N.º de la IFRB	Canaux N°s Channel Nos. N.ºs de los canales	DSP PFD DFP dB(W/m²)	N° IFRB IFRB No. N.º de la IFRB	Canaux N°s Channel Nos. N.ºs de los canales	DSP PFD DFP dB(W/m²)	N° IFRB IFRB No. N.º de la IFRB	Canaux N°s Channel Nos. N.ºs de los canales	DSP PFD DFP dB(W/m²)
AND 341	4 8 12 16 20	-146,35	AZR 134	3 7 11 15 19	-140,72	ALG 251	2 6 10 14 18	-135,17	AUT 016	4 8 12 16 20	-143,67
CVA 085	23	-141,92	CNR 130	23	-140,93	ALG 252	4 8 12 16 20	-130,26	BEL 018	21 25	-144,97
GMB 302	3 7 11 15 19	-137,17	CPV 301	4 8 12 16 20	-137,14	GHA 108	23	-134,45	BEN 233	3 7 11 15 19	-140,20
GUI 192	1 5 9 13 17	-132,98	CTI 237	22	-132,20	LBY 280	1 5 9 13 17	-138,64	D 087	2 6 10 14 18	-140,17
LIE 253	3 7 11 15 19	-146,00	E 129	23	-137,48	LBY 321	3 7 11 15 19	-139,00	F 093	1 5 9 13 17	-138,67
MCO 116	21 25	-145,75	G 027	4 8 12 16 20	-140,02	MRC 209	21 25	-128,74	GNE 303	23	-141,30
MLI 327	2 6 10 14 18	-132,79	GNP 304	2 6 10 14 18	-137,07	NGR 115	24	-127,77	HOL 213	23	-144,77
MLI 328	4 8 12 16 20	-131,06	HVO 107	21 25	-131,90	TGO 226	2 6 10 14 18	-141,45	I 082	24	-138,57
MTN 223	22	-129,20	IRL 211	2 6 10 14 18	-144,38	TUN 150	22	-141,14	LUX 114	3 7 11 15 19	-145,56
MTN 288	24	-135,68	ISL 049	21 25	-142,72				NIG 119	22	-129,39
SEN 222	21 25	-133,19	LBR 244	3 7 11 15	-137,10				NMB 025	25	-130,13
SMR 311	1 5 9 13 17	-145,92	POR 133	3 7 11 15 19	-142,35				SUI 140	22	-143,10
			SRL 259	23	-136,72				ZAI 322	4 8 12 16 20	-130,94
									ZAI 323	2 6 10 14 18	-130,05

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Position nominale sur l'orbite Nominal orbital position Posición orbital nominal -13,0			Position nominale sur l'orbite Nominal orbital position Posición orbital nominal -7,0			Position nominale sur l'orbite Nominal orbital position Posición orbital nominal -1,0			Position nominale sur l'orbite Nominal orbital position Posición orbital nominal +5,0		
Nº IFRB IFRB No. N.º de la IFRB	Canaux N° Channel Nos. N.º de los canales	DSP PFD DFP dB(W/m²)	Nº IFRB IFRB No. N.º de la IFRB	Canaux N° Channel Nos. N.º de los canales	DSP PFD DFP dB(W/m²)	Nº IFRB IFRB No. N.º de la IFRB	Canaux N° Channel Nos. N.º de los canales	DSP PFD DFP dB(W/m²)	Nº IFRB IFRB No. N.º de la IFRB	Canaux N° Channel Nos. N.º de los canales	DSP PFD DFP dB(W/m²)
AGL 295	23	-129,57	ALB 296	22	-146,49	BOT 297	2 6 10 14 18	-134,49	CYP 086	21 25	-147,47
CAF 258	24	-130,81	EGY 026	4 8 12 16 20	-136,59	BUL 020	4 8 12 16 20	-144,97	DNK 089	12 16 20	-143,42
CME 300	1 5 9 13 17	-132,87	SDN 231	22	-133,37	DDR 216	21 25	-145,17	DNK 090	24	-135,20
COG 235	22	-134,83	SDN 230	23	-136,84	HNG 106	22	-145,07	FNL 103	2 6 10	-138,17
GAB 260	3 7 11 15 19	-136,65	SDN 232	24	-134,23	IFB 135	22	-136,51	FNL 104	22	-135,20
ISR 110	25	-145,02	YUG 148	21 25	-140,79	MOZ 307	4 8 12 16 20	-135,37	GRC 105	3 7 11 15 20	-140,87
MLT 147	4 8 12 16	-148,55	YUG 149	23	-140,79	MWI 308	24	-142,67	IFB 021	21 25	-132,06
STP 241	4 8 12 16 20	-144,70				POL 132	1 5 9 13 17	-142,67	ISL 050	23	-137,87
TCD 143	2 6 10 14 18	-133,89				ROU 136	2 6 10 14 18	-143,17	LSO 305	24	-145,06
						SWZ 313	1 5 9 13 17	-147,30	NOR 120	14 18	-139,42
						TCH 144	3 7 11 15 19	-143,27	S 138	4 8	-138,94
						ZMB 314	3 7 11 15 19	-134,29	TUR 145	1 5 9 13 17	-138,47

APPENDIX 31

**Table of Frequencies to Be Used in the Bands Between 4 MHz and 27.5 MHz
Allocated Exclusively to the Maritime Mobile Service**

(See Article 60)

In the table, where appropriate, the assignable frequencies in a given band for each usage are:

- indicated by the lowest and highest frequency, in heavy type, assigned in that band;
- regularly spaced, the number of assignable frequencies and the spacing in kHz being indicated in italics.

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**Table of Frequencies to Be Used in the Bands Between 4 MHz and 23 MHz
Allocated Exclusively to the Maritime Mobile Service**

(kHz)

Bands (MHz)	Limits	Frequencies assignable to ship stations for telephony, duplex operation	Limits	Frequencies assignable to ship and coast stations for telephony, simplex operation	Limits	Frequencies (non-paired) assignable to ship stations for narrow-band direct-printing telegraph and data transmission systems, at speeds not exceeding 100 bauds	Limits	Frequencies assignable to ship stations for wide-band telegraphy, facsimile and special transmission systems	Limits	Frequencies assignable to ship stations for oceanographic data transmission	Limits	Frequencies assignable to ship stations for wide-band telegraphy, facsimile and special transmission systems	Limits	Frequencies (paired) assignable to ship stations for narrow-band direct-printing telegraph and data transmission systems, at speeds not exceeding 100 bauds	Limits	Frequencies (non-paired) assignable to ship stations for narrow-band direct-printing telegraph and data transmission systems, at speeds not exceeding 100 bauds	Limits
		a)*		a)		b)				c)				d)		b)	
4	4 063	4 064.4 - - 4 141.9 <i>26 frequencies spaced 3.1</i>	4 143.6	4 145 <i>1 frequency</i>	4 146.6		4 146.6	4 148.6 - - 4 160.6 <i>4 frequencies spaced 4</i>	4 162.5	4 162.9 - - 4 165.6 <i>10 frequencies spaced 0.3</i>	4 166	4 168 <i>1 frequency</i>	4 170	4 170.5 - - 4 177 <i>14 frequencies spaced 0.5</i>	4 177.25	4 177.5 - - 4 179.5 <i>5 frequencies spaced 0.5</i>	4 179.75
6	6 200	6 201.4 - - 6 216.9 <i>6 frequencies spaced 3.1</i>	6 218.6	6 220 and 6 223 <i>2 frequencies spaced 3</i>	6 224.6		6 224.6	6 226.6 - - 6 242.6 <i>5 frequencies spaced 4</i>	6 244.5	6 244.9 - - 6 247.6 <i>10 frequencies spaced 0.3</i>	6 248	6 250 and 6 254 <i>2 frequencies spaced 4</i>	6 256	6 256.5 - - 6 267.5 <i>23 frequencies spaced 0.5</i>	6 267.75	6 268 - - 6 269.5 <i>4 frequencies spaced 0.5</i>	6 269.75
8	8 195	8 196.4 - - 8 289.4 <i>31 frequencies spaced 3.1</i>	8 291.1	8 292.5 and 8 295.6 <i>2 frequencies spaced 3.1</i>	8 297.3	8 297.6 - - 8 299.6 <i>5 frequencies spaced 0.5</i>	8 300	8 302 - - 8 326 <i>7 frequencies spaced 4</i>	8 328	8 328.4 - - 8 331.1 <i>10 frequencies spaced 0.3</i>	8 331.5	8 333.5 - - 8 341.5 <i>3 frequencies spaced 4</i>	8 343.5	8 344 - - 8 357 <i>27 frequencies spaced 0.5</i>	8 357.25	8 357.5 <i>1 frequency</i>	8 357.75
12	12 330	12 331.4 - - 12 427.5 <i>32 frequencies spaced 3.1</i>	12 429.2	12 430.6 - - 12 436.8 <i>3 frequencies spaced 3.1</i>	12 439.5		12 439.5	12 441.5 - - 12 477.5 <i>10 frequencies spaced 4</i>	12 479.5	12 479.9 - - 12 482.6 <i>10 frequencies spaced 0.3</i>	12 483	12 485 and 12 489 <i>2 frequencies spaced 4</i>	12 491	12 491.5 - - 12 519.5 <i>57 frequencies spaced 0.5</i>	12 519.75	12 520 - - 12 526.5 <i>14 frequencies spaced 0.5</i>	12 526.75
16	16 460	16 461.4 - - 16 585.4 <i>41 frequencies spaced 3.1</i>	16 587.1	16 588.5 - - 16 594.7 <i>3 frequencies spaced 3.1</i>	16 596.4		16 596.4	16 598.4 - - 16 634.4 <i>10 frequencies spaced 4</i>	16 636.5	16 636.9 - - 16 639.6 <i>10 frequencies spaced 0.3</i>	16 640	16 642 - - 16 658 <i>5 frequencies spaced 4</i>	16 660	16 660.5 - - 16 694.5 <i>69 frequencies spaced 0.5</i>	16 694.75	16 695 - - 16 705.5 <i>22 frequencies spaced 0.5</i>	16 705.8
22	22 000	22 001.4 - - 22 122.3 <i>40 frequencies spaced 3.1</i>	22 124	22 125.4 - - 22 137.8 <i>5 frequencies spaced 3.1</i>	22 139.5		22 139.5	22 142 - - 22 158 <i>5 frequencies spaced 4</i>	22 160.5	22 160.9 - - 22 163.6 <i>10 frequencies spaced 0.3</i>	22 164	22 166 - - 22 190 <i>7 frequencies spaced 4</i>	22 192	22 192.5 - - 22 225.5 <i>67 frequencies spaced 0.5</i>	22 225.75	22 226 and 22 226.5 <i>2 frequencies spaced 0.5</i>	22 227

* For notes a) to h), see page AP31-7.

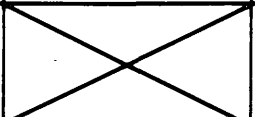
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**Table of Frequencies to Be Used in the Bands Between 4 MHz and 23 MHz
Allocated Exclusively to the Maritime Mobile Service**

(kHz)
(concluded)

Bands (MHz)	Limits	Working frequencies assignable to ship stations for A1A or A1B Morse telegraphy	Limits	Calling frequencies assignable to ship stations for A1A or A1B Morse telegraphy	Limits	Frequencies assignable to ship stations for digital selective calling	Limits	Working frequencies assignable to ship stations for A1A or A1B Morse telegraphy	Limits	Frequencies assignable to coast stations for wide-band and A1A or A1B Morse telegraphy, facsimile, special and data transmission systems and direct-printing telegraphy systems	Limits	Frequencies (paired) assignable to coast stations, narrow-band direct-printing telegraph and data transmission systems, at speeds not exceeding 100 bauds	Limits	Frequencies assignable to coast stations for digital selective calling	Limits	Frequencies assignable to coast stations for telephony, duplex operation	Limits
		e) *		g) h)				e) f)				d)				a)	
4	4 179.75		4 179.75		4 187.2	4 187.6 1 frequency	4 188	4 188.5 --- 4 219 62 frequencies spaced 0.5	4 219.4		4 349.4	4 350 --- 4 356.5 14 frequencies spaced 0.5	4 356.75	4 357 1 frequency	4 357.4	4 358.8 --- 4 436.3 26 frequencies spaced 3.1	4 438
6	6 269.75		6 269.75		6 280.8	6 281.4 1 frequency	6 282	6 282.75 --- 6 324.75 57 frequencies spaced 0.75	6 325.4		6 493.9	6 494.5 --- 6 505.5 23 frequencies spaced 0.5	6 505.75	6 506 1 frequency	6 506.4	6 507.8 --- 6 523.3 6 frequencies spaced 3.1	6 525
8	8 357.75	8 358.5 --- 8 359.5 3 frequencies spaced 0.5	8 359.75		8 374.4	8 375.2 1 frequency	8 376	8 377 --- 8 435 117 frequencies spaced 0.5	8 435.4		8 704.4	8 705 --- 8 718 27 frequencies spaced 0.5	8 718.25	8 718.5 1 frequency	8 718.9	8 720.3 --- 8 813.3 31 frequencies spaced 3.1	8 815
12	12 526.75	12 528 --- 12 538.5 22 frequencies spaced 0.5	12 539.6		12 561.6	12 562.3 and 12 562.8 2 frequencies spaced 0.5	12 564	12 565.5 --- 12 651 172 frequencies spaced 0.5	12 652.3		13 070.8	13 071.5 --- 13 099.5 57 frequencies spaced 0.5	13 099.75	13 100 and 13 100.5 2 frequencies spaced 0.5	13 100.8	13 102.2 --- 13 198.3 32 frequencies spaced 3.1	13 200
16	16 705.8	16 707 --- 16 719 25 frequencies spaced 0.5	16 719.8		16 748.8	16 749.9 and 16 750.4 2 frequencies spaced 0.5	16 752	16 754 --- 16 858 209 frequencies spaced 0.5	16 859.4		17 196.9	17 197.5 --- 17 231.5 69 frequencies spaced 0.5	17 231.75	17 232 and 17 232.5 2 frequencies spaced 0.5	17 232.9	17 234.3 --- 17 358.3 41 frequencies spaced 3.1	17 360
22	22 227		22 227		22 247	22 248 and 22 248.5 2 frequencies spaced 0.5	22 250	22 250.5 --- 22 309 118 frequencies spaced 0.5	22 310.5		22 561	22 561.5 --- 22 594.5 67 frequencies spaced 0.5	22 594.75	22 595 and 22 595.5 2 frequencies spaced 0.5	22 596	22 597.4 --- 22 718.3 40 frequencies spaced 3.1	22 720

* For notes a) to h), see page AP31-7.

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**Table of Frequencies Assignable to Ship Stations in the 25 MHz Band
(kHz)**

Limit	Calling frequencies assignable to ship stations for A1A or A1B Morse telegraphy	Limit	Frequencies (non-paired) assignable to ship stations for narrow-band direct-printing telegraph and data transmission systems, at speeds not exceeding 100 bauds	Limit	Working frequencies assignable to ship stations for A1A or A1B Morse telegraphy	Limit
	<i>g)</i>		<i>b)</i>		<i>e)</i>	
25 070		25 076	25 076.3 - - - 25 089.8 <i>28 frequencies spaced 0.5</i>	25 090.1	25 091.5 - - - 25 108.5 <i>35 frequencies spaced 0.5</i>	25 110

- a)* See Appendix 16.
- b)* See Appendix 33.
- c)* The frequency bands may also be used by buoy stations for oceanographic data transmission and by stations interrogating these buoys, in accordance with the conditions set forth in Resolution 314.
- d)* See Appendix 32.
- e)* In the frequency bands to be used by ship stations for A1A Morse telegraphy working at speeds not exceeding 40 bauds, administrations may assign additional frequencies interleaved between the extreme assignable frequencies. Any frequencies so assigned shall be multiples of 100 Hz. Administrations shall ensure a uniform distribution of such assignments within the bands, and avoid, as far as possible, assigning the two frequencies at ± 100 Hz from each of the harmonically related frequencies indicated in the first line of each series in Appendix 35.
- f)* See Appendix 35.
- g)* See Appendix 34.
- h)* For the conditions of use of the frequency 8 364 kHz, see No. 2988.

APPENDIX 32

**Channelling of the Maritime Mobile Bands Between 4 000 kHz and
23 000 kHz Used for Narrow-Band Direct-Printing Telegraphy
and Data Systems (Paired Frequencies)**

(See Article 60 and Resolution 300)

Each coast station which uses paired frequencies is assigned
one or more frequency pairs from the following series;
each pair consists of a transmitting and a receiving frequency.

**Table of Frequencies for Two-Frequency Operation by Coast Stations
(kHz)**

Series No.	4 MHz Band		6 MHz Band		8 MHz Band	
	Transmit	Receive	Transmit	Receive	Transmit	Receive
1	4 350	4 170.5	6 494.5	6 256.5	8 705	8 344
2	4 350.5	4 171	6 495	6 257	8 705.5	8 344.5
3	4 351	4 171.5	6 495.5	6 257.5	8 706	8 345
4	4 351.5	4 172	6 496	6 258	8 706.5	8 345.5
5	4 352	4 172.5	6 496.5	6 258.5	8 707	8 346
6	4 352.5	4 173	6 497	6 259	8 707.5	8 346.5
7	4 353	4 173.5	6 497.5	6 259.5	8 708	8 347
8	4 353.5	4 174	6 498	6 260	8 708.5	8 347.5
9	4 354	4 174.5	6 498.5	6 260.5	8 709	8 348
10	4 354.5	4 175	6 499	6 261	8 709.5	8 348.5
11	4 355	4 175.5	6 499.5	6 261.5	8 710	8 349
12	4 355.5	4 176	6 500	6 262	8 710.5	8 349.5
13	4 356	4 176.5	6 500.5	6 262.5	8 711	8 350
14	4 356.5	4 177	6 501	6 263	8 711.5	8 350.5
15			6 501.5	6 263.5	8 712	8 351
16			6 502	6 264	8 712.5	8 351.5
17			6 502.5	6 264.5	8 713	8 352
18			6 503	6 265	8 713.5	8 352.5
19			6 503.5	6 265.5	8 714	8 353
20			6 504	6 266	8 714.5	8 353.5
21			6 504.5	6 266.5	8 715	8 354
22			6 505	6 267	8 715.5	8 354.5
23			6 505.5	6 267.5	8 716	8 355
24					8 716.5	8 355.5
25					8 717	8 356
26					8 717.5	8 356.5
27					8 718	8 357

Table of Frequencies for Two-Frequency Operation by Coast Stations
(kHz)

Series No.	12 MHz Band		16 MHz Band		22 MHz Band	
	Transmit	Receive	Transmit	Receive	Transmit	Receive
1	13 071.5	12 491.5	17 197.5	16 660.5	22 561.5	22 192.5
2	13 072	12 492	17 198	16 661	22 562	22 193
3	13 072.5	12 492.5	17 198.5	16 661.5	22 562.5	22 193.5
4	13 073	12 493	17 199	16 662	22 563	22 194
5	13 073.5	12 493.5	17 199.5	16 662.5	22 563.5	22 194.5
6	13 074	12 494	17 200	16 663	22 564	22 195
7	13 074.5	12 494.5	17 200.5	16 663.5	22 564.5	22 195.5
8	13 075	12 495	17 201	16 664	22 565	22 196
9	13 075.5	12 495.5	17 201.5	16 664.5	22 565.5	22 196.5
10	13 076	12 496	17 202	16 665	22 566	22 197
11	13 076.5	12 496.5	17 202.5	16 665.5	22 566.5	22 197.5
12	13 077	12 497	17 203	16 666	22 567	22 198
13	13 077.5	12 497.5	17 203.5	16 666.5	22 567.5	22 198.5
14	13 078	12 498	17 204	16 667	22 568	22 199
15	13 078.5	12 498.5	17 204.5	16 667.5	22 568.5	22 199.5
16	13 079	12 499	17 205	16 668	22 569	22 200
17	13 079.5	12 499.5	17 205.5	16 668.5	22 569.5	22 200.5
18	13 080	12 500	17 206	16 669	22 570	22 201
19	13 080.5	12 500.5	17 206.5	16 669.5	22 570.5	22 201.5
20	13 081	12 501	17 207	16 670	22 571	22 202
21	13 081.5	12 501.5	17 207.5	16 670.5	22 571.5	22 202.5
22	13 082	12 502	17 208	16 671	22 572	22 203
23	13 082.5	12 502.5	17 208.5	16 671.5	22 572.5	22 203.5
24	13 083	12 503	17 209	16 672	22 573	22 204
25	13 083.5	12 503.5	17 209.5	16 672.5	22 573.5	22 204.5
26	13 084	12 504	17 210	16 673	22 574	22 205
27	13 084.5	12 504.5	17 210.5	16 673.5	22 574.5	22 205.5

Table of Frequencies for Two-Frequency Operation by Coast Stations
(kHz)

Series No.	12 MHz Band		16 MHz Band		22 MHz Band	
	Transmit	Receive	Transmit	Receive	Transmit	Receive
28	13 085	12 505	17 211	16 674	22 575	22 206
29	13 085.5	12 505.5	17 211.5	16 674.5	22 575.5	22 206.5
30	13 086	12 506	17 212	16 675	22 576	22 207
31	13 086.5	12 506.5	17 212.5	16 675.5	22 576.5	22 207.5
32	13 087	12 507	17 213	16 676	22 577	22 208
33	13 087.5	12 507.5	17 213.5	16 676.5	22 577.5	22 208.5
34	13 088	12 508	17 214	16 677	22 578	22 209
35	13 088.5	12 508.5	17 214.5	16 677.5	22 578.5	22 209.5
36	13 089	12 509	17 215	16 678	22 579	22 210
37	13 089.5	12 509.5	17 215.5	16 678.5	22 579.5	22 210.5
38	13 090	12 510	17 216	16 679	22 580	22 211
39	13 090.5	12 510.5	17 216.5	16 679.5	22 580.5	22 211.5
40	13 091	12 511	17 217	16 680	22 581	22 212
41	13 091.5	12 511.5	17 217.5	16 680.5	22 581.5	22 212.5
42	13 092	12 512	17 218	16 681	22 582	22 213
43	13 092.5	12 512.5	17 218.5	16 681.5	22 582.5	22 213.5
44	13 093	12 513	17 219	16 682	22 583	22 214
45	13 093.5	12 513.5	17 219.5	16 682.5	22 583.5	22 214.5
46	13 094	12 514	17 220	16 683	22 584	22 215
47	13 094.5	12 514.5	17 220.5	16 683.5	22 584.5	22 215.5
48	13 095	12 515	17 221	16 684	22 585	22 216
49	13 095.5	12 515.5	17 221.5	16 684.5	22 585.5	22 216.5
50	13 096	12 516	17 222	16 685	22 586	22 217
51	13 096.5	12 516.5	17 222.5	16 685.5	22 586.5	22 217.5
52	13 097	12 517	17 223	16 686	22 587	22 218
53	13 097.5	12 517.5	17 223.5	16 686.5	22 587.5	22 218.5
54	13 098	12 518	17 224	16 687	22 588	22 219
55	13 098.5	12 518.5	17 224.5	16 687.5	22 588.5	22 219.5

Table of Frequencies for Two-Frequency Operation by Coast Stations
(kHz)

Series No.	12 MHz Band		16 MHz Band		22 MHz Band	
	Transmit	Receive	Transmit	Receive	Transmit	Receive
56	13 099	12 519	17 225	16 688	22 589	22 220
57	13 099.5	12 519.5	17 225.5	16 688.5	22 589.5	22 220.5
58			17 226	16 689	22 590	22 221
59			17 226.5	16 689.5	22 590.5	22 221.5
60			17 227	16 690	22 591	22 222
61			17 227.5	16 690.5	22 591.5	22 222.5
62			17 228	16 691	22 592	22 223
63			17 228.5	16 691.5	22 592.5	22 223.5
64			17 229	16 692	22 593	22 224
65			17 229.5	16 692.5	22 593.5	22 224.5
66			17 230	16 693	22 594	22 225
67			17 230.5	16 693.5	22 594.5	22 225.5
68			17 231	16 694		
69			17 231.5	16 694.5		

APPENDIX 33

**Channelling of the Maritime Mobile Bands Between
4 000 kHz and 27 500 kHz Used for Narrow-Band
Direct-Printing Telegraphy and Data
Transmission (Non-Paired Frequencies)**

(See Article 60 and Resolution 301)

**One or more frequencies are assigned
to each ship station as transmitting frequencies.**

Table of Ship Station Transmitting Frequencies
(kHz)

Frequency Bands							
	4 MHz	6 MHz	8 MHz	12 MHz	16 MHz	22 MHz	25 MHz
1	4 177.5	6 268	8 297.6	12 520	16 695	22 226	25 076.3
2	4 178	6 268.5	8 298.1	12 520.5	16 695.5	22 226.5	25 076.8
3	4 178.5	6 269	8 298.6	12 521	16 696		25 077.3
4	4 179	6 269.5	8 299.1	12 521.5	16 696.5		25 077.8
5	4 179.5		8 299.6	12 522	16 697		25 078.3
6			8 357.5	12 522.5	16 697.5		25 078.8
7				12 523	16 698		25 079.3
8				12 523.5	16 698.5		25 079.8
9				12 524	16 699		25 080.3
10				12 524.5	16 699.5		25 080.8
11				12 525	16 700		25 081.3
12				12 525.5	16 700.5		25 081.8
13				12 526	16 701		25 082.3
14				12 526.5	16 701.5		25 082.8
15					16 702		25 083.3
16					16 702.5		25 083.8
17					16 703		25 084.3
18					16 703.5		25 084.8
19					16 704		25 085.3
20					16 704.5		25 085.8
21					16 705		25 086.3
22					16 705.5		25 086.8
23							25 087.3
24							25 087.8
25							25 088.3
26							25 088.8
27							25 089.3
28							25 089.8

APPENDIX 34

**Table of Calling Frequencies Assignable to Ship Stations for A1A Morse Telegraphy
at Speeds Not Exceeding 40 Bauds**

(See Article 60 and Resolution 312)

(kHz)

Group	Channel series	4 MHz Band (Ch. width 0.4) <i>a)</i>	6 MHz Band (Ch. width 0.6) <i>a)</i>	8 MHz Band (Ch. width 0.8) <i>a)</i>	12 MHz Band (Ch. width 1.2) <i>a)</i>	16 MHz Band (Ch. width 1.6) <i>a)</i>	Channel series (22 MHz)	22 MHz Band (Ch. width 2.0) <i>b)</i>	25 MHz Band (Ch. width 2.0) <i>b)</i>
I	1	4 180 - 4 180.4	6 270 - 6 270.6	8 360 - 8 360.8	12 540 - 12 541.2	16 720 - 16 721.6	1 2	22 227 - 22 229 22 229 - 22 231	Channel A
	2	4 180.4 - 4 180.8	6 270.6 - 6 271.2	8 360.8 - 8 361.6	12 541.2 - 12 542.4	16 721.6 - 16 723.2			25 070 - 25 072
	3	4 180.8 - 4 181.2	6 271.2 - 6 271.8	8 361.6 - 8 362.4	12 542.4 - 12 543.6	16 723.2 - 16 724.8			Groups I and II
	4	4 181.2 - 4 181.6	6 271.8 - 6 272.4	8 362.4 - 8 363.2	12 543.6 - 12 544.8	16 724.8 - 16 726.4			
Common Ch. Common Ch.	5	4 181.6 - 4 182	6 272.4 - 6 273	8 363.2 - 8 364	12 544.8 - 12 546	16 726.4 - 16 728	3	22 231 - 22 233	Common Channel C 25 072 - 25 074
	6	4 182 - 4 182.4	6 273 - 6 273.6	8 364 - 8 364.8	12 546 - 12 547.2	16 728 - 16 729.6	4	22 233 - 22 235	
II	7	4 182.4 - 4 182.8	6 273.6 - 6 274.2	8 364.8 - 8 365.6	12 547.2 - 12 548.4	16 729.6 - 16 731.2	5 6	22 235 - 22 237 22 237 - 22 239	Channel A
	8	4 182.8 - 4 183.2	6 274.2 - 6 274.8	8 365.6 - 8 366.4	12 548.4 - 12 549.6	16 731.2 - 16 732.8			25 070 - 25 072
	9	4 183.2 - 4 183.6	6 274.8 - 6 275.4	8 366.4 - 8 367.2	12 549.6 - 12 550.8	16 732.8 - 16 734.4			Groups I and II
	10	4 183.6 - 4 184	6 275.4 - 6 276	8 367.2 - 8 368	12 550.8 - 12 552	16 734.4 - 16 736			
III	11	4 184 - 4 184.4	6 276 - 6 276.6	8 368 - 8 368.8	12 552 - 12 553.2	16 736 - 16 737.6	7 8	22 239 - 22 241 22 241 - 22 243	Channel B
	12	4 184.4 - 4 184.8	6 276.6 - 6 277.2	8 368.8 - 8 369.6	12 553.2 - 12 554.4	16 737.6 - 16 739.2			
	13	4 184.8 - 4 185.2	6 277.2 - 6 277.8	8 369.6 - 8 370.4	12 554.4 - 12 555.6	16 739.2 - 16 740.8			
	14	4 185.2 - 4 185.6	6 277.8 - 6 278.4	8 370.4 - 8 371.2	12 555.6 - 12 556.8	16 740.8 - 16 742.4			
IV	15	4 185.6 - 4 186	6 278.4 - 6 279	8 371.2 - 8 372	12 556.8 - 12 558	16 742.4 - 16 744	9 10	22 243 - 22 245 22 245 - 22 247	25 074 - 25 076
	16	4 186 - 4 186.4	6 279 - 6 279.6	8 372 - 8 372.8	12 558 - 12 559.2	16 744 - 16 745.6			Groups III and IV
	17	4 186.4 - 4 186.8	6 279.6 - 6 280.2	8 372.8 - 8 373.6	12 559.2 - 12 560.4	16 745.6 - 16 747.2			
	18	4 186.8 - 4 187.2	6 280.2 - 6 280.8	8 373.6 - 8 374.4	12 560.4 - 12 561.6	16 747.2 - 16 748.8			

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a) Administrations should assign the centre frequency within each channel of the appropriate group and/or common channel to ship stations equipped only with crystal-controlled oscillators and using harmonic relationships for **A1A Morse** telegraphy calling. However, administrations may subdivide each appropriate group channel and common channels into specific calling frequencies commencing 100 Hz from the lower end of the channel and ending 100 Hz from the upper end (see examples below) and assign these discrete frequencies to ships with synthesized transmitters. Administrations shall avoid, as far as possible, assigning the two frequencies at ± 100 Hz from each of the harmonically related centre frequencies in this Appendix.

Examples of subdivision of channels (centre frequencies in italics)

4/1/a	4 180.1	6/1/a	6 270.1	8/1/a	8 360.1	12/1/a	12 540.1	16/1/a	16 720.1
4/1/b	4 180.2	6/1/b	6 270.2	8/1/b	8 360.2	12/1/b	12 540.2	16/1/b	16 720.2
4/1/c	4 180.3	6/1/c	6 270.3	8/1/c	8 360.3	12/1/c	12 540.3	16/1/c	16 720.3
		6/1/d	6 270.4	8/1/d	8 360.4	12/1/d	12 540.4	16/1/d	16 720.4
		6/1/e	6 270.5	8/1/e	8 360.5	12/1/e	12 540.5	16/1/e	16 720.5
				8/1/f	8 360.6	12/1/f	12 540.6	16/1/f	16 720.6
				8/1/g	8 360.7	12/1/g	12 540.7	16/1/g	16 720.7
						12/1/h	12 540.8	16/1/h	16 720.8
						12/1/i	12 540.9	16/1/i	16 720.9
						12/1/j	12 541.0	16/1/j	16 721.0
						12/1/k	12 541.1	16/1/k	16 721.1
								16/1/l	16 721.2
								16/1/m	16 721.3
								16/1/n	16 721.4
								16/1/o	16 721.5

b) In the 22 MHz and 25 MHz bands the channels are not harmonically related to those in the 4 to 16 MHz bands. However, the principle of subdivision of channels into specific calling frequencies commencing 100 Hz from the lower end of the channel and ending 100 Hz from the upper end applies.

APPENDIX 35

**Table of Working Frequencies, in kHz, Assignable to Ship Stations
for A1A Morse Telegraphy at Speeds Not Exceeding 40 Bauds**

(See also Note *e*) to Appendix 31)

Note: The first line in each series up to and including series No. 53 indicates the harmonically related assignable frequencies in the 4, 6, 8, 12 and 16 MHz bands. The other frequencies are not necessarily harmonically related.

(kHz)

Series No.	Bands				
	4 MHz	6 MHz	8 MHz	12 MHz	16 MHz
1.	4 188.5	6 282.75	8 377	12 565.5	16 754
a)				12 566	16 754.5
b)			8 377.5		16 755
c)				12 566.5	16 755.5
2.	4 189	6 283.5	8 378	12 567	16 756
a)				12 567.5	16 756.5
b)			8 378.5		16 757
c)				12 568	16 757.5
3.	4 189.5	6 284.25	8 379	12 568.5	16 758
a)				12 569	16 758.5
b)			8 379.5		16 759
c)				12 569.5	16 759.5
4.	4 190	6 285	8 380	12 570	16 760
a)				12 570.5	16 760.5
b)			8 380.5		16 761
c)				12 571	16 761.5
5.	4 190.5	6 285.75	8 381	12 571.5	16 762
a)				12 572	16 762.5
b)			8 381.5		16 763
c)				12 572.5	16 763.5
6.	4 191	6 286.5	8 382	12 573	16 764
a)				12 573.5	16 764.5
b)			8 382.5		16 765
c)				12 574	16 765.5
7.	4 191.5	6 287.25	8 383	12 574.5	16 766
a)				12 575	16 766.5
b)			8 383.5		16 767
c)				12 575.5	16 767.5
8.	4 192	6 288	8 384	12 576	16 768
a)				12 576.5	16 768.5
b)			8 384.5		16 769
c)				12 577	16 769.5
9.	4 192.5	6 288.75	8 385	12 577.5	16 770
a)				12 578	16 770.5
b)			8 385.5		16 771
c)				12 578.5	16 771.5
10.	4 193	6 289.5	8 386	12 579	16 772
a)				12 579.5	16 772.5
b)			8 386.5		16 773
c)				12 580	16 773.5

(kHz)**AP35-3**

Series No.	Bands				
	4 MHz	6 MHz	8 MHz	12 MHz	16 MHz
11.	4 193.5	6 290.25	8 387	12 580.5	16 774
a)				12 581	16 774.5
b)			8 387.5		16 775
c)				12 581.5	16 775.5
12.	4 194	6 291	8 388	12 582	16 776
a)				12 582.5	16 776.5
b)			8 388.5		16 777
c)				12 583	16 777.5
13.	4 194.5	6 291.75	8 389	12 583.5	16 778
a)				12 584	16 778.5
b)			8 389.5		16 779
c)				12 584.5	16 779.5
14.	4 195	6 292.5	8 390	12 585	16 780
a)				12 585.5	16 780.5
b)			8 390.5		16 781
c)				12 586	16 781.5
15.	4 195.5	6 293.25	8 391	12 586.5	16 782
a)				12 587	16 782.5
b)			8 391.5		16 783
c)				12 587.5	16 783.5
16.	4 196	6 294	8 392	12 588	16 784
a)				12 588.5	16 784.5
b)			8 392.5		16 785
c)				12 589	16 785.5
17.	4 196.5	6 294.75	8 393	12 589.5	16 786
a)				12 590	16 786.5
b)			8 393.5		16 787
c)				12 590.5	16 787.5
18.	4 197	6 295.5	8 394	12 591	16 788
a)				12 591.5	16 788.5
b)			8 394.5		16 789
c)				12 592	16 789.5
19.	4 197.5	6 296.25	8 395	12 592.5	16 790
a)				12 593	16 790.5
b)			8 395.5		16 791
c)				12 593.5	16 791.5
20.	4 198	6 297	8 396	12 594	16 792
a)				12 594.5	16 792.5
b)			8 396.5		16 793
c)				12 595	16 793.5

Series No.	Bands				
	4 MHz	6 MHz	8 MHz	12 MHz	16 MHz
21. a) b) c)	4 198.5	6 297.75	8 397 8 397.5	12 595.5 12 596 12 596.5	16 794 16 794.5 16 795 16 795.5
22. a) b) c)	4 199	6 298.5	8 398 8 398.5	12 597 12 597.5 12 598	16 796 16 796.5 16 797 16 797.5
23. a) b) c)	4 199.5	6 299.25	8 399 8 399.5	12 598.5 12 599 12 599.5	16 798 16 798.5 16 799 16 799.5
24. a) b) c)	4 200	6 300	8 400 8 400.5	12 600 12 600.5 12 601	16 800 16 800.5 16 801 16 801.5
25. a) b) c)	4 200.5	6 300.75	8 401 8 401.5	12 601.5 12 602 12 602.5	16 802 16 802.5 16 803 16 803.5
26. a) b) c)	4 201	6 301.5	8 402 8 402.5	12 603 12 603.5 12 604	16 804 16 804.5 16 805 16 805.5
27. a) b) c)	4 201.5	6 302.25	8 403 8 403.5	12 604.5 12 605 12 605.5	16 806 16 806.5 16 807 16 807.5
28. a) b) c)	4 202	6 303	8 404 8 404.5	12 606 12 606.5 12 607	16 808 16 808.5 16 809 16 809.5
29. a) b) c)	4 202.5	6 303.75	8 405 8 405.5	12 607.5 12 608 12 608.5	16 810 16 810.5 16 811 16 811.5
30. a) b) c)	4 203	6 304.5	8 406 8 406.5	12 609 12 609.5 12 610	16 812 16 812.5 16 813 16 813.5

(kHz)**AP35-5**

Series No.	Bands				
	4 MHz	6 MHz	8 MHz	12 MHz	16 MHz
31. a) b) c)	4 203.5	6 305.25	8 407 8 407.5	12 610.5 12 611 12 611.5	16 814 16 814.5 16 815 16 815.5
32. a) b) c)	4 204	6 306	8 408 8 408.5	12 612 12 612.5 12 613	16 816 16 816.5 16 817 16 817.5
33. a) b) c)	4 204.5	6 306.75	8 409 8 409.5	12 613.5 12 614 12 614.5	16 818 16 818.5 16 819 16 819.5
34. a) b) c)	4 205	6 307.5	8 410 8 410.5	12 615 12 615.5 12 616	16 820 16 820.5 16 821 16 821.5
35. a) b) c)	4 205.5	6 308.25	8 411 8 411.5	12 616.5 12 617 12 617.5	16 822 16 822.5 16 823 16 823.5
36. a) b) c)	4 206	6 309	8 412 8 412.5	12 618 12 618.5 12 619	16 824 16 824.5 16 825 16 825.5
37. a) b) c)	4 206.5	6 309.75	8 413 8 413.5	12 619.5 12 620 12 620.5	16 826 16 826.5 16 827 16 827.5
38. a) b) c)	4 207	6 310.5	8 414 8 414.5	12 621 12 621.5 12 622	16 828 16 828.5 16 829 16 829.5
39. a) b) c)	4 207.5	6 311.25	8 415 8 415.5	12 622.5 12 623 12 623.5	16 830 16 830.5 16 831 16 831.5
40. a) b) c)	4 208	6 312	8 416 8 416.5	12 624 12 624.5 12 625	16 832 16 832.5 16 833 16 833.5

Series No.	Bands				
	4 MHz	6 MHz	8 MHz	12 MHz	16 MHz
41. a) b) c)	4 208.5	6 312.75	8 417 8 417.5	12 625.5 12 626 12 626.5	16 834 16 834.5 16 835 16 835.5
42. a) b) c)	4 209	6 313.5	8 418 8 418.5	12 627 12 627.5 12 628	16 836 16 836.5 16 837 16 837.5
43. a) b) c)	4 209.5	6 314.25	8 419 8 419.5	12 628.5 12 629 12 629.5	16 838 16 838.5 16 839 16 839.5
44. a) b) c)	4 210	6 315	8 420 8 420.5	12 630 12 630.5 12 631	16 840 16 840.5 16 841 16 841.5
45. a) b) c)	4 210.5	6 315.75	8 421 8 421.5	12 631.5 12 632 12 632.5	16 842 16 842.5 16 843 16 843.5
46. a) b) c)	4 211	6 316.5	8 422 8 422.5	12 633 12 633.5 12 634	16 844 16 844.5 16 845 16 845.5
47. a) b) c)	4 211.5	6 317.25	8 423 8 423.5	12 634.5 12 635 12 635.5	16 846 16 846.5 16 847 16 847.5
48. a) b) c)	4 212	6 318	8 424 8 424.5	12 636 12 636.5 12 637	16 848 16 848.5 16 849 16 849.5
49. a) b) c)	4 212.5	6 318.75	8 425 8 425.5	12 637.5 12 638 12 638.5	16 850 16 850.5 16 851 16 851.5
50. a) b) c)	4 213	6 319.5	8 426 8 426.5	12 639 12 639.5 12 640	16 852 16 852.5 16 853 16 853.5

(kHz)

AP35-7

Series No.	Bands				
	4 MHz	6 MHz	8 MHz	12 MHz	16 MHz
51.	4 213.5	6 320.25	8 427	12 640.5	16 854
a)				12 641	16 854.5
b)			8 427.5		16 855
c)				12 641.5	16 855.5
52.	4 214	6 321	8 428	12 642	16 856
a)				12 642.5	16 856.5
b)			8 428.5		16 857
c)				12 643	16 857.5
53.	4 214.5	6 321.75	8 429	12 643.5	16 858 *
a)				12 644	
b)			8 429.5		
c)				12 644.5	
54.	4 215	6 322.5	8 430	12 645	
a)				12 645.5	
b)			8 430.5		
c)				12 646	
55.	4 215.5	6 323.25	8 431	12 646.5	
a)				12 647	
b)			8 431.5		
c)				12 647.5	
56.	4 216	6 324	8 432	12 648	
a)				12 648.5	
b)			8 432.5		
c)				12 649	
57.	4 216.5	6 324.75 *	8 433	12 649.5	
a)				12 650	
b)			8 433.5		
c)				12 650.5	
58.	4 217		8 434	12 651 *	
a)					
b)			8 434.5		
59.	4 217.5		8 435 *		
60.	4 218				
61.	4 218.5				
62.	4 219 *				

* This is the highest assignable frequency within the band.

APPENDIX 36

**Automatic Receiving Equipment for Radiotelegraph
and Radiotelephone Alarm Signals**

(See Section II of Article 41)

1. The automatic devices intended for the reception of the radio-telegraph alarm signal shall fulfil the following conditions:

- a)* the equipment shall respond to the alarm signal transmitted by the telegraphic emissions of at least class A2B and H2B (see No. 4216);
- b)* the equipment shall respond to the alarm signal through interference (provided it is not continuous) caused by atmospherics and powerful signals other than the alarm signal, preferably without any manual adjustment being required during any period of watch maintained by the apparatus;
- c)* the equipment shall not be actuated by atmospherics or by strong signals other than the alarm signal;
- d)* the equipment shall possess a minimum sensitivity such that with negligible atmospheric interference, it is capable of being operated by the alarm signal transmitted by the emergency transmitter of a ship station at any distance from this station up to the normal range fixed for this transmitter by the International Convention for the Safety of Life at Sea, and preferably at greater distances;
- e)* the equipment shall give warning of any fault which would prevent the apparatus from performing its normal functions during watch hours.

2. The automatic devices intended for the reception of the radio-telephone alarm signal shall fulfil the following conditions:

- a)* the equipment shall respond to the alarm signal through intermittent interference caused by atmospherics and powerful signals other than the alarm signal, preferably without any manual adjustment being required during any period of watch maintained by the equipment;
 - b)* the equipment shall not be actuated by atmospherics or by strong signals other than the alarm signal;
 - c)* the equipment shall be effective beyond the range at which speech transmission is satisfactory and it should, as far as practicable, give warning of faults that would prevent the apparatus from performing its normal function during watch hours.
-

APPENDIX 37

**Technical Characteristics of Emergency
Position-Indicating Radiobeacons Operating
on the Carrier Frequency 2 182 kHz**

(See Section I of Article 41)

Emergency position-indicating radiobeacons shall fulfil the following conditions:

a) the power radiated by low-power radiobeacons (Type L) shall be of a value necessary to produce at a distance of 30 nautical miles at sea level a field strength equal to or less than 10 microvolts per metre, with an initial field strength of at least 2.5 microvolts per metre;

b) the power radiated by high-power radiobeacons (Type H) shall be of a value necessary to produce at a distance of 30 nautical miles at sea level a field strength greater than 10 microvolts per metre;

c) after a period of 48 hours' continuous operation the radiated power shall not be less than 20 per cent of the initial power;

d) the radiobeacons shall be capable of class A2A (or A2B) or H2A (or H2B) emissions, with a depth of modulation between 30 and 90 per cent;

e) the audio-frequency tolerance of emissions used for emergency position-indicating radiobeacons (Nos. 3256 to 3258) are:

± 20 Hz for the frequency of 1 300 Hz

± 35 Hz for the frequency of 2 200 Hz

f) equipment shall be designed to comply with relevant CCIR Recommendations.

APPENDIX 38

Narrow-Band Direct-Printing Telegraph Equipment

(See Articles 59, 60, 63 and 64)

The equipment for narrow-band direct-printing telegraph systems in the maritime mobile service shall fulfil the following conditions:

- a)* the equipment shall accept signals conforming to International Telegraph Alphabet Code No. 2 at a modulation rate of 50 bauds and shall provide similar signals at its output suitable for extension to the public telegraph network;
- b)* the modulation rate over the radio path shall not exceed 100 bauds;
- c)* class F1B emissions shall be used, with a frequency shift of 170 Hz (*Note 1*);

Note 1: When frequency-shift keying is effected by applying audio signals to the input of a single-sideband transmitter particular care should be taken to suppress adequately the residual carrier of the single-sideband modulation process. In addition a suitable choice of the centre audio frequency will minimize the possibility of the residual carrier causing interference to nearby channels. For this reason some administrations have chosen 1 700 Hz as the centre frequency.

- d) the frequency tolerance of the transmitted signal shall be ± 40 Hz for ship stations, and shall be ± 15 Hz for coast stations (*Note 1*, *Note 2* and *Note 3*);
- e) the higher of the emitted frequencies shall correspond to “space” (start), and the lower of the emitted frequencies shall correspond to “mark” (stop) in accordance with the relevant CCIR Recommendation;
- f) where an error control system is employed the apparatus should be provided with a simple device to by-pass the error control system to permit transmission and reception over the radio path of uncorrected signals conforming with a) above;
- g) when an error-detecting and correcting system is used for direct-printing telegraphy in the maritime mobile service, a 7-unit ARQ system or a 7-unit forward acting error-correcting and indicating time diversity system, using the same code, shall be employed. Remaining technical characteristics of the error-detecting and correcting equipment should be in accordance with the relevant CCIR Recommendations;

Note 1: For operational purposes the associated receiving equipment should conform to the frequency stability of the transmitters.

Note 2: These tolerances shall apply to equipment installed after 1 January 1976 and to all equipment after 1 January 1985. For equipment installed before 2 January 1976 the tolerance is 100 Hz for ship station transmitters (with a maximum deviation of 40 Hz for short periods of the order of 15 minutes) and for coast station transmitters the tolerance is 40 Hz.

Note 3: Stricter tolerances may be desirable, depending on the method of operation of the service and the equipment employed.

- h)* if a station is equipped with a selective calling system in accordance with the provisions of **Appendix 39** and with a direct-printing system in accordance with the provisions of the present Appendix and uses a two block call signal, that station shall be assigned the same identification or selective call number in accordance with Nos. **2088** and **2143** to **2146** for both systems;
 - i)* a station, equipped with a direct-printing system in accordance with the provisions of the present Appendix and using a two block call signal, which has not already been assigned a number in accordance with Nos. **2088** and **2143** to **2146**, should be assigned such a number for the direct-printing system;
 - j)* conversion from the numerical identification to the 28-bit (4-character) pattern shall be performed according to the relevant CCIR Recommendations.
-

APPENDIX 39

**Selective Calling System for Use in the
International Maritime Mobile Service**

(See Articles 25, 62, 63 and 65 and Appendix 9)

1. Where there is a need to fulfil immediate requirements for selective calling, the system to be used shall have the following characteristics:

1.1 the selective call signal shall consist of five figures representing the code number assigned to a ship for selective calling;

1.2 the audio-frequency signal applied to the input of the coast station transmitter shall consist of consecutive audio-frequency pulses conforming to the following:

1.2.1 the audio frequencies used to identify the figures of the code number assigned to a ship shall conform to the following series:

Figure	1	2	3	4	5	6	7	8	9	0	Figure repetition
Audio frequency (Hz)	1124	1197	1275	1358	1446	1540	1640	1747	1860	1981	2110

For example, the series of audio-frequency pulses corresponding to the selective call 12133 would be 1124-1197-1124-1275-2110 Hz, and the series corresponding to the code number 22222 would be 1197-2110-1197-2110-1197 Hz;

- 1.2.2 if the series of numbers represented by the use of only two frequencies, chosen from those in paragraph 1.2.1, are reserved for calling predetermined groups of ships, then 100 different groups of numbers are available for allocation, according to the needs of administrations;
- 1.2.3 the waveforms of the audio-frequency generators shall be substantially sinusoidal, not exceeding 2% total harmonic distortion;
- 1.2.4 the audio-frequency pulses shall be transmitted sequentially;
- 1.2.5 the difference between the maximum amplitude of any audio-frequency pulses shall not exceed 1 dB;
- 1.2.6 the duration of each audio-frequency pulse, measured between the half-amplitude points, shall be 100 ms $\pm$ 10 ms;
- 1.2.7 the time interval between consecutive pulses, measured between the half-amplitude points, shall be 3 ms $\pm$ 2 ms;
- 1.2.8 the rise and the decay time of each audio-frequency pulse, measured between the 10% and 90% amplitude points, shall be 1.5 ms $\pm$ 1 ms;
- 1.2.9 the frequency tolerance of the audio frequencies given in paragraph 1.2.1 shall be $\pm$ 4 Hz;
- 1.2.10 the selective call signal (the selective call number assigned to the ship station) shall be transmitted twice with an interval of 900 ms $\pm$ 100 ms between the end of the first signal and the beginning of the second signal (Figure 1);
- 1.2.11 the interval between calls from a coast station to different ships shall be at least 1 second (Figure 1).

2. The additional information following the selective call signal shall be transmitted as follows:

- 2.1 to identify the calling coast station, four figures shall be transmitted;
- 2.2 to identify the VHF channel on which a reply is required, two "zeros" followed by two "figures" should be transmitted (see Appendix 18);
- 2.3 the characteristics of the signals shall conform to paragraphs 1.2.1 and 1.2.3 to 1.2.9 inclusive;
- 2.4 the composition of the signal shall be as shown in the diagram (Figure 2), the tolerance on the 350 ms interval being ± 30 ms.

3. A special "all ships call" signal to actuate the receiving selectors on all ships, regardless of their individual code number, shall consist of a continuous sequential transmission of the eleven audio-frequencies given in paragraph 1.2.1. The parameters of the audio-frequency pulses shall be in accordance with paragraphs 1.2.3, 1.2.4, 1.2.5 and 1.2.9. The duration of each audio-frequency pulse, measured between the half-amplitude points, shall be $17 \text{ ms} \pm 1 \text{ ms}$ and the interval between consecutive pulses, measured between half-amplitude points, shall not exceed 1 ms. The total duration of this "all ships call" signal should be at least five seconds.

4. Receiving selectors on ships should operate reliably in any radio conditions acceptable for satisfactory communication.

5. The receiving selector shall be designed to accept the signals as defined in paragraph 1. However, bearing in mind that coast stations may transmit additional signals (e.g. coast station identification), it is important that the reset time of the decoder should be $250 \text{ ms} \pm 40 \text{ ms}$.

6. The receiving selector should be so designed, constructed and maintained that it is resistant to atmospheric and other unwanted signals including selective calling signals other than that for which the decoder has been set up.

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7. The receiving selector shall include an audible or visual means of indicating the receipt of a call and, if required, an additional facility allowing the determination of the identity of the calling station or the VHF channel on which to reply according to the needs of administrations.

8. The indicating means shall be actuated on correct reception of the calling signal, no matter whether the correct registration has occurred on the first, or the second, or both parts of the calling signal transmitted by the coast stations.

9. The indicating means shall remain actuated until reset manually.

10. The receiving selector equipment should be as simple as is practicable, be capable of reliable operation over long periods with a minimum of maintenance, and could, with advantage, include facilities for self-testing.

FIGURE 1

Composition of Selective Call Signals Without Additional Information

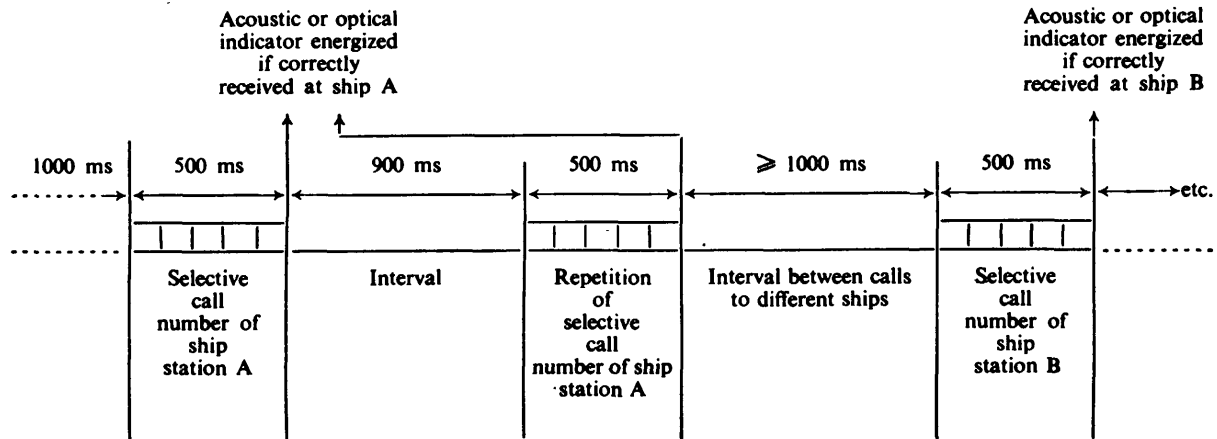
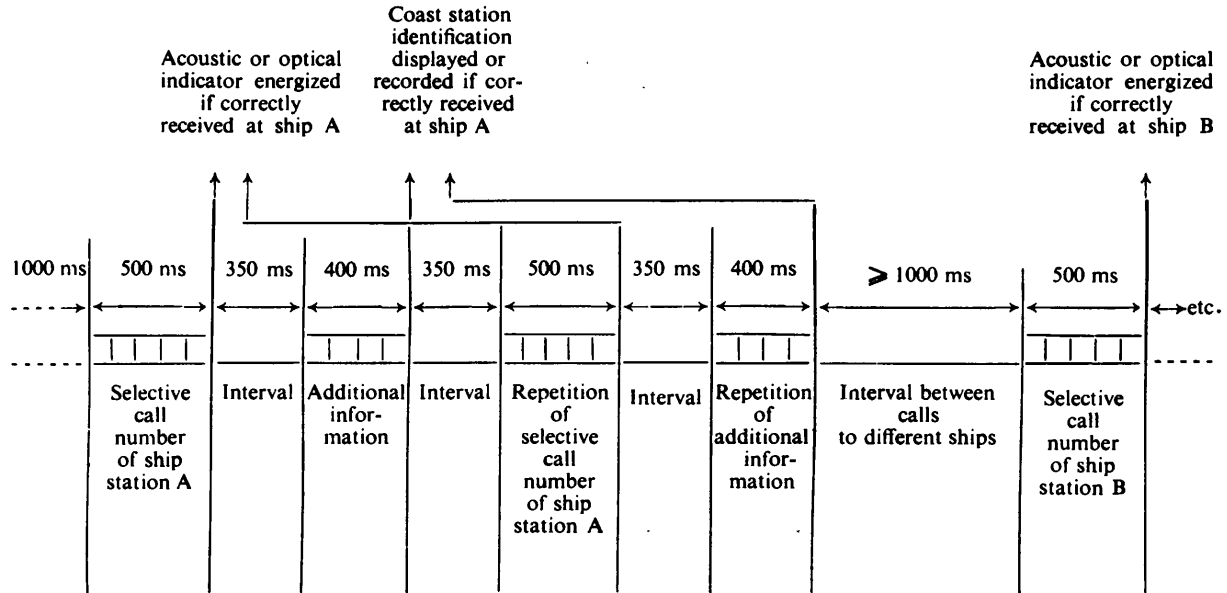


FIGURE 2

Composition of Selective Call Signals with Additional Information



APPENDIX 40

Linked Compressor and Expander Systems

(See Section IV of Article 60 and Appendix 17)

When linked compressor and expander systems are used in the international maritime mobile radiotelephone service:

- a)* the characteristics of the linked compressor and expander equipment shall be in accordance with relevant CCIR Recommendations;
- b)* for optimum performance the characteristics of SSB radio equipment used in conjunction with compressor and expander systems shall be in accordance with **Appendix 17** and should, in addition, meet the following requirements:
 - 1. the short-term frequency stability (of the order of 15 minutes) of coast station transmitters should be within ± 2 Hz;
 - 2. the short-term frequency stability (of the order of 15 minutes) of ship station transmitters should be within ± 5 Hz;
 - 3. to ensure sufficient overall gain stability of the system, for the duration of a call, facilities should be provided in coast station receivers to keep the end-to-end frequency error within ± 2 Hz; similarly, facilities should be provided in ship station receivers to keep the end-to-end frequency error within ± 5 Hz;

4. the maximum permissible amplitude variation in the transmitter over the 350 — 2 700 Hz audio frequency band should be 6 dB and the differential delay should not exceed 3 ms. The receiver should have at least the same standards of performance in these respects;
 5. if the pilot carrier of a class R3E emission is not used to provide a continuous signal for controlling the frequency and gain of the receiver, for example where a class J3E emission is used, the initial tuning procedure will require the provision, for a brief period, of a suitable reference tone (e.g. 1 000 Hz ± 1 Hz) at a level of the order of -10 dBm0 ± 0.5 dB;
 6. where it is desired to use speech inverters or other types of privacy equipment, it should be borne in mind that the upper audio frequency of the speech channel is 2 380 Hz.
-

APPENDIX 41

**Procedure for Obtaining Radio Direction-Finding Bearings
and Positions**

(See Article 35)

Section I. General Instructions

1. Stations of the aeronautical mobile service shall use such special procedures as may be in force as a result of agreements concluded between administrations. However, if they have need to participate in direction-finding operations with stations of the maritime mobile service, the provisions of this Appendix shall be applicable.

2. Before calling one or more radio direction-finding stations for the purpose of asking for a bearing or position, a mobile station shall ascertain from the List of Radiodetermination and Special Service Stations:

- a)* the call signs of the stations to be called to obtain the desired bearings or position;
- b)* the frequency on which the radio direction-finding stations keep watch, and the frequency or frequencies on which they take bearings;
- c)* the radio direction-finding stations which, being linked by special circuits, can be grouped operationally with the radio direction-finding station to be called.

3. The procedure to be followed by the mobile station depends on varying circumstances. Generally, the following shall be taken into account:

- a)* if the radio direction-finding stations do not keep watch on the same frequency (whether it be the frequency on which bearings are taken or another frequency), a separate request for the bearings shall be made to each station or group of stations using a given frequency;

- b) if all the radio direction-finding stations concerned keep watch on the same frequency, and if they are able to take bearings on a common frequency (which may be different from the listening frequency), the mobile station shall call all of them at the same time, in order that all these stations may take simultaneous bearings on the same transmission;
 - c) if several radio direction-finding stations are grouped by means of special circuits, only one of them, the radio direction-finding control station, shall be called even if all are furnished with transmitting apparatus. In that case, however, the mobile station shall, if appropriate, specify in the call, by means of call signs, the radio direction-finding stations from which it wishes to obtain bearings.
4. The List of Radiodetermination and Special Service Stations contains information relating to:
- a) the type of signal and class of emission to be used for obtaining the bearings;
 - b) the duration of the transmission to be made by the mobile station;
 - c) the time used by the radio direction-finding station in question, if different from Coordinated Universal Time (UTC).

Section II. Rules of Procedure

5. The following rules of procedure applicable to radiotelegraphy and radiotelephony are based on the use of radiotelegraphy. When used for radiotelephony, appropriate phrases may replace the service abbreviations.

To obtain a bearing

6. (1) The mobile station shall call the radio direction-finding station or the radio direction-finding control station on the listening frequency indicated in the List of Radiodetermination and Special Service Stations. Depending on the type of information desired, the calling station shall transmit the appropriate service abbreviation followed, if the radio direction-finding station is a mobile station, by the service abbreviation QTH?. It shall indicate, if necessary, the frequency on which it is going to transmit to enable its bearing to be taken, and then await instructions.

(2) The radio direction-finding station called shall request the calling station, by means of the appropriate service abbreviation, to transmit for the bearing. If necessary, it shall indicate the frequency to be used for this purpose and the number of times the transmission is to be repeated.

(3) After having changed, if necessary, to its new transmitting frequency, the calling station shall transmit two dashes of approximately ten seconds each, followed by its call sign. It shall repeat this signal as often as the radio direction-finding station requires.

(4) The radio direction-finding station shall determine the direction and, if possible, the sense of the bearing, and its classification (see paragraph 7).

(5) If the radio direction-finding station is not satisfied with the operation, it shall request the calling station to repeat the transmission described in (3).

(6) The radio direction-finding station shall transmit the information to the calling station in the following order:

- a) the appropriate service abbreviation;
- b) three digits indicating the true bearing in degrees from the radio direction-finding station;
- c) class of bearing;
- d) time of observation;
- e) if the radio direction-finding station is mobile, its own position in latitude and longitude, preceded by the service abbreviation QTH.

(7) As soon as the calling station has received the result of the observation, it shall repeat the message, if this is considered necessary to obtain confirmation. The radio direction-finding station then shall confirm that the repetition is correct or, if necessary, correct it by repeating the message. When the radio direction-finding station is sure that the calling station has received the message correctly, it shall transmit the signal "end of work". The calling station shall repeat this signal to indicate that the operation is finished.

(8) In the absence of information to the contrary, the calling station may assume that the sense of the bearing was determined. If the radio direction-finding station has not determined the sense, it shall indicate this in the information transmitted, or report the bearing and its reciprocal.

Classification of bearings

7. To estimate the accuracy and determine the corresponding class of a bearing:

- a) an operator should generally, and particularly in the maritime mobile radio direction-finding service on frequencies below 3 000 kHz, use the observational characteristics of bearings shown in the following table;
- b) the operators at a radio direction-finding station, when facilities and time permit, may take into account the probability of error in the bearing. A bearing is considered as belonging to a particular class if there is a probability of less than one in twenty that the bearing error would exceed the numerical values specified for that class shown in the following table. This probability should be determined from an analysis of the five components that make up the total variance of the bearing (instrumental, site, propagation, random-sampling and observational components).

To obtain a position determined by two or more radio direction-finding stations organized as a group

8. (1) If the calling station wishes to be informed of its position by a group of radio direction-finding stations, it shall call the control station as is indicated in (1) of paragraph 6 above, and request its position by means of the appropriate service abbreviation.

(2) The control station shall reply to the call and, when the radio direction-finding stations are ready, request, by means of the appropriate service abbreviation, that the calling station transmit. When the position has been determined, the control station shall transmit to the calling station:

- a) the appropriate service abbreviation;
- b) the position, in latitude and longitude or, if appropriate, in relation to a known geographical position;
- c) the class of position as defined in the following sub-paragraph;
- d) the time of observation.

(3) According to its estimate of the accuracy of the observations, the control station shall classify the position in one of the four following classes:

Class A: positions which the operator may reasonably expect to be accurate to within 5 nautical miles;

Class B: positions which the operator may reasonably expect to be accurate to within 20 nautical miles;

Class C: positions which the operator may reasonably expect to be accurate to within 50 nautical miles;

Class D: positions which the operator may not expect to be accurate to within 50 nautical miles.

(4) However, for frequencies above 3 000 kHz, where the distance limits specified in the preceding sub-paragraph may not be appropriate, the control station may classify the position in accordance with current CCIR Recommendations.

To obtain simultaneous bearings from two or more radio direction-finding stations organized as a group

9. On a request for bearings, the control station of a group of radio direction-finding stations shall proceed as indicated in paragraph 8 above. It then shall transmit the bearings observed by each station of the group, each bearing being preceded by the call sign of the station which observed it.

TABLE
Classification of Bearings

Class	Bearing Error (Degrees)	Observational Characteristics					
		Signal Strength	Bearing Indication	Fading	Interference	Bearing Swing (Degrees)	Duration of Observation
A	± 2	very good or good	definite (sharp null)	negligible	negligible	less than 3	adequate
B	± 5	fairly good	blurred	slight	slight	more than 3 less than 5	short
C	± 10	weak	severely blurred	severe	strong	more than 5 less than 10	very short
D	more than ± 10	scarcely perceptible	ill-defined	very severe	very strong	more than 10	inadequate

APPENDIX 42

**Table of Allocation of International
Call Sign Series¹**

(See Article 25)

Call Sign Series	Allocated to
AAA-ALZ	United States of America
AMA-AOZ	Spain
APA-ASZ	Pakistan (Islamic Republic of)
ATA-AWZ	India (Republic of)
AXA-AXZ	Australia
AYA-AZZ	Argentine Republic
A2A-A2Z	Botswana (Republic of)
A3A-A3Z	Tonga (Kingdom of)
A4A-A4Z	Oman (Sultanate of)
A5A-A5Z	Bhutan (Kingdom of)
A6A-A6Z	United Arab Emirates
A7A-A7Z	Qatar (State of)
A8A-A8Z	Liberia (Republic of)
A9A-A9Z	Bahrain (State of)
BAA-BZZ	China (People's Republic of)
CAA-CEZ	Chile
CFA-CKZ	Canada
CLA-CMZ	Cuba
CNA-CNZ	Morocco (Kingdom of)
COA-COZ	Cuba
CPA-CPZ	Bolivia (Republic of)
CQA-CUZ	Portugal
CVA-CXZ	Uruguay (Oriental Republic of)
CYA-CZZ	Canada
C2A-C2Z	Nauru (Republic of)
C3A-C3Z	Andorra (Principality of)
C4A-C4Z	Cyprus (Republic of)
C5A-C5Z	Gambia (Republic of the)
C6A-C6Z	Bahamas (Commonwealth of the)

¹ The series of call signs preceded by an asterisk are allocated to international organizations.

Call Sign Series	Allocated to
*C7A-C7Z C8A-C9Z DAA-DRZ DSA-DTZ DUA-DZZ D2A-D3Z D4A-D4Z D5A-D5Z D6A-D6Z D7A-D9Z EAA-EHZ EIA-EJZ EKA-EKZ ELA-ELZ EMA-EOZ EPA-EQZ ERA-ESZ ETA-ETZ EUA-EWZ EXA-EZZ FAA-FZZ GAA-GZZ HAA-HAZ HBA-HBZ HCA-HDZ HEA-HEZ HFA-HFZ HGA-HGZ HHA-HHZ HIA-HIZ HJA-HKZ HLA-HLZ HMA-HMZ HNA-HNZ	World Meteorological Organization Mozambique (People's Republic of) Germany (Federal Republic of) Republic of Korea Philippines (Republic of the) Angola (People's Republic of) Cape Verde (Republic of) Liberia (Republic of) Comoros (Federal and Islamic Republic of the) Republic of Korea Spain Ireland Union of Soviet Socialist Republics Liberia (Republic of) Union of Soviet Socialist Republics Iran (Islamic Republic of) Union of Soviet Socialist Republics Ethiopia Byelorussian Soviet Socialist Republic Union of Soviet Socialist Republics France United Kingdom of Great Britain and Northern Ireland Hungarian People's Republic Switzerland (Confederation of) Ecuador Switzerland (Confederation of) Poland (People's Republic of) Hungarian People's Republic Haiti (Republic of) Dominican Republic Colombia (Republic of) Republic of Korea ¹ Democratic People's Republic of Korea ¹ Iraq (Republic of)

¹ The two Administrations concerned undertake to change their existing use of HLA-HLZ and HMA-HMZ call sign series to conform with the 1979 Table of Allocations as soon as practicable, in order to clarify their operational arrangements for other administrations. In this regard, the Administration of the Republic of Korea will take action to change the existing call signs registered with the ITU in the HMA-HMZ series as changes occur in the use of call signs in this series. The above-mentioned actions shall, in any case, be completed by 1 January 1984.

Call Sign Series	Allocated to
HOA-HPZ HQA-HRZ HSA-HSZ HTA-HTZ HUA-HUZ HVA-HVZ HWA-HYZ HZA-HZZ H2A-H2Z H3A-H3Z H4A-H4Z H6A-H7Z H8A-H9Z IAA-IZZ JAA-JSZ JTA-JVZ JWA-JXZ JYA-JYZ JZA-JZZ J2A-J2Z J3A-J3Z J4A-J4Z J5A-J5Z J6A-J6Z J7A-J7Z KAA-KZZ LAA-LNZ LOA-LWZ LXA-LXZ LYA-LYZ LZA-LZZ L2A-L9Z MAA-MZZ NAA-NZZ OAA-OCZ ODA-ODZ OEA-OEZ OFA-OJZ OKA-OMZ ONA-OTZ OUA-OZZ PAA-PIZ PJA-PJZ PKA-POZ PPA-PYZ	Panama (Republic of) Honduras (Republic of) Thailand Nicaragua El Salvador (Republic of) Vatican City State France Saudi Arabia (Kingdom of) Cyprus (Republic of) Panama (Republic of) Solomon Islands Nicaragua Panama (Republic of) Italy Japan Mongolian People's Republic Norway Jordan (Hashemite Kingdom of) Indonesia (Republic of) Djibouti (Republic of) Grenada Greece Guinea-Bissau (Republic of) Saint Lucia Dominica United States of America Norway Argentine Republic Luxembourg Union of Soviet Socialist Republics Bulgaria (People's Republic of) Argentine Republic United Kingdom of Great Britain and Northern Ireland United States of America Peru Lebanon Austria Finland Czechoslovak Socialist Republic Belgium Denmark Netherlands (Kingdom of the) Netherlands Antilles Indonesia (Republic of) Brazil (Federative Republic of)

Call Sign Series	Allocated to
PZA-PZZ	Suriname (Republic of)
P2A-P2Z	Papua New Guinea
P3A-P3Z	Cyprus (Republic of)
P4A-P4Z	Netherlands Antilles
P5A-P9Z	Democratic People's Republic of Korea
QAA-QZZ	(Service abbreviations)
RAA-RZZ	Union of Soviet Socialist Republics
SAA-SMZ	Sweden
SNA-SRZ	Poland (People's Republic of)
SSA-SSM	Egypt (Arab Republic of)
SSN-STZ	Sudan (Democratic Republic of the)
SUA-SUZ	Egypt (Arab Republic of)
SVA-SZZ	Greece
S2A-S3Z	Bangladesh (People's Republic of)
S6A-S6Z	Singapore (Republic of)
S7A-S7Z	Seychelles (Republic of)
S9A-S9Z	Sao Tome and Principe (Democratic Republic of)
TAA-TCZ	Turkey
TDA-TDZ	Guatemala (Republic of)
TEA-TEZ	Costa Rica
TFA-TFZ	Iceland
TGA-TGZ	Guatemala (Republic of)
THA-THZ	France
TIA-TIZ	Costa Rica
TJA-TJZ	Cameroon (United Republic of)
TKA-TKZ	France
TLA-TLZ	Central African Republic
TMA-TMZ	France
TNA-TNZ	Congo (People's Republic of the)
TOA-TQZ	France
TRA-TRZ	Gabon Republic
TSA-TSZ	Tunisia
TTA-TTZ	Chad (Republic of the)
TUA-TUZ	Ivory Coast (Republic of the)
TVA-TXZ	France
TYA-TYZ	Benin (People's Republic of)
TZA-TZZ	Mali (Republic of)
T2A-T2Z	Tuvalu
T3A-T3Z	Kiribati Republic
T4A-T4Z	Cuba
T5A-T5Z	Somali Democratic Republic
T6A-T6Z	Afghanistan (Democratic Republic of)
UAA-UQZ	Union of Soviet Socialist Republics
URA-UTZ	Ukrainian Soviet Socialist Republic
UUA-UZZ	Union of Soviet Socialist Republics

Call Sign Series	Allocated to
VAA-VGZ	Canada
VHA-VNZ	Australia
VOA-VOZ	Canada
VPA-VSZ	United Kingdom of Great Britain and Northern Ireland
VTa-VWZ	India (Republic of)
VXA-VYZ	Canada
VZA-VZZ	Australia
WAA-WZZ	United States of America
XAA-XIZ	Mexico
XJA-XOZ	Canada
XPA-XPZ	Denmark
XQA-XRZ	Chile
XSA-XSZ	China (People's Republic of)
XTA-XTZ	Upper Volta (Republic of)
XUA-XUZ	Democratic Kampuchea
XVA-XVZ	Viet Nam (Socialist Republic of)
XWA-XWZ	Lao People's Democratic Republic
XXA-XXZ	Portugal
XYA-XZZ	Burma (Socialist Republic of the Union of)
YAA-YAZ	Afghanistan (Democratic Republic of)
YBA-YHZ	Indonesia (Republic of)
YIA-YIZ	Iraq (Republic of)
YJA-YJZ	New Hebrides
YKA-YKZ	Syrian Arab Republic
YLA-YLZ	Union of Soviet Socialist Republics
YMA-YMZ	Turkey
YNA-YNZ	Nicaragua
YOA-YRZ	Roumania (Socialist Republic of)
YSA-YSZ	El Salvador (Republic of)
YTA-YUZ	Yugoslavia (Socialist Federal Republic of)
YVA-YYZ	Venezuela (Republic of)
YZA-YZZ	Yugoslavia (Socialist Federal Republic of)
Y2A-Y9Z	German Democratic Republic
ZAA-ZAZ	Albania (Socialist People's Republic of)
ZBA-ZJZ	United Kingdom of Great Britain and Northern Ireland
ZKA-ZMZ	New Zealand
ZNA-ZOZ	United Kingdom of Great Britain and Northern Ireland
ZPA-ZPZ	Paraguay (Republic of)
ZQA-ZQZ	United Kingdom of Great Britain and Northern Ireland
ZRA-ZUZ	South Africa (Republic of)
ZVA-ZZZ	Brazil (Federative Republic of)
2AA-2ZZ	United Kingdom of Great Britain and Northern Ireland
3AA-3AZ	Monaco
3BA-3BZ	Mauritius
3CA-3CZ	Equatorial Guinea (Republic of)

Call Sign Series	Allocated to
3DA-3DM 3DN-3DZ 3EA-3FZ 3GA-3GZ 3HA-3UZ 3VA-3VZ 3WA-3WZ 3XA-3XZ 3YA-3YZ 3ZA-3ZZ 4AA-4CZ 4DA-4IZ 4JA-4LZ 4MA-4MZ 4NA-4OZ 4PA-4SZ 4TA-4TZ *4UA-4UZ 4VA-4VZ 4WA-4WZ 4XA-4XZ *4YA-4YZ 4ZA-4ZZ 5AA-5AZ 5BA-5BZ 5CA-5GZ 5HA-5IZ 5JA-5KZ 5LA-5MZ 5NA-5OZ 5PA-5QZ 5RA-5SZ 5TA-5TZ 5UA-5UZ 5VA-5VZ 5WA-5WZ 5XA-5XZ 5YA-5ZZ 6AA-6BZ 6CA-6CZ 6DA-6JZ 6KA-6NZ 6OA-6OZ 6PA-6SZ 6TA-6UZ	Swaziland (Kingdom of) Fiji Panama (Republic of) Chile China (People's Republic of) Tunisia Viet Nam (Socialist Republic of) Guinea (Revolutionary People's Republic of) Norway Poland (People's Republic of) Mexico Philippines (Republic of the) Union of Soviet Socialist Republics Venezuela (Republic of) Yugoslavia (Socialist Federal Republic of) Sri Lanka (Democratic Socialist Republic of) Peru United Nations Organization Haiti (Republic of) Yemen Arab Republic Israel (State of) International Civil Aviation Organization Israel (State of) Libya (Socialist People's Libyan Arab Jamahiriya) Cyprus (Republic of) Morocco (Kingdom of) Tanzania (United Republic of) Colombia (Republic of) Liberia (Republic of) Nigeria (Federal Republic of) Denmark Madagascar (Democratic Republic of) Mauritania (Islamic Republic of) Niger (Republic of the) Togolese Republic Western Samoa Uganda (Republic of) Kenya (Republic of) Egypt (Arab Republic of) Syrian Arab Republic Mexico Republic of Korea Somali Democratic Republic Pakistan (Islamic Republic of) Sudan (Democratic Republic of the)

Call Sign Series	Allocated to
6VA-6WZ 6XA-6XZ 6YA-6YZ 6ZA-6ZZ 7AA-7IZ 7JA-7NZ 7OA-7OZ 7PA-7PZ 7QA-7QZ 7RA-7RZ 7SA-7SZ 7TA-7YZ 7ZA-7ZZ 8AA-8IZ 8JA-8NZ 8OA-8OZ 8PA-8PZ 8QA-8QZ 8RA-8RZ 8SA-8SZ 8TA-8YZ 8ZA-8ZZ 9AA-9AZ 9BA-9DZ 9EA-9FZ 9GA-9GZ 9HA-9HZ 9IA-9JZ 9KA-9KZ 9LA-9LZ 9MA-9MZ 9NA-9NZ 9OA-9TZ 9UA-9UZ 9VA-9VZ 9WA-9WZ 9XA-9XZ 9YA-9ZZ	Senegal (Republic of the) Madagascar (Democratic Republic of) Jamaica Liberia (Republic of) Indonesia (Republic of) Japan Yemen (People's Democratic Republic of) Lesotho (Kingdom of) Malawi (Republic of) Algeria (Algerian Democratic and Popular Republic) Sweden Algeria (Algerian Democratic and Popular Republic) Saudi Arabia (Kingdom of) Indonesia (Republic of) Japan Botswana (Republic of) Barbados Maldives (Republic of) Guyana Sweden India (Republic of) Saudi Arabia (Kingdom of) San Marino (Republic of) Iran (Islamic Republic of) Ethiopia Ghana Malta (Republic of) Zambia (Republic of) Kuwait (State of) Sierra Leone Malaysia Nepal Zaire (Republic of) Burundi (Republic of) Singapore (Republic of) Malaysia Rwanda (Republic of) Trinidad and Tobago

Note by the General Secretariat

The following call sign series were allocated by the Secretary-General on a provisional basis between the end of the WARC-79 and 1 May 1981 :

Call Sign Series	Allocated to
J8A-J8Z V2A-V2Z Z2A-Z2Z	Saint Vincent and the Grenadines Antigua ¹ Zimbabwe (Republic of)

¹ As from the date of its accession to independence.

APPENDIX 43

Maritime Mobile Service Identities**1. *General***

1.1 Maritime mobile service identities are formed of a series of nine digits which are transmitted over the radio path in order to uniquely identify ship stations, ship earth stations, coast stations, coast earth stations and group calls.

1.2 Ship station identities shall be in accordance with relevant CCIR and CCITT Recommendations.

1.3 These identities are formed in such a way that the identity or part thereof can be used by telephone and telex subscribers connected to the general telecommunications network to call ships automatically in the shore-to-ship direction.

1.4 There are three kinds of maritime mobile service identities:

- i) ship station identities,
- ii) group call identities,
- iii) coast station identities.

1.5 The nationality or flag of a station is given by a three-digit group, the Nationality Identification Digits (NID).

2. *Nationality Identification Digits (NID)*

Table I gives the Nationality Identification Digits (NID) allocated to each country. In accordance with Radio Regulation No. 2087 the

Secretary-General is authorized to allocate Nationality Identification Digits to countries not included in this table ¹.

3. *Ship Station Identities*

The 9-digit code constituting a ship station identity is formed as follows:

N	I	D	X	X	X	X	X	X
1	2	3	4	5	6	7	8	9

wherein

N	I	D
1	2	3

represent the Nationality Identification Digits and X is any figure from 0 to 9.

4. *Group Call Identities*

Group call identities for calling simultaneously more than one ship are formed as follows:

0	N	I	D	X	X	X	X	X
1	2	3	4	5	6	7	8	9

where the first figure is zero and X is any figure from 0 to 9.

The particular NID reflects only the country allocating the group call identity and so does not prevent group calls to fleets containing more than one ship nationality.

¹ Details of Nationality Identification Digits (NID) allocations have to be worked out by the Secretary-General in close cooperation with the CCIR and CCITT in accordance with Resolution 313 and the provisions of this Appendix. Until such time as this information becomes available for final decision by the next competent conference, provisional allocations of NIDs may be issued by the Secretary-General. These allocations will therefore be subject to review and/or revision by the above-mentioned conference.

5. *Coast Station Identities*

Coast station identities are formed as follows:

0 0 N I D X X X X
1 2 3 4 5 6 7 8 9

where the first two figures are zeros and X is any figure from 0 to 9.

The NID reflects the country in which the coast station or coast earth station is located.

TABLE I

NATIONALITY IDENTIFICATION DIGITS¹

Country

Digits

¹ Details of Nationality Identification Digits (NID) allocations have to be worked out by the Secretary-General in close cooperation with the CCIR and CCITT in accordance with Resolution 313 and the provisions of this Appendix. Until such time as this information becomes available for final decision by the next competent conference, provisional allocations of NIDs may be issued by the Secretary-General. These allocations will therefore be subject to review and/or revision by the above-mentioned conference.

APPENDIX 44

**Ship Station Selective Call Numbers and
Coast Station Identification Numbers**

**Part I. Table of Blocks of Selective Call Numbers
for Ship Stations and Selective Call Numbers for Groups of Ship Stations
Supplied to Administrations**

Blocks* of selective call numbers for ship stations and selective call numbers for groups of ship stations	Supplied to
00000* 00001 – 00499 00900 – 00999 01010* 01100 – 01199 01800 – 01899 01900 – 01999 02020* 03200 – 03299 04040* 05200 – 05399 05900 – 05999 06300 – 07069 07070* 07071 – 07999 08080* 08400 – 08499 10400 – 11110 11111* 11112 – 11399 14000 – 14140 14141* 14142 – 14199 14700 – 15150 15151* 15152 – 16099 16161*	Argentine Republic Argentine Republic Saudi Arabia (Kingdom of) Australia Australia Singapore (Republic of) Seychelles (Republic of) Argentine Republic Canada Canada Cyprus (Republic of) Bulgaria (People's Republic of) Denmark Denmark Denmark Denmark Spain United States of America United States of America United States of America Finland Finland Finland France France France France

* The numbers formed by the same digit repeated five times, or by two different digits repeated alternately, are reserved for calling predetermined groups of ship stations, and are to be considered as not included in the blocks of call numbers for ship stations supplied to administrations.

Blocks* of selective call numbers for ship stations and selective call numbers for groups of ship stations	Supplied to
16700 – 17170 17171* 17172 – 17699 18181* 19000 – 19099 19191* 19400 – 19499 19700 – 20199 20202* 20300 – 20799 21212* 22222* 22300 – 22399 22400 – 22599 22700 – 22899 23500 – 23999 24300 – 25199 26000 – 26261 26262* 26263 – 26999 31900 – 31999 32000 – 32099 32400 – 33332 33333* 33334 – 34342 34343* 34344 – 34499 36000 – 36099 36200 – 36299 36400 – 37372 37373* 37374 – 38382 38383* 38384 – 38399 38400 – 39392 39393* 39394 – 40403 40404* 40405 – 41413 41414* 41415 – 41499 41900 – 42199 42424*	Greece Greece Greece China (People's Republic of) Chile China (People's Republic of) Ghana China (People's Republic of) China (People's Republic of) Italy Italy Italy Iraq (Republic of) Kuwait (State of) Iraq (Republic of) India (Republic of) Liberia (Republic of) Sweden Sweden Sweden Malta (Republic of) Cuba Norway Norway Norway Norway Ireland Luxembourg Netherlands (Kingdom of the) Netherlands (Kingdom of the) Netherlands (Kingdom of the) Netherlands (Kingdom of the) Netherlands (Kingdom of the) Germany (Federal Republic of) Germany (Federal Republic of) Germany (Federal Republic of) Germany (Federal Republic of) Germany (Federal Republic of) Germany (Federal Republic of) Germany (Federal Republic of) Panama (Republic of) Panama (Republic of)

* The numbers formed by the same digit repeated five times, or by two different digits repeated alternately, are reserved for calling predetermined groups of ship stations, and are to be considered as not included in the blocks of call numbers for ship stations supplied to administrations.

Blocks* of selective call numbers for ship stations and selective call numbers for groups of ship stations	Supplied to
43000 – 43433 43434* 43435 – 43499 43500 – 44099 44444* 45500 – 46463 46464* 46465 – 46899 47474* 50400 – 50499 50500 – 50504 50505* 50506 – 50699 51100 – 51499 52600 – 53534 53535* 53536 – 54544 54546 – 55554 55556 – 56099 56200 – 56299 56800 – 57099 57800 – 57899 58100 – 58199 58200 – 58299 59400 – 59499 59700 – 59899 59900 – 59999 60100 – 60599 61000 – 61099 61100 – 61199 61500 – 61599 62000 – 62099 63000 – 63099 63200 – 63299 63400 – 63499 64600 – 64645 64646* 64647 – 64799 65700 – 65799 66000 – 66665 66667 – 67675 67677 – 68685 68686* 68687 – 69695	Poland (People's Republic of) Poland (People's Republic of) Poland (People's Republic of) Sweden Panama (Republic of) United Kingdom of Great Britain and Northern Ireland United Kingdom of Great Britain and Northern Ireland United Kingdom of Great Britain and Northern Ireland United Kingdom of Great Britain and Northern Ireland United Kingdom of Great Britain and Northern Ireland Israel (State of) Israel (State of) Israel (State of) Switzerland (Confederation of) Union of Soviet Socialist Republics Union of Soviet Socialist Republics Union of Soviet Socialist Republics Union of Soviet Socialist Republics Union of Soviet Socialist Republics Malaysia Yugoslavia (Socialist Federal Republic of) Venezuela (Republic of) Algeria (Algerian Democratic and Popular Republic) Austria Libya (Socialist People's Libyan Arab Jamahiriya) New Zealand Monaco German Democratic Republic Netherlands Antilles United Kingdom of Great Britain and Northern Ireland Bahamas (Commonwealth of the) Jordan (Hashemite Kingdom of) Qatar (State of) Bahrain (State of) United Arab Emirates South Africa (Republic of) South Africa (Republic of) South Africa (Republic of) Turkey Union of Soviet Socialist Republics Union of Soviet Socialist Republics Union of Soviet Socialist Republics Union of Soviet Socialist Republics Union of Soviet Socialist Republics

* The numbers formed by the same digit repeated five times, or by two different digits repeated alternately, are reserved for calling predetermined groups of ship stations, and are to be considered as not included in the blocks of call numbers for ship stations supplied to administrations.

Blocks* of selective call numbers for ship stations and selective call numbers for groups of ship stations	Supplied to
69697 – 70706 70707* 70708 – 71716 71717* 71718 – 72499 72500 – 72726 72727* 72728 – 73736 73737* 73738 – 73999 74700 – 74746 74747* 74748 – 74799 75500 – 75756 75758 – 75999 77500 – 77699 77700 – 77776 77777* 77778 – 77799 78000 – 78199 78700 – 78786 78787* 78788 – 78799 79000 – 79099 79200 – 79399 82828* 83838* 84848* 86868* 87878* 88888* 89898* 90909* 91919* 92929* 93939* 94949* 95959* 96969* 97979* 98989*	Union of Soviet Socialist Republics Union of Soviet Socialist Republics Union of Soviet Socialist Republics Union of Soviet Socialist Republics Union of Soviet Socialist Republics Belgium Belgium Belgium Belgium Belgium Sierra Leone Sierra Leone Sierra Leone Iceland Iceland Yemen (People's Democratic Republic of) Mexico Mexico Mexico Egypt (Arab Republic of) Mexico Mexico Mexico Oman (Sultanate of) Syrian Arab Republic Malta (Republic of) Malta (Republic of) Netherlands (Kingdom of the) Italy Italy Italy Italy Italy Italy Israel (State of) Israel (State of) Israel (State of) German Democratic Republic German Democratic Republic

* The numbers formed by the same digit repeated five times, or by two different digits repeated alternately, are reserved for calling predetermined groups of ship stations, and are to be considered as not included in the blocks of call numbers for ship stations supplied to administrations.

Note by the General Secretariat

The following blocks of selective call numbers for ship stations were supplied to Administrations by the Secretary-General between the end of the WARC-79 and 1 May 1981:

Blocks of selective call numbers for ship stations	Supplied to
15600 – 16099 34500 – 35099 41500 – 41899 51500 – 51514 51516 – 51599 51800 – 51999 57600 – 57699 60700 – 60999 62100 – 62625 62627 – 62999 64200 – 64599 80000 – 80807 80809 – 80999	France Norway Germany (Federal Republic of) Switzerland (Confederation of) Switzerland (Confederation of) Portugal Uruguay (Oriental Republic of) Pakistan (Islamic Republic of) Germany (Federal Republic of) Germany (Federal Republic of) Germany (Federal Republic of) Netherlands (Kingdom of the) Netherlands (Kingdom of the)

**Part II. Table of Blocks
of Coast Station Identification Numbers Supplied
to Administrations**

Blocks of coast station identification numbers	Supplied to
0100 - 0119	Argentine Republic
0270 - 0279	Algeria (Algerian Democratic and Popular Republic)
0330 - 0339	Australia
0480 - 0489	Belgium
0580 - 0589	Canada
0810 - 0819	Bulgaria (People's Republic of)
0830 - 0899	Denmark
0990 - 1089	Spain
1090 - 1109	United States of America
1590 - 1609	Finland
1630 - 1669	France
1780 - 1789	Greece
1860 - 1889	Chile
1920 - 1929	Ghana
1980 - 1989	Ireland
2010 - 2019	China (People's Republic of)
2070 - 2109	Italy
2130 - 2149	Iraq (Republic of)
2180 - 2189	Kuwait (State of)
2280 - 2289	Libya (Socialist People's Libyan Arab Jamahiriya)
2300 - 2339	India (Republic of)
2480 - 2489	Malta (Republic of)
2500 - 2509	Monaco
2510 - 2519	Cuba
2550 - 2599	Norway
2740 - 2749	Iceland
2770 - 2779	Netherlands (Kingdom of the)
2830 - 2849	Germany (Federal Republic of)
2930 - 2949	Poland (People's Republic of)
2950 - 2959	Sweden
3200 - 3259	United Kingdom of Great Britain and Northern Ireland
3450 - 3459	Israel (State of)
3500 - 3509	Switzerland (Confederation of)
3620 - 3769	Union of Soviet Socialist Republics
3800 - 3809	Malaysia
3850 - 3859	Yugoslavia (Socialist Federal Republic of)
3910 - 3919	Venezuela (Republic of)
4330 - 4349	South Africa (Republic of)
4360 - 4369	Turkey
4400 - 4599	Union of Soviet Socialist Republics
4600 - 4619	German Democratic Republic
4620 - 4629	Singapore (Republic of)

Blocks of coast station identification numbers	Supplied to
4630 – 4639 4640 – 4649 4650 – 4659 4660 – 4669 4690 – 4699 4710 – 4719 4810 – 4819 4820 – 4829 4830 – 4839 4900 – 4939 4980 – 4999 5010 – 5019	United Kingdom of Great Britain and Northern Ireland Sierra Leone Bahrain (State of) Seychelles (Republic of) Qatar (State of) United Arab Emirates Yemen (People's Democratic Republic of) Egypt (Arab Republic of) Saudi Arabia (Kingdom of) Mexico Syrian Arab Republic Oman (Sultanate of)

Note by the General Secretariat

The following blocks of coast station identification numbers were supplied to Administrations by the Secretary-General between the end of the WARC-79 and 1 May 1981:

Blocks of coast station identification numbers	Supplied to
3560 – 3579 3870 – 3879 4050 – 4069	Portugal Uruguay (Oriental Republic of) Pakistan (Islamic Republic of)

RESOLUTIONS

Note by the General Secretariat:

The Resolutions are arranged in order and numbered along the lines of the grouping and numbering system below. As some Resolutions in one group have direct relationship to Resolutions in other groups, this has been reflected, as far as possible, to facilitate consultation.

	Numbers
RESOLUTIONS OF GENERAL APPLICATION	1 – 99
– Principles, general procedures and cooperation	1 – 20
<i>See also: Nos. 35, 36, 37</i>	
– Specific procedures	30 – 39
<i>See also: Nos. 1, 6, 7, 8, 9</i>	
<i>Nos. 100, 101, 102</i>	
<i>Nos. 200, 201, 202</i>	
<i>Nos. 502, 503, 504, 506, 507</i>	
<i>Nos. 700, 701</i>	
– Technical matters	60 – 69
FIXED SERVICE/FIXED-SATELLITE SERVICE	100 – 199
<i>See also: Nos. 8, 9</i>	
<i>Nos. 31, 32, 33, 34</i>	
<i>Nos. 502, 503, 504, 506, 507</i>	
<i>Nos. 700, 701</i>	
MOBILE SERVICE/MOBILE-SATELLITE SERVICE	200 – 299
<i>See also: No. 38</i>	
<i>Nos. 305, 315</i>	
MARITIME MOBILE SERVICE/MARITIME MOBILE-SATELLITE SERVICE	300 – 399
<i>See also: Nos. 200, 201</i>	
AERONAUTICAL MOBILE SERVICE/AERONAUTICAL MOBILE-SATELLITE SERVICE	400 – 499
BROADCASTING SERVICE/BROADCASTING-SATELLITE SERVICE	500 – 599
<i>See also: Nos. 31, 32, 33, 34</i>	
<i>Nos. 100, 101, 102</i>	
<i>Nos. 700, 701</i>	
OTHER SERVICES	600 – 699
RELATING TO MORE THAN ONE SERVICE	700 – 799
<i>See also: Nos. 31, 32, 33, 34</i>	
<i>Nos. 100, 101, 102</i>	
<i>Nos. 502, 503, 504, 506, 507</i>	

In this respect, see also the Analytical Index of Resolutions.

RESOLUTION No. 1

Relating to Notification of Frequency Assignments¹

The World Administrative Radio Conference, Geneva, 1979,

referring to

- the Preamble of the Convention*,
- Article 31 of the Convention* (Special Arrangements),
- Article 7 of the Radio Regulations (Special Agreements),
- Article 12 of the Radio Regulations (Notification and Recording in the Master International Frequency Register of Frequency Assignments to Terrestrial Radiocommunication Stations),
- Article 13 of the Radio Regulations (Notification and Recording in the Master International Frequency Register of Frequency Assignments to Radio Astronomy and Space Radiocommunication Stations Except Stations in the Broadcasting-Satellite Service),
- Article 17 of the Radio Regulations (Procedure for the Bands Allocated Exclusively to the Broadcasting Service Between 5 950 kHz and 26 100 kHz);

¹ Replaces Resolution No. 5 of the Administrative Radio Conference, Geneva, 1959.

* International Telecommunication Convention (Malaga-Torremolinos, 1973).

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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.

RESOLUTION No. 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;

¹ Replaces Resolution No. Spa2 – 1 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

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resolves

1. that the registration with the IFRB 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 IFRB 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 paragraphs 1 and 2 of this Resolution should be taken into account by the administrations and the permanent organs of the Union.

RESOLUTION No. 3

**Relating to the Use of the Geostationary-Satellite Orbit
and to the Planning of Space Services Utilizing It**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the geostationary-satellite orbit and the radio frequency spectrum are limited natural resources and are utilized by space services;
- b)* that there is a need for equitable access to, and efficient and economical use of, these resources by all countries as provided for in Article 33 of the International Telecommunication Convention (Malaga-Torremolinos, 1973) and Resolution 2;
- c)* that the utilization of radio frequencies and the geostationary-satellite orbit by individual countries and groups of countries can take place at various points in time, based on their requirements and the availability of the resources at their disposal;
- d)* that there are growing requirements all over the world for orbital position and frequency assignments for the space services;
- e)* that in the use of the geostationary-satellite orbit for space services, attention should be given to the relevant technical aspects concerning the special geographical situation of particular countries;

resolves

1. that a world space administrative radio conference shall be convened not later than 1984 to guarantee in practice for all countries equitable access to the geostationary-satellite orbit and the frequency bands allocated to space services;

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2. that this conference shall be held in two sessions;
3. that the first session shall:
 - 3.1 decide which space services and frequency bands should be planned;
 - 3.2 establish the principles, technical parameters and criteria for the planning, including those for orbit and frequency assignments of the space services and frequency bands identified as per paragraph 3.1, taking into account the relevant technical aspects concerning the special geographical situation of particular countries; and provide guidelines for associated regulatory procedures;
 - 3.3 establish guidelines for regulatory procedures in respect of services and frequency bands not covered by paragraph 3.2;
 - 3.4 consider other possible approaches that could meet the objective of *resolves* 1;
4. that the second session shall be held not sooner than twelve months and not later than eighteen months after the first session and implement the decisions taken at the first session;

invites

1. *the CCIR* to carry out preparatory studies and provide the first session of the conference with technical information concerning principles, criteria and technical parameters including those required for planning space services;
2. *the IFRB* to prepare a report on the operation of the procedures of Articles 11 and 13 including information about difficulties which may be reported to the IFRB by administrations in gaining access to suitable orbital locations and frequencies, and to circulate this report to administrations at least one year before the first session of the conference;

3. *the IFRB* to carry out technical preparations for the conference in accordance with the provisions of the Radio Regulations;
4. *the administrations* to examine all aspects of the matter with a view to submitting proposals to the conference, and to cooperate actively in the above-mentioned work of the CCIR and IFRB;
5. *the Administrative Council* to take all necessary steps for the convening of the conference in accordance with this Resolution.

RESOLUTION No. 4

Relating to the Period of Validity of Frequency Assignments to Space Stations Using the Geostationary-Satellite Orbit

The World Administrative Radio Conference, Geneva, 1979,

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 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 a world space administrative radio conference is due to meet around 1984 to deal with the use of the geostationary-satellite orbit and the planning of the space services using this orbit;
- f)* 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 radiocommunications, but

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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;

resolves

1. that, as from 1 July 1980 until the world space administrative radio conference (see Resolution 3), frequency assignments to space radiocommunication stations located on the geostationary-satellite orbit shall be dealt with as follows:

1.1 a frequency assignment to a space station¹ 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 Board shall then invite the notifying administration to take steps to cancel the assignment. If the Board 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 station¹ informs the Board 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 Board 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 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.

- 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 station¹, an administration initiates the coordination procedure specified in No. 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 Board finds after the notification that the new assignment conforms with the provisions of No. 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 station¹ recorded in the Master Register shall initiate, in any case other than those covered by paragraphs 1.2 and 1.3, the appropriate modification procedure in accordance with the provisions of Nos. 1547 to 1551;
2. that, for the application of the provisions of paragraph 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 Appendices 3 and 4 to the Radio Regulations;
3. that the application of this Resolution shall not prejudice in any way the decisions of the space administrative radio conference referred to in Resolution 3;

invites the world space administrative radio conference provided for in Resolution 3

to take cognizance of the initial results of the application of this Resolution.

¹ 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.

RESOLUTION No. 5

**Relating to Technical Cooperation with the
Developing Countries in the Study of Propagation
in Tropical Areas**

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 the CCIs 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 CCIR Recommendations, Questions and Study Programmes in order to improve the use of the radio spectrum;
3. to arrange funds and resources for this purpose from the UNDP or other sources in order to enable the Union to provide the countries concerned with adequate and effective technical assistance for the purpose of this Resolution;

urges administrations

to submit the results of these propagation measurements to the CCIR for consideration in its studies;

invites the Administrative 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 No. 6

**Relating to the Preparation of a Handbook to Explain
and Illustrate the Procedures of the Radio Regulations**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the complexity of the regulatory procedures specified in Chapter IV of the Radio Regulations;
- b) the need of many administrations for a handbook to give their staff a better understanding of these procedures to help in their application;
- c) the possible use of diagrams, flow charts and other graphical aids to the understanding of complex procedures;

recognizing

- 1. that the World Administrative Radio Conference, Geneva, 1979, has insufficient time to develop explanatory material and diagrams for inclusion in or attachment to the Final Acts;
- 2. that a special effort will be required to develop a handbook to meet adequately the need referred to in *b)* above;
- 3. that it would be advantageous if the format of such a handbook were compatible with that of the Radio Regulations;

resolves

that the IFRB should, as soon as possible after the World Administrative Radio Conference, Geneva, 1979, prepare a handbook incorporating appropriate graphical material, including flow charts, to help the staff

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of administrations to apply the regulatory procedures of Chapter IV of the Radio Regulations;

instructs the Secretary-General

- 1. to publish the handbook prepared by the IFRB;**
- 2. to insert the flow charts, when available, in an appropriate manner in published editions of the Radio Regulations, clearly marked to the effect that they are an aid to understanding and that they do not form part of the Radio Regulations.**

RESOLUTION No. 7

**Relating to the Development of
National Radio Frequency Management**

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 countries;
- b) that the application of the above-mentioned procedures necessitates an appropriate radio frequency management unit in each Member country;
- c) that the existence of such a unit helps Member countries 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 IFRB, the CCIR 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;
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 Administrative Council

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

instructs the Secretary-General

1. to circulate this Resolution to all Members of the Union, 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 No. 8

**Relating to Implementation of the Changes in Allocations
in the Bands Between 4 000 kHz and 27 500 kHz**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that parts of frequency bands between 4 000 kHz and 27 500 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

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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*;

5. that a special transfer procedure, described in Resolution 404, shall apply to stations in the aeronautical fixed service operating in the band 21 924 - 22 000 kHz (band allocated by this Conference exclusively to the aeronautical mobile (R) service) and shall be terminated on 1 February 1983;

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 No. 8**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 4 000 kHz and 27 500 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 assignment ¹.

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 assignment ¹.

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 No. 8

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

¹ On request from an administration, the Board shall assist in the application of provision 19.1 *b)* or 19.2.

shared basis to the fixed service. Such notices shall contain the information listed in the appropriate section of Appendix 1.

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 No. 8

Review Procedure Concerning Notices Relating to Assignments for Stations of the Fixed Service in the Bands Between 4 000 kHz and 27 500 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 paragraph 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 paragraphs 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 No. 9

**Relating to the Revision of Entries in the
Master International Frequency Register in the Bands
Allocated to the Fixed Service Between 3 000 kHz and 27 500 kHz**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that there is a need to improve the accuracy and reliability of the Master International Frequency Register, particularly in the bands allocated on an exclusive or shared basis to the fixed service between 3 000 kHz and 27 500 kHz;
- b) that previous initiatives of the IFRB have shown that, with the cooperation of administrations, substantial improvements can be made in the accuracy and reliability of the Master Register;

recognizing

- a) that only a vigorous and cooperative worldwide attack on this problem will lead to a solution;
- b) that a procedure involving the mutual cooperation of all administrations and the IFRB is required for the purpose of revising parts of the Master Register;

recognizing also

- a) that a significant proportion of assignments for the fixed service is intended for purposes other than regular operational use;

RES9-2

- b) that the identification of the class of operation of such assignments in the Master Register would facilitate international frequency management of the fixed service in this part of the spectrum and should be made a standard feature of the Master Register;
- c) that the identification of the hours of regular operation would further facilitate the management of this service;
- d) that both the class and the hours of regular operation of assignments should be introduced in any procedure intended for revision of parts of the Master Register;
- e) that upon completion such action would provide a firm foundation for the transitional arrangements required to provide replacements for assignments to stations in the fixed service displaced by decisions of the World Administrative Radio Conference, Geneva, 1979;

resolves

to adopt the procedure in the Annex to this Resolution for the purpose of revising the parts of the Master Register relating to the bands allocated to the fixed service between 3 000 kHz and 27 500 kHz;

further resolves

that this Resolution shall enter into force on 1 January 1980;

invites administrations and the IFRB

to participate fully and promptly in this procedure.

ANNEX TO RESOLUTION No. 9

**Procedure for Reviewing Entries
in the Master Register in Frequency Bands
Allocated to the Fixed Service Between 3 000 kHz and 27 500 kHz**

1. The Board shall extract from the Master Register and shall, as soon as possible after 1 January 1980, forward to each administration an individual National List¹ of all assignments² recorded in the Master Register on behalf of that administration or for which notices have been received prior to that date in the bands allocated exclusively or on a shared basis to the fixed service between 3 000 kHz and 27 500 kHz. The Board shall at the same time draw the attention of the administration to any assignments for which another means of telecommunication is believed to be available.
2. Each administration, upon receiving the List mentioned in paragraph 1 above, shall so inform the Board by telegram. An administration not receiving its National List by 1 April 1980 shall promptly inform the Board, which shall forthwith send to that administration a further copy of the National List. The Board shall ensure that every administration has received the National List pertaining to its own assignments.
3. Each administration, after having acknowledged receipt of its National List, shall examine the List and shall:
 - a) delete from it any of the entries no longer required;
 - b) classify the remaining entries of the fixed service with the use of the following symbols:

Symbol A — assignment for regular operational use which is not provided by another satisfactory means of telecommunication; or

¹ The Board shall determine by prior enquiries the number of copies of the National List to be sent to each administration. The National List shall be prepared in the format of the International Frequency List but the form in which the List is forwarded may, at the request of individual administrations and with the agreement of the Board, be varied to suit different circumstances.

² For the purposes of this procedure, assignments to stations of the aeronautical fixed service shall be treated as if they were stations of the fixed service within the band(s) concerned.

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Symbol B – assignment for use as a standby to some other means of telecommunication; or

Symbol C – assignment for occasional use on a reserve basis and not requiring internationally recognized protection from harmful interference;

- c) indicate the regular hours of operation of the frequency assignment in UTC; otherwise indicate the hours of operation as day service (HJ), night service (HN), or transition period service (HT).

4. An administration, after having completed the actions described in paragraphs 2 and 3 above, shall return its annotated National List to the Board as quickly as possible and in any event not later than 31 March 1981.

5. The Board shall send to each administration an acknowledgement of receipt of its annotated National List, and shall, in cases of special difficulty or at the request of administrations, give such help and advice as the circumstances may warrant.

6. On 1 October 1981, the Board shall publish a provisional section of the Master Register relating solely to the assignments in the bands allocated to the fixed service between 3 000 kHz and 27 500 kHz. This section shall contain all assignments shown in National Lists as annotated by administrations and those shown in the National Lists which have not been returned to the Board, excluding those assignments with an unfavourable finding with respect to No. 1240, without reference to No. 342. The assignments in this provisional section shall be annotated as follows:

6.1 all assignments shall bear a symbol indicating a reference to this Resolution;

6.2 the dates entered in Columns 2a, 2b or 2d or the symbol entered in Column 2d and the findings shown in the appropriate part of Column 13 shall be amended as shown in the attached table;

6.3 frequency assignments to fixed service stations in the parts of bands re-allocated to other services shall bear a symbol indicating that they are assignments for which replacement assignments shall be found in accordance with Resolution 8, retaining the date and status afforded in the attached table.

7. Before applying items I.2 and II.2 of the attached table to assignments of countries having a small number of assignments, the Board shall consult the administration whose assignment caused the unfavourable finding in order to ensure that no actual interference has occurred since the registration of the recorded assignment. If the administration replies that no actual interference has occurred, the Board shall enter the symbol corresponding to class of operation A for the assignment and amend the unfavourable finding. Otherwise, it shall apply the provisions of No. 1218 in order to find another frequency and shall proceed to replace the frequency in consultation with the administration concerned.

8. As soon as possible after 1 January 1982, the Board shall:

8.1 publish a supplement to the provisional section of the Master Register containing those assignments for which notices were received between 1 January 1980 and 31 December 1981 and recorded in the Master Register;

8.2 send to administrations a copy of their National List;

8.3 incorporate in the Master Register the provisional section mentioned in paragraph 6 including the assignments mentioned in paragraph 8.1 above in replacement of the corresponding entries in the frequency bands concerned.

9. Following completion of the action described above, the Board shall publish a report showing the results obtained from the operation of this procedure.

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TABLE

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	Column 13a	Column 2	Column 13c
I. Frequency bands below 3 900 kHz (Region 1) — 3 950 kHz (Region 3) — 4 000 kHz (Region 2)			
I.1 Lists returned to the Board:			
— A class of operation assignments	Delete any symbols indicating the finding under No. 1241	Replace the date in 2a or 2b by 1.1.82 in 2a	RES 9 SUP RR 515
— B or C class of operation assignments	idem	Replace the date in 2a or 2b by 2.1.82 in 2b	RES 9 SUP RR 515
— entries under No. 342 of the Radio Regulations	NOC	Replace the date by 5.1.82 in 2b	RES 9
I.2 Lists not returned to the Board:			
— assignments entered with a date in 2a	NOC	Replace the date by 3.1.82 in 2a	RES 9
— assignments entered with a date in 2b	NOC	Replace the date by 4.1.82 in 2b	RES 9
— entries under No. 342 of the Radio Regulations	NOC	Replace the date by 5.1.82 in 2b	RES 9
II. Frequency bands above 3 900 kHz (Region 1) — 3 950 kHz (Region 3) — 4 000 kHz (Region 2)			
II.1 Lists returned to the Board:			
— A class of operation assignments	Delete any symbols indicating the finding under No. 1242	Replace the date or the symbol in 2d by 1.1.82	RES 9 SUP RR 515
— B or C class of operation assignments	idem	Replace the date or the symbol in 2d by 2.1.82	RES 9 SUP RR 515
— entries under No. 342 of the Radio Regulations	NOC	Replace the date or the symbol in 2d by 5.1.82	RES 9
II.2 Lists not returned to the Board:			
— finding favourable under No. 1240	NOC	Replace the date or the symbol in 2d by 3.1.82	RES 9
— entries under No. 342 of the Radio Regulations	NOC	Replace the date or the symbol in 2d by 5.1.82	RES 9

RESOLUTION No. 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;

RES10-2

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 No. 11

**Relating to the Use of Radiocommunications
for Ensuring the Safety of Ships and Aircraft
of States Not Parties to an Armed Conflict ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that international law recognizes the rights of States not parties to an armed conflict, hereinafter referred to as neutral States, to safely conduct normal commerce without risk of harm from parties to an armed conflict;
- b) that in the vicinity of armed conflict the ships and aircraft of neutral States encounter considerable risk;
- c) that for the safety of human life it is desirable to be able to identify and determine the position of these ships and aircraft in such circumstances;
- d) that radiocommunication offers a rapid means of identifying and locating such ships and aircraft prior to their entering areas of armed conflict and during their passage through the areas;

¹ Replaces Recommendation No. Mar2 – 17 of the World Maritime Administrative Radio Conference, Geneva, 1974.

taking into account

- a) that the World Maritime Administrative Radio Conference, Geneva, 1974, adopted a Recommendation concerning medical transports as well as the safety of ships and aircraft of States not parties to an armed conflict;
- b) that the World Administrative Radio Conference, Geneva, 1979, fully treated the subject of medical transports within the Radio Regulations by adding a new Section II to Article 40, but that this Conference did not make provisions for the safety of ships and aircraft of neutral States;

resolves to invite administrations

1. to bear in mind the requirements for identification and location of and communications with ships and aircraft of neutral States, including the possible use of aeronautical secondary surveillance radar and maritime radar transponders;
2. to consider the need for, and to formulate as appropriate, an acceptable procedure to be followed in order to assist in ensuring the safety of ships and aircraft of neutral States in times of armed conflict, referring to the Annex to this Resolution as one possible procedure;

invites the Administrative Council

to consider placing this matter on the agenda of the next competent world administrative radio conference;

requests the Secretary-General

to communicate the contents of this Resolution to IMCO and ICAO for such actions as they may consider appropriate.

ANNEX TO RESOLUTION No. 11

**Possible Procedure for the Identification and Location of
Ships and Aircraft of Neutral States**

For the purpose of announcing and identifying ships and aircraft of States not parties to an armed conflict, referred to below as neutral transports, a complete transmission of the urgency signals described in Nos. 3196 and 3197 is 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.

The frequencies specified in No. 3201 may be used by neutral transports for self-identification and for establishing communications. As soon as practicable, communications shall be transferred to an appropriate working frequency.

The use of the signal as described in the first paragraph indicates that the message which follows concerns a neutral transport. The message shall convey the following data:

- a) call sign or other recognized means of identification of the neutral transport;
- b) position of the neutral transport;
- c) number and type of neutral transports;
- d) intended route;
- e) estimated time en route and of departure and arrival, as appropriate;
- f) any other information, such as flight altitude, radio frequencies guarded, languages and secondary surveillance radar modes and codes.

The provisions of Section I of Article 40 shall apply as appropriate to the use of the urgency signal by neutral transports.

The identification and location of neutral ships may be effected by means of appropriate standard maritime radar transponders.

RES11-4

The identification and location of neutral aircraft may be effected by the use of the secondary surveillance radar (SSR) system specified in Annex 10 to the Chicago Convention on International Civil Aviation dated 7 December 1944, which is periodically brought up to date. The SSR mode and code reserved for the exclusive use of neutral aircraft must be defined by the parties to the conflict or by one of the parties to the conflict, acting by common agreement or individually, in accordance with procedures to be recommended by the International Civil Aviation Organization.

The use of radiocommunications for announcing and identifying neutral transports is optional; however, if they are used, the provisions of the Radio Regulations and particularly those of Articles 37 and 38 apply.

RESOLUTION No. 12

Relating to the New Rules for the Formation of Call Signs

The World Administrative Radio Conference, Geneva, 1979,

noting

- a) that many countries, especially developing countries, have an urgent need for new call signs;
- b) that the Radio Regulations (Geneva, 1979) contain new rules for the formation of call signs in Article 25;
- c) that under Article 69 of the Regulations, these rules will enter into force on 1 January 1981;

urges administrations concerned

to make use of the new rules for the formation of call signs contained in Article 25 of the Regulations as soon as required and even before the date established for their entry into force;

instructs the Secretary-General

to publish the information received from administrations on the use of the new rules for the formation of call signs.

RESOLUTION No. 13

**Relating to the Formation of Call Signs and the Allocation
of New International Series¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* the recommendation of the International Radio Conference, Atlantic City, 1947, relating to the formation of call signs;
- b)* the increasing demand for call signs justified by the increased number of Members of the Union and by the increased requirements of countries which are already Members;
- c)* the information supplied by the Secretary-General regarding allocations of call signs since 1947 and the possibilities of the current system of forming call signs;

believing

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

¹ Replaces Resolution No. 8 of the Administrative Radio Conference, Geneva, 1959.

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 mentioned in *noting a)* is not applicable to series beginning with one of the following letters: B, F, G, I, K, M, N, R, U, W;
- c) that a proposal has been submitted to this Conference for the formation of new call sign series by replacing the third character, which is a letter, by a digit;
- d) however, that this would require consequential changes in Section III of Article 25;

resolves

- 1. that the Secretary-General shall continue to urge administrations:
 - 1.1 to make the maximum use of the possibilities of the series at present allocated, 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 place them at the disposal of the Union;
- 2. that the Secretary-General 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 administrative radio conference, it appears that all the possibilities of the present system of forming call signs will be exhausted, the Secretary-General shall:
 - 3.1 explore the possibility of forming new series on the basis of the proposal mentioned in *noting c)* ;

3.2 issue a circular-letter:

3.2.1 explaining the position;

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

4. that, from the information thus submitted, the Secretary-General shall prepare a report, together with his comments and suggestions, for submission to the next competent world administrative radio conference.

RESOLUTION No. 14

Relating to the Transfer of Technology

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 International Telecommunication Convention;

resolves to urge

1. *the governments of the Member countries*, 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 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 International Consultative Committees 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 countries of the Union and the competent bodies of the United Nations;

invites the Administrative 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 No. 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 countries Members of the International Telecommunication Union are not in a position to take immediate advantage of satellite techniques for the development of their telecommunication services;
- b) that such countries 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;

¹ Replaces Resolution No. Spa 4 of the Extraordinary Administrative Radio Conference, Geneva, 1963.

resolves to invite the Administrative 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 countries of the Union 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 countries of the Union to make effective use of space communications;
4. to consider in what way the work of the Consultative Committees and other organs of the Union may be utilized in the most effective way for the information and assistance of administrations of Member countries of the Union in the development of space radiocommunications.

RESOLUTION No. 16

**Relating to the Role of Telecommunications
in Integrated Rural Development**

The World Administrative Radio Conference, Geneva, 1979,

recalling

Resolution 3362 (S-VII) of the seventh special session of the United Nations General Assembly which, *inter alia*, requested Member States to promote integrated rural development in the developing countries;

recalling further

the importance placed on rural development by various inter-governmental conferences during the Second United Nations Development Decade, which recognized the need for the intensification of development efforts aimed at satisfying the aspirations of the rural communities and accelerating the development of infrastructure in the rural areas;

the ITU Administrative Council Resolutions 779 (Implementation of the International Development Strategy for the Second United Nations Development Decade) and 800 (Telecommunications, an important factor of economic and social development; role of the ITU in this domain) and the importance of telecommunications for social and economic development, as well as the various projects and studies undertaken by the Union to meet these objectives;

convinced

of the importance of telecommunications as an essential element of infrastructure for the rural areas;

recognizing

- a) that most developing countries are still lacking adequate telecommunication resources;
- b) that many rural areas of the world do not currently enjoy the benefits of telecommunication technology;
- c) that many populations within individual countries live in isolation from each other due to geographical barriers such as oceans, mountains, forests and deserts;
- d) that the provision of modern telecommunications and, in particular, radiocommunications, including satellite technology, can serve to overcome those difficulties and to integrate rural communities in the development process;
- e) that many developing countries are unable to provide entirely from their own resources such modern telecommunications;

noting

the proven possibilities of modern telecommunication technology as a means of bringing to the rural areas, education, health care and other welfare services of importance for social development;

noting further

the significant supporting role of an adequate rural telecommunication network in stimulating growth in agricultural activities and in other sectors important for economic and social progress;

urges Member governments

to strengthen their technical cooperation efforts for the realization of accelerated telecommunication development to serve the rural communities, bearing in mind the existing inadequacies in the resources of various developing countries;

urges also administrations

to participate actively in the studies carried out by the Autonomous Working Groups (GAS 3 and GAS 5) of the CCITT/CCIR in regard to rural telecommunication development;

requests the Secretary-General

1. to continue to give special attention to the Union's technical assistance activities for the detailed planning, operation and maintenance of the rural telecommunication infrastructure and application of appropriate technology;
2. to bring this Resolution to the attention of the appropriate United Nations bodies;
3. to continue to cooperate with the specialized agencies and organizations of the United Nations system in the field of integrated rural development;

invites the Administrative Council

to consider this Resolution, to monitor its implementation and to report on progress in the Annual Report on the activities of the Union.

RESOLUTION No. 17

**Relating to the Determination, on the Basis of the Agenda,
of the Possible Committee Structure to Be Set Up at an
Administrative Radio Conference**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that some administrations, owing to lack of personnel, have difficulty in staffing their delegations at administrative radio conferences so as to be able to send at least one delegate to attend each of the committees;
- b)* that at present it is difficult for administrations to predict beforehand the number and names of the committees to be set up at conferences, and the subjects to be allocated to each committee;
- c)* that the Secretary-General might usefully prepare a draft structure for future conferences sufficiently in advance, in the light of relevant former conferences;

recognizing

- a)* that the organization of the work of each administrative radio conference can be determined only by the conference itself, in the light of its agenda and of the proposals and other documents submitted to it;
- b)* that nevertheless the organization of previous conferences can often be a helpful guide to the organization of a new conference, and that information about the organization of the work of previous conferences could therefore be of assistance to administrations in their preparations for conferences;

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resolves

1. that, when the Administrative Council has established the agenda of an administrative radio conference, the Secretary-General shall send to administrations, together with a copy of the resolution containing the agenda, an invitation to give their opinion on the structure of the conference in the light of the agenda;
2. that, on receipt of replies from administrations, the Secretary-General, in consultation with the IFRB and the Director of the CCIR and guided by the experience of earlier conferences of a similar character, shall draw up a draft conference structure showing which of the articles, appendices, resolutions, recommendations and other topics contained in the agenda might be considered by each committee;
3. that the Secretary-General shall bring this draft document to the attention of the Administrative Council and shall send it as an information paper to all administrations.

RESOLUTION No. 30

**Relating to the Review of Entries in the
Master International Frequency Register
at the Request of Previous Conferences**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the Extraordinary Administrative Radio Conference, Geneva, 1951, adopted an International Frequency List which included entries not in conformity with the Table of Frequency Allocations (Atlantic City, 1947);
- b) that the Administrative Radio Conference, Geneva, 1959, introduced the concept of primary and secondary services thus modifying the Table of Frequency Allocations (Atlantic City, 1947), resulting in the loss of priority for certain entries in the International Frequency List;
- c) that the Administrative Radio Conference, Geneva, 1959, in the establishment of the Master International Frequency Register, gave special consideration and treatment to the transfer of these entries from the Master Radio Frequency Record in accordance with the provisions of Resolution No. 4 (Geneva, 1959);
- d) that, in the period between 1 January 1952 and 31 March 1953, assignments were included in the above List without examination with a symbol in Column 2d and that the Board takes these assignments into account in the examination of any assignment notice;

considering further

- e) that administrations were urged to take the required action;
- f) that this Conference was invited to reconsider the situation;

resolves

1. that the Board shall examine, for their conformity with the new Table of Frequency Allocations, the frequency assignments to which Resolution No. 4 of the Radio Conference, Geneva, 1959, was applied and shall correct its findings accordingly with effect from the date of the entry into force of the Final Acts of this Conference. Where a finding has been modified in application of this Resolution, an appropriate remark shall be entered in the Remarks Column;
2. that the assignments with a symbol in Column 2d and not covered by Resolution 9 shall be examined with a view to the replacement of this symbol by the date of 1 April 1953;
3. that the Board shall inform the administrations concerned of any action taken with regard to these recorded assignments.

RESOLUTION No. 31

**Relating to the Application of Certain Provisions of the Final Acts
of the World Broadcasting-Satellite Administrative
Radio Conference, Geneva, 1977, to Take into Account Changes Made
by the World Administrative Radio Conference, Geneva, 1979
to the Table of Frequency Allocations for
Region 2 in the Band 11.7 - 12.7 GHz**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971, allocated the frequency band 11.7 - 12.2 GHz in Region 2 to the fixed-satellite, broadcasting-satellite, fixed, mobile except aeronautical mobile, and broadcasting services;
- b)* that the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, established provisions and an associated Plan for the broadcasting-satellite service in the band 11.7 - 12.5 GHz in Region 1 and in the band 11.7 - 12.2 GHz in Region 3;
- c)* that that Conference also established inter-regional sharing criteria based on the frequency allocations prevailing at that time;
- d)* that the frequency allocations to the fixed-satellite and broadcasting-satellite services in the 12 GHz band in Region 2 have been expanded and modified by this Conference;
- e)* that this Conference has also decided to incorporate the provisions and associated Plan adopted by the 1977 Conference into the Radio Regulations as Appendix 30;

recognizing

a) that these modifications to the Table of Frequency Allocations do not introduce in principle new inter-regional sharing situations apart from that identified in *b)* below;

b) that the provisions of Appendix 30 can be applied directly as indicated above to all sharing situations other than that between the fixed-satellite service in Regions 1 and 3 and the broadcasting-satellite service in Region 2 in the frequency band 12.2 - 12.7 GHz;

c) that the single case referred to in *recognizing b)* above is dealt with in Resolution 700;

resolves

1. that the provisions of Article 4 and Annex 1 of Appendix 30 relating to the modification to the Plan for the broadcasting-satellite service in Regions 1 and 3, shall also be applied with respect to the protection of the broadcasting-satellite service in the band 12.2 - 12.5 GHz, and to the fixed-satellite service in the band 12.2 - 12.3 GHz allocated in Region 2;

2. that the provisions of Article 6 and Annex 3 of Appendix 30 relating to the procedure for the coordination and notification of frequency assignments to terrestrial stations affecting broadcasting-satellite frequency assignments, shall also be applied in the band 12.2 - 12.7 GHz with respect to the broadcasting-satellite service in Region 2;

3. that the provisions of Article 7 and Annex 4 of Appendix 30 and Resolution 503, which relate to the preliminary procedures, and the coordination, notification and recording of frequency assignments to stations in the fixed-satellite and broadcasting-satellite services respectively, in Region 2, shall also be applied to the band 12.2 - 12.3 GHz as allocated to the fixed-satellite service, and to the band 12.2 - 12.5 GHz as allocated to the broadcasting-satellite service in Region 2;

4. that the provisions of Article 9 and Annex 5 of Appendix 30, which specify power flux-density limits between 11.7 - 12.2 GHz to protect terrestrial services in Regions 1 and 3 from Region 2 broadcasting-satellite space stations, shall also be applied to the band 12.2 - 12.5 GHz;

5. that until the final decisions are made by the 1983 regional administrative radio conference for Region 2 in the band 12.5 - 12.7 GHz:

- a) Article 9 and the limits in Annex 5 paragraph (1) of Appendix 30 shall be applied to the operation of Region 2 space stations in the broadcasting-satellite service, and
- b) the power flux-density limits specified in No. 2574 shall be applied to the operation of Region 2 space stations in the fixed-satellite service with respect to the countries mentioned in Nos. 848 and 850 and in Region 3;

requests the CCIR

1. to study urgently the question of appropriate protection for terrestrial services in each affected Region in the band 12.2 - 12.7 GHz, in the context of efficient planning of the broadcasting-satellite service in Region 2, as referred to in *resolves* 4 and 5 above;

2. to prepare a special report on the subject in time for its consideration by appropriate preparatory meetings and as a guideline for the work of the said regional conference.

RESOLUTION No. 32

**Relating to the Use of Frequency Assignments to
Terrestrial and Space Radiocommunication Stations
in the Band 11.7 - 12.2 GHz in Region 3 and in
the Band 11.7 - 12.5 GHz in Region 1¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, adopted Resolution No. Sat - 2;
- b) that No. 838 of the Radio Regulations provides that, in the band 11.7 - 12.2 GHz in Region 3 and in the band 11.7 - 12.5 GHz in Region 1, existing and future fixed, mobile and broadcasting services shall not cause harmful interference to broadcasting-satellite stations operating in accordance with the decisions of that Conference;
- c) that the decisions of that Conference included a Plan for stations in the broadcasting-satellite service;
- d) that the coordination procedures described in Resolution 33 are to be applied only until the entry into force of plans pursuant to Resolution 507;

resolves

1. that all administrations using or intending to use frequency assignments to terrestrial stations in the bands covered by the Plan shall decide, as soon as possible, whether or not these assignments will affect frequency assignments in accordance with the Plan (if necessary, with the assistance of the IFRB);

¹ Replaces Resolution No. Sat - 2 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

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2. that administrations may continue to use frequency assignments which are not in accordance with the Plan, provided that agreement is reached with the administration whose broadcasting-satellite stations are affected;
3. that the administrations seeking agreement shall inform the IFRB of the terms of the agreement reached;
4. that, upon receipt of such information, the IFRB shall insert a symbol in the Remarks Column of the Master Register indicating the duration specified in the agreement. The duration specified shall also be published in a special section of its weekly circular;
5. that Resolution No. Sat – 2 is abrogated and superseded by this Resolution;

invites the IFRB

to assist administrations in implementing the provisions of this Resolution.

RESOLUTION No. 33

**Relating to the 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 ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that while Resolution 507 envisages plans for the broadcasting-satellite service, 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 broadcasting-satellite service before such plans have been established;
- c) that a space station in the broadcasting-satellite service 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 Article 11 of the Radio Regulations contain no provisions for coordination between space stations in the broadcasting-satellite service and terrestrial stations and between space stations in that service and space systems of other administrations;

¹ Replaces Resolution No. Spa2 - 3 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

resolves

1. that, except in those cases where agreements and associated plans for the broadcasting-satellite service have been established and have entered into force, the following procedure shall be applied:

**Section A. Coordination Procedure Between Space Stations in the
Broadcasting-Satellite Service and Terrestrial Stations**

2.1 Before an administration notifies to the IFRB 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 Board of all the technical characteristics of the station, as listed in the relevant sections of Appendix 3 to the Radio Regulations, which are necessary to assess the risk of interference to a terrestrial radiocommunication service¹.

¹ The calculation methods and the interference criteria to be employed in evaluating the interference should be based upon relevant CCIR Recommendations agreed by the administrations concerned either as a result of Resolution 703 or otherwise. In the event of disagreement on a CCIR 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.

2.2 The Board 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 radio-communication services may be affected shall forward its comments to the administration seeking coordination and, in any case, to the Board. These comments must be forwarded within four months from the date of the relevant IFRB 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 Board, 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 Board 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 Board 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 paragraph 2.2.

**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:

3.1 Nos. 1041 to 1058 inclusive.

3.2.1 Nos. 1060 to 1065 ¹.

3.2.2 No coordination under paragraph 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.

¹ The calculation methods and the interference criteria to be employed in evaluating the interference should be based upon relevant CCIR Recommendations agreed by the administrations concerned either as a result of Resolution 703 or otherwise. In the event of disagreement on a CCIR 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 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 assignment¹ to a space station in the broadcasting-satellite service shall be notified to the Board. The notifying administration shall apply for this purpose the provisions of Nos. 1495 to 1497 of the Radio Regulations.

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

5.1 The Board 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 paragraphs 5.3, 5.4, and 5.5;
- 5.3 b) its conformity, where applicable, with the provisions of paragraph 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 paragraph 3.2.1 of Section B above, relating to coordination of the use of the frequency assignment with the other administrations concerned;

¹ 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 of the Radio Regulations, 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 Board subsequent to the examination prescribed in paragraphs 5.2, 5.3, 5.4 and 5.5, further action shall be as follows:

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

6.3 Where the Board reaches a favourable finding with respect to paragraph 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 paragraphs 5.3 and 5.4.

6.4 Where the Board finds that the coordination procedures mentioned in paragraphs 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 Board 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 Board finds that the coordination procedures mentioned in paragraph 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 Board 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 Board with respect to paragraph 5.5.

6.7 Where the notifying administration resubmits the notice and the Board 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 paragraph 6.4.

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

6.9 Where the Board reaches an unfavourable finding with respect to paragraph 5.5, the notice shall be returned immediately by airmail to the notifying administration with the reasons for the Board's finding together with such suggestions as the Board 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 Board's unfavourable finding under paragraph 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 Board 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 Board of the original notice shall be entered in Column 2d of the Master Register, with the remark mentioned in paragraph 6.4. An appropriate remark shall be placed in Column 13 to indicate that the assignment is not in conformity with the provisions of paragraph 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 Board 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 paragraphs 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 paragraph 6.10 of this Resolution or of No. 1544 of the Radio Regulations, 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 radiocommunication 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 paragraph 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 paragraph 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 paragraph 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 No. 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 Administrative Council may wish to empower a future competent administrative radio 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 together with Article 11 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;

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2. that the CCIR 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 CCIR and accepted by administrations concerned under Resolution 703, the sharing between space stations in the broadcasting-satellite service in Region 3 and terrestrial services in Regions 1, 2 and 3 shall be based on the following criteria as appropriate:

- 1) the power flux-density at the Earth's surface, produced by emissions from a space station in the broadcasting-satellite service in Region 3 for all conditions and for all methods of modulation shall not exceed the limits given in Annex 5 of Appendix 30; noting that sub-paragraph 2) shall only apply with respect to protection of the broadcasting service;
- 2) in addition to 1) above, the provisions of No. 2574 shall apply in the countries mentioned in Nos. 848 and 850;
- 3) the limits given in 1) and 2) above may be exceeded on the territory of any country provided the administration of that country has so agreed.

RESOLUTION No. 35

**Relating to a Procedure for Resolving a Disagreement
over the Technical Standards or Rules of Procedure of
the International Frequency Registration Board**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that, in accordance with No. 1001.1, the Technical Standards and Rules of Procedure of the IFRB shall be distributed to all Members of the Union and shall be open to comment from administrations;
- b)* that an administration may disagree with the substantive contents of these documents;
- c)* that, in the event of such a disagreement remaining unresolved, there should be a procedure for the resolution of that disagreement;

recognizing

- a)* that, with respect to the Technical Standards, the CCIR could provide the best source of professional advice;
- b)* that, with respect to the Rules of Procedure, a world administrative radio conference could provide the best source of interpretation of the Radio Regulations;

resolves

- 1. that, in the event of an unresolved disagreement over the substantive contents of the Technical Standards of the IFRB, the Board, in agreement with the administration concerned, shall refer the question to the CCIR for international study and the development of a Recommendation thereon by the next Plenary Assembly of the CCIR;

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2. that, in the event of the CCIR not having formulated a Recommendation thereon, or in the event of an unresolved disagreement over the substantive contents of the Rules of Procedure of the IFRB, in either case the matter may be referred to the Administrative Council for inclusion in the agenda of the next world administrative radio conference;

3. that, pending resolution of the matter, the Board shall continue to use the particular Technical Standard or Rule of Procedure in dispute but that, following resolution of the matter by a CCIR Recommendation or by a decision of a world administrative radio conference, the Board shall promptly take the consequential action including a review of all relevant findings.

RESOLUTION No. 36

**Relating to the Preparation of Explanatory Information by the
International Frequency Registration Board on the Application
of the New Method for Designating Emissions in Notification
Procedures and the Consequential Revision of the Master
International Frequency Register**

The World Administrative Radio Conference, Geneva, 1979,

having adopted

Article 4 and Appendix 6 containing a new system for the designation of emissions;

considering

- a)* that such designations are fundamental to the notification procedures detailed in the Radio Regulations;
- b)* that it is essential for this new system of designating emissions to be applied not only to new frequency assignments but also to existing entries in the Master Register;
- c)* that certain new designations are more detailed than the former designations;
- d)* that the IFRB does not have the means to replace automatically all former designations by the new designations;

noting

- a)* that some administrations may have difficulties in implementing the new method of designating emissions when it first comes into use;

b) that these administrations need explanatory information well in advance of the entry into force of the Final Acts of this Conference;

resolves

1. that the IFRB shall prepare explanatory information on the application of the new method of designation, including examples, in the context of the notification procedures specified in the Radio Regulations and shall make this information available to administrations as early as possible and not later than 1 October 1980;
2. that the IFRB shall proceed with the conversion of the data appearing in the Master Register in consultation with, and on the basis of information provided by, administrations;
3. that, if the Board does not receive from administrations within a reasonable time the information required in the application of *resolves* 2, it shall convert the data appearing in the Master Register as accurately as possible and insert in the Remarks Column a remark referring to the fact that the conversion was made under the terms of this paragraph;
4. that, from the date of entry into force of the present revision of the Radio Regulations, only the designations of emissions contained in Article 4 shall be used in the coordination and notification procedures. If however the Board receives, after this date, information or notifications containing the old type of designation, the Board shall not consider them incomplete for this reason alone. The Board shall, when practicable, modify the designation and, if clarification is required, shall consult the administrations concerned.

RESOLUTION No. 37

**Relating to the Introduction and Development
of Computer Assistance in Radio Frequency
Management Within Administrations**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* Resolution 7 relating to the development of national radio frequency management;
- b)* Resolution 6 relating to the preparation of a handbook to explain and illustrate certain provisions of the Radio Regulations;
- c)* Recommendation 31 addressed to the CCIR relating to the preparation of a handbook on computer-aided techniques in radio frequency management;

considering also

- d)* the potential value of computer aids in many aspects of radio frequency management;
- e)* the need for further assistance to administrations, particularly in developing countries, in introducing and developing computer facilities or in optimizing the use of their existing computer facilities as aids to radio frequency management;

resolves that the Secretary-General

shall promptly initiate a review of these problems to ensure that the following actions be taken in the most effective manner:

1. the holding of regional seminars particularly directed to education in this field, bearing in mind the national requirements of administrations;
2. the use of all educational resources available to the Union to provide further training in this field appropriate to the national requirements of administrations;
3. the making of appropriate arrangements, within the existing framework of the ITU, for aiding administrations in the identification of special problems in this field and helping to provide solutions, by the best possible application of computer technology;

invites the Administrative Council

to consider the recommendations of the Secretary-General and to find the necessary resources.

RESOLUTION No. 38

**Relating to the Reassignment of Frequencies of Stations
in the Fixed and Mobile Services in the Bands Allocated
to the Radiolocation and Amateur Services in Region 1**

(1 625 - 1 635 kHz, 1 800 - 1 810 kHz,
1 810 - 1 850 kHz and 2 160 - 2 170 kHz)

The World Administrative Radio Conference, Geneva, 1979,

considering

that this Conference has adopted modifications to the allocation of the frequency bands between 1 606.5 kHz and 2 850 kHz;

noting

a) that the implementation of the revised Table of Frequency Allocations presents difficulties in particular for stations in the maritime mobile service in Region 1 in the bands 1 625 - 1 635 kHz, 1 800 - 1 810 kHz and 2 160 - 2 170 kHz which are being made available for radiolocation services and in the band 1 810 - 1 850 kHz which is being made available to the amateur service;

b) that this Conference has recommended the convening of a general mobile administrative radio conference not later than 1982;

emphasizing

the need for frequency assignment plans to be drawn up for Region 1 for the band 1 606.5 - 2 850 kHz in order to implement the provisions in Nos. 486 and 492 of the Radio Regulations;

invites the general mobile administrative radio conference mentioned above

to give priority to the adoption of a new assignment plan for Region 1 for the band 1 606.5 - 2 850 kHz for the maritime mobile service;

resolves

1. that in Region 1, except for the countries and frequency bands mentioned¹ in Nos. 485, 490, 491, 493 and 499, on the date of implementation of a frequency assignment plan for the maritime mobile service to be contained in the final acts of the competent conference, all operations of stations of the fixed and mobile services shall be terminated in the bands 1 625 - 1 635 kHz, 1 800 - 1 810 kHz, 1 810 - 1 850 kHz and 2 160 - 2 170 kHz;
2. that replacement frequencies for stations of the maritime mobile service shall be provided in the frequency assignment plan mentioned above, together with the arrangements for their implementation;
3. that administrations having assignments to stations of the fixed, land mobile or aeronautical mobile (OR) services in the bands concerned shall choose and notify to the IFRB appropriate replacement assignments; and where the finding of the Board is favourable with respect to Nos. 1240 and 1241, each such replacement assignment shall have the same date and status as that which it replaced, as far as the assignments of the countries in Region 1 are concerned;

¹ No. 485, bands 1 625 - 1 635 kHz, 1 800 - 1 810 kHz and 2 160 - 2 170 kHz;
No. 490, band 1 810 - 1 830 kHz;
No. 491, band 1 810 - 1 830 kHz;
No. 493, band 1 810 - 1 850 kHz;
No. 499, band 2 160 - 2 170 kHz.

4. that the protection afforded to stations of the fixed and mobile services by Nos. 486 and 492 shall continue to apply until such time as satisfactory replacement assignments have been found and implemented in accordance with this Resolution;

5. that, after the date of implementation of the frequency assignment plan for the maritime mobile service contained in the final acts of the competent conference, the continued use of frequency assignments that have not been transferred in accordance with *resolves* 3 shall be only on the basis of No. 342.

RESOLUTION No. 60

**Relating to Information on the Propagation of Radio Waves
Used in the Determination of the Coordination Area**

(See Appendix 28)

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that Appendix 28 to the Radio Regulations provides a method for the determination of the coordination area which incorporates certain material concerned with radio wave propagation;
- b) that the propagation information contained in Appendix 28 is based directly or indirectly on propagation data given in the texts of the CCIR;
- c) that CCIR studies of radio wave 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 28 which incorporate the propagation information;
- d) that no radio wave 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 radio wave 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 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 CCIR

to continue to study propagation data concerned with the determination of the coordination area, and to maintain the relevant CCIR texts in a format which would permit direct insertion into Appendix 28 in place of the existing paragraphs 3, 4 and 6 or Annex III;

resolves

1. that each Plenary Assembly of the CCIR should come to a conclusion as to whether, according to the propagation information given in the most recent CCIR Recommendations, any revision of paragraphs 3, 4 and 6 or Annex III of Appendix 28 to the Radio Regulations is warranted;
2. that when a Plenary Assembly of the CCIR has come to the conclusion that a revision of paragraphs 3, 4 and 6 or Annex III of Appendix 28 is warranted, the Director of the CCIR shall so inform the Secretary-General of the ITU and send him the proposed amendments to Appendix 28;

requests

1. that the Administrative Council then place, as an extraordinary item, on the agenda of the next world administrative radio conference, the consideration of the conclusion of the CCIR;
2. that, if the said world administrative radio conference decides that the propagation information used in Appendix 28 is to be revised, the Secretary-General, in consultation with the IFRB, 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 28 in a form

suitable for direct substitution in the version of Appendix 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 28.

RESOLUTION No. 61

**Relating to the Division of the World into Climatic Zones
for the Purpose of Calculation of Propagation Parameters**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the propagation of radio waves, particularly at frequencies greater than 1 GHz, is significantly influenced by rain, as well as by sand and dust storms;
- b)* that measured values of rainfall intensity and more particularly short-term rain intensity statistics are not available for certain geographical regions;
- c)* that very little information exists on the occurrence and effects of sand and dust storms;
- d)* that for the purpose of evaluating propagation characteristics, the CCIR has divided the world into five rain-climatic zones, broadly corresponding to the characteristics of the rainfall and this division is no longer adequate;
- e)* that the present division of the world into such a limited number of rain-climatic zones is likely to be insufficiently precise to give a correct evaluation of attenuation and scattering by rain in some parts of the world;
- f)* that the effects of dust and sand storms have not been adequately examined and evaluated, either in terms of their severity or in terms of their temporal variations;
- g)* that the CCIR has some studies in progress on the effects of rain, as well as of dust and sand storms;

requests the CCIR

1. to expedite and expand the studies on the effects of rain and to give greater emphasis to the studies of sand and dust storms;
2. to advise on the nature of the studies required in geographical regions for which little information exists;
3. in the light of new data becoming available, to give particular attention to the revision of the current classification of the world into climatic zones;

resolves to urge administrations

1. to encourage and undertake, as a matter of urgency, measurements in their countries of the rates of precipitation of rain and of the spatial and temporal variations of this precipitation including its cellular structure;
2. to encourage and undertake, also as a matter of urgency, measurements of the influence of sand and dust storms on propagation;
3. to communicate the results of such measurements to the CCIR to enable the development of a better and more comprehensive description of the phenomena which apply and an improved classification of dust and sand storms and rainfall climates for application to radiocommunication problems.

RESOLUTION No. 62

**Relating to the Experimental Use of Radio Waves
by Ionospheric Research Satellites ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that research into the Earth's ionosphere is very important in the study of the relationship between the Sun and the Earth and also for the effective use of radio wave transmission via the ionosphere;
- b)* that successful research has been conducted with satellites such as Alouette 1 and 2, ISIS 1 and 2 and ISS in which top-side sounding equipment is installed;
- c)* that similar ionospheric research satellites will be used for further research into the ionosphere and beyond;
- d)* that top-side sounding equipment is operated mostly in a frequency-sweeping pulse mode;
- e)* that these types of satellite are usually operated intermittently during a limited period each day according to the orbital characteristics;
- f)* that operation of the sounder can be accurately commanded at will by the earth station concerned;

¹ Replaces Resolution No. **Spa2** – 4 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

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resolves

that administrations may continue to permit the emissions of radio waves from ionospheric research satellites in orbit above the ionosphere in the MF and HF bands provided that suitable means are available for controlling emissions from these satellites as required by No. 2612 of the Radio Regulations to prevent harmful interference to other services.

RESOLUTION No. 63

**Relating to the Protection of Radiocommunication Services
Against Interference Caused by Radiation from Industrial, Scientific
and Medical (ISM) Equipment**

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;

invites the CCIR

1. to continue, in collaboration with the CISPR and the 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 administrative radio conference

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

RESOLUTION No. 64

Relating to CCIR Study of Lightning Protection of Radio Equipment

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that there are areas in the world where, although the required protective devices against lightning have been installed, equipments constantly deteriorate, often very seriously, following discharges produced during electrical or violent storms;
- b) that due to circumstances such as climatic conditions, man-made environmental pollution, etc., studies have not led to conclusive results;
- c) the lack of material means and of experience among technicians confronted with this phenomenon;

considering further

No. 72 of the International Telecommunication Convention (Malaga-Torremolinos, 1973);

invites the CCIR

1. to study this phenomenon, in consultation with the CCITT and to formulate a Recommendation in this matter;

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2. to include in the study of this phenomenon, in order to facilitate the application of such protection techniques and, to the extent possible, statistics on lightning with respect to climatic zones of occurrence, frequency of occurrence and magnitude of lightning as measured in terms of induced currents or voltages and their related time constants;

and invites administrations

to submit to the CCIR technical data and results of studies in this matter.

RESOLUTION No. 65

**Relating to the Circulation of Current Information
on CCIR Recommendations Referred To
in the Radio Regulations**

The World Administrative Radio Conference, Geneva, 1979,

noting

- a) that reference is made in the Radio Regulations to specific CCIR Recommendations as well as to "relevant CCIR Recommendations";
- b) that Resolution 703 provides for consultation on the applicability of those CCIR Recommendations relating to the technical criteria for sharing frequency bands between space radiocommunication and terrestrial radiocommunication services or between space radiocommunication services;
- c) that the CCIR Recommendations may be revised by CCIR Plenary Assemblies, with consequent changes of reference numbers;

considering

- a) that a correct application of the Radio Regulations requires the identification by administrations of the relevant CCIR Recommendations to be taken into account;
- b) that information on the up-dating of these Recommendations is of the utmost importance;

invites the CCIR

1. to identify and list those provisions of the Radio Regulations containing a reference to a specific CCIR Recommendation or to a "relevant CCIR Recommendation" together with the reference numbers and titles of those Recommendations;
2. to instruct the Director of the CCIR to provide the Secretary-General with the information required to update the list;

requests the Secretary-General

to communicate to all administrations the list of those Recommendations as well as any subsequent updating thereof.

RESOLUTION No. 66

**Relating to the Division of the World into Regions for the
Purposes of Allocating Frequency Bands**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the present division of the world into Regions 1, 2 and 3 for the purposes of allocating frequency bands was made in 1947 and the technical bases for this division were not clearly defined;
- b)* that since 1947 considerable advances in radiocommunication techniques have been made and many new countries have emerged;

being aware

that this division of the world into three Regions as presently constituted, may not be appropriate to meet the requirements of all countries on an equitable basis;

recognizing

that it is not possible to carry out the required revision of the existing Regional division during this Conference;

resolves

that this division should be reviewed in the light of the major developments in radio technology and increase in the membership of the Union with countries at different stages of development;

requests the CCIR

to undertake a study of the technical and operational bases for the possible revision of the division of the world for the purposes of allocating the frequency bands, based on all relevant factors such as radio propagation, climatic conditions, natural geographical configuration of the world, state of economic and technical development, which would permit improvement in the efficient utilization of the radio frequency spectrum by all Member countries of the Union;

urges all Members of the Union

to participate actively in the above study by contributing to its work;

further requests the CCIR

to complete and submit this study not later than its XVIth Plenary Assembly, and in any case to prepare a report for consideration by the next Plenary Assembly;

invites the Administrative Council

to follow the conduct of the study and to furnish advice to the Plenipotentiary Conference with a view to this matter being suitably resolved at one of the future world administrative radio conferences of the Union.

RESOLUTION No. 67

**Relating to Improvements in the Design
and Use of Radio Equipment**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the radio frequency spectrum is a scarce natural resource which has value only when used;
- b)* that efficient utilization of the spectrum can be limited by the characteristics of both transmitting and receiving equipment;
- c)* that operational aspects of radio systems can also limit the efficient utilization of the spectrum;
- d)* that continuing advances in electronics and allied fields are enabling the production of more spectrum-efficient radiocommunication systems;

resolves

that administrations should encourage improvements in the design and construction of radio equipment and in the mode of operation of systems in order to improve the utilization of the radio frequency spectrum.

RESOLUTION No. 68

**Relating to the Redefinition of Certain Terms
Contained in Annex 2 to the International Telecommunication
Convention (Malaga-Torremolinos, 1973)
and Applicable to the Radio Regulations**

The World Administrative Radio Conference, Geneva, 1979,

having considered and adopted

the terms and definitions contained in Article 1 of the Radio Regulations (Geneva, 1979) which includes a number of terms already defined in Annex 2 ("Definition of Certain Terms Used in the Convention and in the Regulations of the International Telecommunication Union") to the International Telecommunication Convention (Malaga-Torremolinos, 1973);

believing

that some of the terms as defined in Annex 2 to the Convention which are of importance to the Radio Regulations, i.e. "harmful interference", "telegraphy" and "telephony", and associated terms, should be reviewed and made more precise and better adapted to current technology;

recognizing however

that, in view of Article 51, in particular No. 167, of the International Telecommunication Convention (Malaga-Torremolinos, 1973), only a Plenipotentiary Conference of the International Telecommunication Union is competent to amend the terms and their definitions contained in Annex 2 to that Convention;

recommends

that the Plenipotentiary Conference of the International Telecommunication Union, Nairobi, 1982, re-examine the definition in Annex 2 to the International Telecommunication Convention of the terms "harmful interference", "telegraphy", "telephony" and associated terms, taking into account the terms and definitions adopted for the purposes of the Radio Regulations by the World Administrative Radio Conference, Geneva, 1979, together with any proposals submitted by the CCIR and CCITT under Resolution No. 44 of the Plenipotentiary Conference, Malaga-Torremolinos, 1973;

instructs the Secretary-General

1. to bring this matter to the attention of that Plenipotentiary Conference;
2. to indicate in the published text of the Radio Regulations, by means of notes, those definitions which are not in alignment with Annex 2 to the Convention, drawing attention to the fact that the corresponding definitions in that Annex shall prevail over those in the Radio Regulations to the extent that there are differences between them;
3. to amend or delete these notes in the light of any relevant decisions of the Plenipotentiary Conference.

RESOLUTION No. 100

**Relating to the Coordination, Notification and Recording
in the Master International Frequency Register of
Assignments to Stations in the Fixed-Satellite
Service with Respect to Stations in the
Broadcasting-Satellite Service in Region 2¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

that the Radio Regulations contain no provisions governing the coordination, notification or recording in the Master International Frequency Register of frequency assignments to stations in the fixed-satellite service in the band 12.1 - 12.3 GHz with respect to stations in the broadcasting-satellite service in Region 2;

resolves

that the provisions of Articles 11 and 13 of the Radio Regulations shall be applied in such cases until the matter is considered by a competent administrative radio conference.

¹ Replaces Resolution No. Sat - 6 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

RESOLUTION No. 101

**Concerning the Drawing Up of Agreements and of the Associated
Plans for Feeder Links to Space Stations in the
Broadcasting-Satellite Service Operating in the
12 GHz Band under the Plan Adopted by the
World Broadcasting-Satellite Administrative Radio Conference,
Geneva, 1977, for Regions 1 and 3**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the geostationary-satellite orbit and the frequency bands allocated to the fixed-satellite service should be utilized as efficiently as possible;
- b)* that the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, prepared and adopted the provisions and associated Plan for the assignment of frequency channels and orbital positions in the band 11.7 - 12.5 GHz for Region 1 and 11.7 - 12.2 GHz for Region 3, contained in Appendix 30;
- c)* that the feeder links to broadcasting satellites are part of the fixed-satellite service and that the use of the frequency bands for these feeder links is currently governed by Articles 11 and 13 of the Radio Regulations;
- d)* that the presence of a large number of broadcasting satellites operating in geostationary orbit positions determined by the above plans will cause considerable difficulties in the coordination of the use of frequency bands for feeder links for the transmission of programmes with systems of the fixed-satellite service;
- e)* that the existing sharing criteria in Article 27 have not been specifically determined for feeder links for the broadcasting-satellite service in bands in which the use of the fixed-satellite service is exclusively reserved for these feeder links;

noting

a) that this Conference has identified certain frequency bands as available for the feeder links to broadcasting satellites (see the Table of Frequency Allocations and associated footnotes, Nos. 835, 858, 863 and 869);

b) that the choice of bands for feeder links to broadcasting satellites shall be left to the administrations concerned;

resolves

1. that the feeder links to broadcasting satellites operating in the bands 11.7 - 12.5 GHz in Region 1 and 11.7 - 12.2 GHz in Region 3 shall be organized and operated in the bands 10.7 - 11.7 GHz, 14.5 - 14.8 GHz (limited to countries outside Europe and to Malta) and 17.3 - 18.1 GHz for Region 1 and 14.5 - 14.8 GHz and 17.3 - 18.1 GHz for Region 3 in accordance with agreements and the associated plans adopted at an administrative radio conference in which all the administrations concerned and any administrations whose services may be affected may participate; however, administrations may also use feeder links to broadcasting satellites in the band 14.0 - 14.5 GHz (limited to countries outside Europe and to Malta) or in other frequency bands allocated to the fixed-satellite service (Earth-to-space), subject to coordination with other networks in the fixed-satellite service;

2. that, pending the entry into force of such agreements and relevant plans, the administrations and the IFRB shall apply the procedures prescribed in Articles 11 and 13 and in Resolution 102 for feeder links to broadcasting satellites operating in the bands mentioned in *resolves* 1;

3. that until the final acts of the proposed administrative radio conference come into force the criteria given in Article 27 for sharing between terrestrial services and the fixed-satellite service shall also be applicable with regard to the feeder links for the broadcasting-satellite service in the bands mentioned above;

invites the Administrative Council

to study the question of convening an administrative radio conference in order to determine the appropriate date, the place of meeting and the agenda for such a conference;

invites the CCIR

1. to study the most appropriate technical characteristics for feeder links for the broadcasting-satellite service and the method of planning the assignment of frequency channels for the feeder links in the bands which have been allocated by the World Administrative Radio Conference, Geneva, 1979 (also see Recommendation 101);
2. to study and to determine, as a matter of urgency, suitable criteria applicable to sharing between the fixed and mobile services and feeder links to broadcasting satellites.

RESOLUTION No. 102

**Relating to Coordination among Administrations of the
Technical Characteristics of Feeder Links to Space Stations in the
Broadcasting-Satellite Service in the Band 11.7 - 12.5 GHz
(Region 1) and 11.7 - 12.2 GHz (Region 3) During the Period
Between the Entry into Force of the Final Acts of the
World Administrative Radio Conference, Geneva, 1979, and the
Entry into Force of the Final Acts of a Future Conference on the
Planning of Feeder Links to Such Space Stations**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that before a conference is convened to draw up a plan for feeder links, any administration wishing to use a feeder link to a space station in the broadcasting-satellite service should be able to determine the technical characteristics of the link by agreement with all administrations sharing the same orbital position for such stations as given in the Plan contained in the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, (Appendix 30), taking into account the relevant CCIR Recommendations;
- b) that any administration wishing to bring into use a space station in the broadcasting-satellite service in accordance with Appendix 30, and to use to that effect a frequency assignment for the feeder link, shall apply the advance publication and coordination procedures described in Article 11 for this feeder link;

resolves

1. that when publishing the advance information under No. 1044, the IFRB shall also indicate the administrations on behalf of which a frequency assignment is recorded in Appendix 30 for the same orbital position;

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- 2. that the agreement or comments of the administrations mentioned in paragraph 1 above shall be communicated to the administration seeking coordination within four months of the date of the advance publication;**
- 3. that a pre-coordination agreement among administrations sharing the same orbital position in the Plan may be concluded, if necessary with the assistance of the Board, during a meeting to which those administrations shall be invited and in which they may take part if they so wish;**
- 4. that the result of this pre-coordination agreement shall be published as a complement to the normal coordination procedures carried out under Article 11 and that the conference which will be responsible for the planning of feeder links shall be informed of all pre-coordination agreements made in pursuance of this Resolution without prejudging in any way the decisions to be taken by that conference.**

RESOLUTION No. 103

**Relating to Improvements in Assistance to Developing Countries in
Securing Access to the HF Bands for their
Fixed Services and in Ensuring Protection of their
Assignments from Harmful Interference**

The World Administrative Radio Conference, Geneva, 1979,

noting

the other Resolutions adopted at this Conference relating to the special needs of developing countries;

considering

a) that in many cases the developing countries have a need of assistance of a highly specialized nature and that this assistance must often be obtained at short notice, particularly in relation to the fixed service and the use of the HF bands;

b) that the technical knowledge and experience of most value to the developing countries in this field is obtainable from or through the International Frequency Registration Board;

considering also

c) that the resources of the IFRB are limited;

resolves

1. that the provisions of the Radio Regulations Nos. **1218, 1260, 1275 to 1304, 1416 and 1963 to 1966** are intended essentially for use by the administrations of developing countries;
2. that the administrations of developed countries should make the minimum possible use of these provisions;
3. that the administrations of developing countries should make the maximum possible use of these provisions.

RESOLUTION No. 200 *

**Relating to the Use of Class R3E and J3E Emissions
for Distress and Safety Purposes on the Carrier
Frequency 2 182 kHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

noting

a) that the Radio Regulations require the use on the carrier frequency 2 182 kHz of:

- class A3E or H3E emissions by ship, aircraft and survival craft stations;
- class H3E emissions by coast stations;
- the classes of emission, specified in Appendix 37, by emergency position-indicating radiobeacons;

b) that the main object of these provisions is to maintain reliable distress and safety communications by using proven techniques;

noting also

a) the Final Report of the Panel of Experts (Geneva, 1963);

b) the relevant CCIR studies concerning single-sideband techniques (see CCIR Question 26-1/8, Recommendations 488, 543 and 544 and Report 744);

¹ Replaces Resolution No. **Mar2** – 20 of the World Maritime Administrative Radio Conference, Geneva, 1974.

* *Note by the General Secretariat:* See also Resolution 305.

recognizing

that the use of class R3E and J3E emissions on the carrier frequency 2 182 kHz would provide the operational advantages, inherent in single-sideband techniques, which are already being obtained on other frequencies;

recognizing, however,

that the CCIR recommends that class R3E emissions should not be used for distress and safety purposes (see CCIR Recommendation 543);

considering

a) that a large number of equipments employing class A3E and H3E emissions will still be in use for distress and safety purposes on 1 January 1982;

b) that single-sideband equipment must be designed to work with closer frequency tolerances and higher technical standards than those necessary for double-sideband equipment;

c) that equipment designed for safety purposes, particularly survival craft equipment, should:

- be capable of reliable operation in varying environments, and after long periods of storage;
- be easy to operate by an inexperienced person in all circumstances;
- be relatively low priced;

d) that the requirement for direction-finding and homing must be satisfied;

e) that the need to transmit and receive the two-tone radiotelephone alarm signal, including signals from emergency position-indicating radio-beacons, must also be satisfied, taking into account the frequency tolerances in Appendix 37 and the relevant CCIR Recommendations;

resolves

1. that continuation of the study of the use of class R3E and J3E emissions for distress and safety purposes is required;
2. that this study should be completed in time for a decision on the date for the final conversion to class R3E and J3E emissions on the carrier frequency 2 182 kHz to be made by the next competent world administrative radio conference;

requests the CCIR

to continue its studies on the above-mentioned subject as a matter of urgency and, if possible, to issue Recommendations sufficiently in advance of the above-mentioned conference;

requests the Secretary-General

to communicate this Resolution to the Inter-Governmental Maritime Consultative Organization;

invites the Inter-Governmental Maritime Consultative Organization

to consider the matter as part of the study currently being undertaken of the maritime distress and safety system.

RESOLUTION No. 201

**Relating to Operational Provisions, Charging and Accounting
for Public Correspondence in the Mobile Services**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the CCITT, in accordance with a request by the World Maritime Administrative Radio Conference, Geneva, 1974, has prepared two Recommendations relating to the operational provisions for the maritime mobile service, and charging, accounting, and refunds in the maritime mobile service;
- b)* that this Conference has accepted the overall conclusions and most of the detailed conclusions of the report of the CCITT studies carried out in accordance with the pertinent Resolutions of the World Maritime Administrative Radio Conference, Geneva, 1974, which have now been abrogated;
- c)* that as a consequence, the Additional Radio Regulations and certain provisions of the Radio Regulations relating to the operation of, and charging and accounting for, public correspondence in the mobile services have been replaced by provisions governing the general application of the CCITT Recommendations;
- d)* that a number of the provisions which have been replaced referred to mobile services other than the maritime mobile service and the maritime mobile-satellite service;
- e)* that the provisions contained in the two above-mentioned CCITT Recommendations relating to public correspondence apply at present only to the maritime mobile service and the maritime mobile-satellite service;
- f)* further, that in any revision of the relevant CCITT Recommendations full account needs also to be taken of maritime interests, ensuring adequate time for administrations to consult these interests;

recognizing

- a) that there is at present no specific provision for international public correspondence in any mobile service other than the maritime mobile service and the maritime mobile-satellite service;
- b) that international public correspondence might nevertheless be extended in the future to mobile services other than the maritime mobile service and the maritime mobile-satellite service;

invites the CCITT

to undertake, if the need arises, studies on the operational provisions, charging and accounting for international public correspondence in the mobile services other than the maritime mobile service and the maritime mobile-satellite service, seeking to harmonize to the maximum extent possible all such provisions for the mobile services in question;

further invites the CCITT

in continuance of its work relating to the maritime mobile service and the maritime mobile-satellite service to take particular account of maritime interests therein;

resolves

that in the case of a new international public correspondence service being established in a mobile service other than the maritime mobile service or the maritime mobile-satellite service, the new service should conform as far as practicable in its operational provisions, charging and accounting with the existing provisions of the Telephone Regulations, the Telegraph Regulations and the Radio Regulations and with the relevant CCITT Recommendations, until such time as any necessary revision could be made.

RESOLUTION No. 202

**Relating to the Convening of a
World Administrative Radio Conference for the Mobile Services**

The World Administrative Radio Conference, Geneva, 1979,

noting

Resolution No. 814 of the Administrative Council;

considering

- a) that the agenda of this Conference provided for partial revision of the Radio Regulations and that complete revision would require an appropriate conference to be convened to revise the substance of the remaining articles, particularly those related to the mobile services;**
- b) that, as a consequence of the decisions made by this Conference, and to harmonize some provisions for the aeronautical, maritime and land mobile services, particularly to improve the provisions related to distress and safety, and as a result of technological improvements and the introduction of new systems, there is a need to revise a number of provisions concerning the mobile services;**
- c) that there are new demands upon the mobile services;**
- d) that this Conference has made various Recommendations which envisage the holding of a conference to deal with provisions for the mobile services;**
- e) that where changes have been made by this Conference to the frequency allocations to mobile services it may be necessary for consequential changes to be made to channelling plans and other subdivisions of those frequency bands for the services concerned;**

noting further

that the Final Acts of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, provide for a Frequency Allotment Plan for that service which is currently in the process of implementation and should not therefore be altered in the near future;

resolves to invite the Administrative Council

to take the necessary steps to arrange a world administrative radio conference for the mobile services to revise the provisions of the Radio Regulations which relate specifically to these services;

invites

1. *the CCIR* to prepare the technical and operational bases for the conference;
2. *the IFRB* to give its technical assistance for the preparation and the organization of the conference.

RESOLUTION No. 300

**Relating to the Use and Notification of Paired Frequencies
Reserved for Narrow-Band Direct-Printing Telegraph
and Data Transmission Systems in the HF Bands Allocated
to the Maritime Mobile Service¹**

(See Appendix 32)

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that certain sections of the HF bands allocated to the maritime mobile service have been reserved for narrow-band direct-printing telegraph and data transmission systems for use on a paired frequency basis only;
- b)* that the number of paired frequencies in each band is limited;
- c)* that a future competent conference may provide for wider bands for narrow-band direct-printing than those available at present;
- d)* that for this reason the World Maritime Administrative Radio Conference, Geneva, 1974, considered it inopportune to draw up a plan at that time but that such a plan might later be rendered necessary by the congested state of channels;
- e)* that, however, interim measures have to be taken by administrations and by the IFRB to provide for the orderly introduction of these new paired frequencies;

¹ Replaces Resolution No. Mar2 – 7 of the World Maritime Administrative Radio Conference, Geneva, 1974.

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, and shall be notified 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 to achieve efficient frequency usage each administration shall choose the pairs of frequencies to be assigned to coast stations according to its requirements, with the assistance of the IFRB;

1.3 the assignments thus selected and brought into service shall be notified to the IFRB on notices as shown in Appendix 1 to the Radio Regulations and administrations shall supply the basic characteristics listed in Section A or B of that Appendix, as appropriate. If the assignments conform to the Table of Frequency Allocations, to the related provisions of the Radio Regulations and to this Resolution, the Board shall enter them for information in Part 1A of its weekly circular and in the Master Register. No date will be entered in Column 2 of the Master Register and no finding resulting from a technical examination of compatibility with an existing assignment will be issued. However, the date of receipt of the notice by the Board will be entered in Part 1A of the weekly circular and in the Remarks Column of the Master Register. A reference to this Resolution shall also be entered in the Remarks Column;

1.4 any notice not in conformity with the above-mentioned provisions of the Radio Regulations or with this Resolution shall be returned to the notifying administration by the IFRB, together with any suggestion which the Board may be able to submit in this respect;

- 1.5 should difficulties arise between countries using the same channel, the matter shall be settled by mutual arrangements between the administrations concerned;
2. that a future competent conference be invited to examine any difficulties which may have arisen in the application of this Resolution and to take a decision, if necessary, on the status to be given to the above-mentioned assignments or on the conditions for drawing up a plan for the bands and systems in question. The entries in the Master Register under this Resolution shall in no way prejudice any decisions which may be taken by the aforementioned conference;
3. that this Resolution shall apply to assignments of paired frequencies for narrow-band direct-printing telegraphy as shown in paragraph 1.1 above, notwithstanding any other provisions of the Radio Regulations and existing resolutions of administrative radio conferences that may conflict with this Resolution.

RESOLUTION No. 301

**Relating to the Notification of Non-Paired Ship Station
Frequencies Used for Narrow-Band Direct-Printing Telegraph
and Data Transmission Systems¹**

(See Appendix 33)

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that certain sections of the HF bands allocated to the maritime mobile service are reserved for narrow-band direct-printing telegraph and data transmission systems operating on a non-paired frequency basis;
- b) the World Maritime Administrative Radio Conference, Geneva, 1974, was not in a position to decide the extent to which it was necessary to regulate the orderly use of frequencies for the transmission by ship stations of non-paired direct-printing telegraph signals or on what basis this might be done;
- c) that these questions should be considered by a subsequent competent conference;
- d) that the existing provisions of the Radio Regulations do not provide administrations with appropriate guidance for the period between the coming into force of the Final Acts of the World Maritime Administrative Radio Conference, Geneva, 1974, and the coming into force of those of the conference mentioned in c) above;

¹ Replaces Resolution No. **Mar2** – 8 of the World Maritime Administrative Radio Conference, Geneva, 1974.

resolves

1. that, during the period referred to in *considering d)* above, any administration operating or bringing into operation non-paired narrow-band direct-printing telegraph or data transmission systems for ships shall notify to the IFRB, for recording in the Master International Frequency Register, the frequencies on which ship stations participating in the service will be required to transmit;
2. that these notices concerning frequencies used for reception by coast stations shall not be subject to technical examination by the Board, and that the assignments notified shall be recorded in the Master Register for information only, bearing no date in Column 2, but with a suitable remark in the Remarks Column merely referring to this Resolution;
3. that these entries in the Master Register shall not prejudice any decisions which may be taken by the conference referred to in *considering c)* above.

RESOLUTION No. 302

**Relating to the Manner in Which the IFRB Shall Treat Notifications
Dealing with Frequency Assignments to Oceanographic Stations ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that this Conference has adopted Resolution 314 concerning the establishment of a coordinated worldwide system for the collection of data relating to oceanography;
- b) that the IFRB requires instructions regarding the notification and registration in the Master International Frequency Register of assignments to oceanographic stations;

resolves

that the IFRB be instructed to accept for registration in the Master International Frequency Register only such notifications, submitted by administrations in accordance with Nos. 1214 to 1217 and 1219 of the Radio Regulations, as pertain to transmitting and receiving oceanographic stations which are land based and which are in conformity with Resolution 314. Such notifications shall be treated by the Board in accordance with No. 1245 of the Regulations. These entries in the Master Register shall not prejudice any decisions to be taken by the next administrative radio conference competent to deal with the maritime mobile service.

¹ Replaces Resolution No. Mar 19 of the World Administrative Radio Conference, Geneva, 1967.

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RESOLUTION No. 303

**Relating to Inter-Ship Frequencies in the Bands
Between 1 605 kHz and 3 600 kHz in Region 1¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the Master International Frequency Register contains among the initial entries the frequency assignments adopted by the Extraordinary Administrative Radio Conference, Geneva, 1951, made to specific countries for inter-ship communications in the bands between 1 605 kHz and 3 600 kHz in Region 1;
- b) that provisions should be made for the notification and recording of the use of these frequencies for inter-ship communications by administrations of other countries in Region 1;

resolves

- 1. that the use of the frequencies referred to in a) above by other administrations should be coordinated with the administrations concerned, and subsequently notified to the International Frequency Registration Board;
- 2. that upon such notification the Board shall record these new assignments in the Master International Frequency Register, without any date in Columns 2a or 2b, but with an appropriate note in the Remarks Column followed by the date of receipt of the notice by the Board;

¹ Replaces Resolution No. 15 of the Administrative Radio Conference, Geneva, 1959.

RES303-2

invites administrations

to review the recorded areas of operation of the frequency assignments concerned, with a view to improving sharing possibilities;

requests the IFRB

to make, where necessary, such suggestions to the administrations concerned as it may be able to offer with a view to achieving the purpose referred to in the immediately preceding paragraph.

RESOLUTION No. 304

**Relating to the Implementation of the New Channelling Arrangement
for A1A Morse Radiotelegraphy in the Bands Allocated
to the Maritime Mobile Service Between 4 000 kHz and 27 500 kHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that Recommendation No. **Mar 7** of the World Administrative Radio Conference, Geneva, 1967, requested administrations to study the problems relating to the future use of harmonic relationships in ships' radio equipment;
- b)* that the World Maritime Administrative Radio Conference, Geneva, 1974, provided, for use by ship stations, calling and working frequencies for A1A Morse telegraphy which are not harmonically related;
- c)* that it is desirable to implement the new channelling arrangement as soon as possible;

recognizing

- a)* that there is a need to provide an amortization period for radio equipment dependent upon the harmonic relationship of calling and working frequencies;
- b)* that developments and advances in technique, and in frequency synthesizers in particular, have led to more stable and reliable radio equipment;

¹ Replaces Resolution No. **Mar2** – 4 of the World Maritime Administrative Radio Conference, Geneva, 1974.

resolves

1. that ship stations dependent upon harmonically related calling and working frequency assignments made prior to 1 January 1976 may continue to use such of their assignments as are within the ship calling and working bands for A1A Morse telegraphy shown in Appendix 31;
2. that, as soon as possible, ships should utilize equipment which is capable of operating in accordance with the new channelling arrangement contained in Appendix 35 for the frequencies required for their service;
3. that equipments installed after 1 January 1976 shall be capable of operating in accordance with the new channelling arrangement contained in Appendix 35 for the frequencies required for their service.

RESOLUTION No. 305 *

**Relating to the Use of Class R3E and J3E Emissions on the
Carrier Frequencies 4 125 kHz and 6 215.5 kHz Used to
Supplement the Carrier Frequency 2 182 kHz
for Distress and Safety Purposes¹**

The World Administrative Radio Conference, Geneva, 1979,

noting

- a) that the Radio Regulations permit, until 1 January 1984, the use, on the carrier frequencies 4 125 kHz and 6 215.5 kHz, of class H3E emissions by coast, ship and aircraft stations (see Nos. 2982 and 2986);
- b) that the main object of these provisions is to maintain reliable distress and safety communications using proven techniques;

noting also

- a) the Final Report of the Panel of Experts (Geneva, 1963);
- b) relevant CCIR studies concerning single-sideband techniques (see CCIR Question 26-1/8, Recommendations 488, 543 and 544 and Report 744);

¹ Replaces Resolution No. Mar2 - 21 of the World Maritime Administrative Radio Conference, Geneva, 1974.

* *Note by the General Secretariat:* See also Resolution 200.

recognizing

that the use of class R3E and J3E emissions on the carrier frequencies 4 125 kHz and 6 215.5 kHz would provide the operational advantages, inherent in single-sideband techniques, which are already being obtained on other frequencies;

recognizing, however,

that the CCIR recommends that class R3E emissions should not be used for distress and safety purposes (see CCIR Recommendation 543);

considering

a) that a large number of equipments employing class H3E emissions are still in use for distress and safety purposes;

b) that equipment employing class R3E and J3E emissions must be designed to work with closer frequency tolerances and higher technical standards than those necessary for equipment employing class H3E emissions and envelope detection in the receiver;

c) that equipment designed for safety purposes should, in all circumstances, be capable of reliable operation and be easy to operate by an inexperienced person;

resolves

that no further study of the use of class R3E and J3E emissions for distress and safety purposes on the carrier frequencies 4 125 kHz and 6 215.5 kHz is required (see CCIR Recommendations 543 and 544);

requests the Secretary-General

to communicate this Resolution to the Inter-Governmental Maritime Consultative Organization;

invites

1. *the Inter-Governmental Maritime Consultative Organization* to consider the matter as part of the study currently being undertaken of the maritime distress and safety system;
2. *the next competent world administrative radio conference* to consider this matter further.

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RESOLUTION No. 306

**Relating to the Use of Single-Sideband Technique
in the Radiotelephone Maritime Mobile Service Bands
Between 1 605 kHz and 4 000 kHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) Recommendation No. 28 of the Administrative Radio Conference, Geneva, 1959;
- b) that the World Administrative Radio Conference, Geneva, 1967, decided to require the use of single-sideband techniques, except in certain circumstances;
- c) the desirability of replacing double-sideband emissions by single-sideband emissions as early as possible in the maritime mobile service bands between 1 605 kHz and 4 000 kHz;

resolves

that, unless otherwise specified in the Final Acts of this Conference, radiotelephone stations in the maritime mobile service operating in the bands between 1 605 kHz and 4 000 kHz shall comply with the following conditions:

1. new installations of double-sideband equipment in ship stations shall not be permitted, except in the cases covered by Nos. 2973, 4127 and 4130 of the Radio Regulations;

¹ Replaces Resolution No. Mar 5 of the World Administrative Radio Conference, Geneva, 1967.

2. until 1 January 1982, coast and ship stations equipped for single-sideband operation shall also be equipped to transmit class H3E emissions compatible with reception by double-sideband equipment. On the carrier frequency 2 182 kHz this requirement with respect to class H3E emissions will continue beyond 1 January 1982;

3. with the following exceptions, as from 1 January 1982, the use of class R3E and J3E emissions only shall be authorized:

- class A3E and H3E emissions for ship, survival craft and aircraft stations transmitting with a carrier frequency of 2 182 kHz;
- class H3E emissions for coast stations transmitting with a carrier frequency of 2 182 kHz;
- in Regions 1 and 3 and in Greenland, in exceptional circumstances, class H3E emissions for coast stations sending safety messages on the carrier frequency 2 170.5 kHz;
- classes of emission H2B, R2B and J2B for coast stations for selective calling on the carrier frequency 2 170.5 kHz;
- the class of emission specified in Appendix 37 to the Radio Regulations for emergency position-indicating radiobeacons (see also No. 3265 of the Radio Regulations);

4. as from 1 January 1982, ship and aircraft stations required to employ single-sideband operation on the working frequencies of the maritime mobile service shall use only class H3E emissions on the carrier frequency 2 182 kHz.

RESOLUTION No. 307

**Relating to the Conversion to Single-Sideband Technique
of Stations of the Radiotelephone Maritime Mobile Service
Operating in the Bands Between 1 605 kHz and 4 000 kHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that radiotelephone stations in the maritime mobile service operating with double-sideband emissions in the bands between 1 605 kHz and 4 000 kHz use a bandwidth of the order of 6 kHz;
- b) that these stations will have to use single-sideband operation in future;
- c) that, during the period of conversion to single-sideband operation, every precaution must be taken to avoid harmful interference between stations operating with double-sideband emissions and those operating with single-sideband emissions;

resolves

1. that the transition to single-sideband operation in the stations referred to in *considering a)* above shall be made in accordance with the following provisions:

- 1.1 the carrier frequency of the single-sideband channel in the upper part of the previous double-sideband channel shall be the same as the carrier frequency of that channel;

¹ Replaces Resolution No. Mar 4 of the World Administrative Radio Conference, Geneva, 1967.

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1.2 the carrier frequency of the single-sideband channel in the lower part of the previous double-sideband channel shall be 3 kHz lower than the carrier frequency of the previous double-sideband channel when the latter has a carrier frequency at least 6 kHz above that of the lower adjacent double-sideband radiotelephone channel;

1.3 in Region 1, the carrier frequency of the single-sideband channel in the lower part of the previous double-sideband channel for intership communication shall be 2.5 kHz below the carrier frequency of the previous double-sideband channel when the latter has a carrier frequency 5 kHz above that of the lower adjacent double-sideband radiotelephone channel;

2. that class H3E emissions shall not be used on single-sideband channels in the lower part of previous double-sideband channels.

RESOLUTION No. 308

**Relating to the Channel Spacing of Frequencies
Allocated to the Maritime Mobile Service
in the Band 156 - 174 MHz ¹**

(See Appendix 18 and Article 60)

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the expanding use of the maritime mobile frequencies in the VHF bands between 156 MHz and 174 MHz;
- b) the increasing demand for VHF channels for port operations;
- c) the increasing demand for VHF channels for public correspondence in the maritime mobile service;
- d) the need for VHF channels for the ship movement service;
- e) the need to provide VHF channels for uses other than radiotelephony, such as facsimile and narrow-band direct-printing telegraphy;
- f) the need to provide VHF channels for communication between helicopters or light aircraft and ships in connection with anti-pollution, search and rescue, ice breaking and the operation of ships;

¹ Replaces Resolution No. Mar2 - 14 of the World Maritime Administrative Radio Conference, Geneva, 1974.

noting

that, in consequence of the revisions of the Radio Regulations (Geneva, 1959) made by the World Administrative Radio Conference, Geneva, 1967, and the World Maritime Administrative Radio Conference, Geneva, 1974:

a) the channel spacing for the maritime mobile VHF radiotelephone service is being reduced from 50 kHz to 25 kHz;

b) additional channels were obtained by interleaving the 25 kHz channels midway between the 50 kHz channels of Appendix 18 to the Radio Regulations (Geneva, 1959) and were numbered from 60 to 88;

c) the 25 kHz channels should be allocated on an international basis;

d) the transition from a channel spacing of 50 kHz to that of 25 kHz was scheduled as follows:

1. date by which modification of transmitters to a maximum deviation of ± 5 kHz and of receivers to increase the audio gain, where necessary, could commence 1 January 1972
2. date by which the modifications specified in paragraph *d)* 1 shall have been completed for all existing equipments 1 January 1973
3. date up to which coast stations should have maintained capability to receive transmissions with a maximum deviation of ± 15 kHz and after which the modification of coast station receivers should have taken place to meet the selectivity requirements for a channel spacing of 25 kHz 1 January 1973

4. date by which all new equipments shall have conformed to 25 kHz standards 1 January 1973
5. date by which all equipments shall conform to 25 kHz standards and all interleaved channels may be generally introduced 1 January 1983

resolves

1. that administrations may, in areas where this is found to be necessary, authorize the use of channels 60 to 88, excluding channels 75 and 76 which were designated as guardbands for channel 16;
2. that the technical characteristics of equipment for 25 kHz channel spacing in the maritime mobile VHF service shall be in accordance with Appendix 19;
3. that, by 1 January 1983, all equipments shall conform to 25 kHz standards; thereafter, all interleaved channels may be generally introduced.

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RESOLUTION No. 309

**Relating to the Unauthorized Use of Frequencies
in the Bands Allocated to the Maritime Mobile Service¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that monitoring observations of the use of frequencies in the band 2 170 - 2 194 kHz and the bands allocated exclusively to the maritime mobile service between 4 063 kHz and 25 110 kHz show that a number of frequencies in these bands are still being used by stations of services other than the maritime mobile service, notably by high-powered broadcasting stations, some of which are operating in contravention of No. 2665 of the Radio Regulations;
- b) that these stations are causing harmful interference to the maritime mobile service and that a considerable number of emissions, the sources of which could not be positively identified, were observed in these bands;
- c) that radio is the sole means of communication of the maritime mobile service;

considering in particular

- d) that it is of paramount importance that the distress and safety channels be kept free from harmful interference, since they are essential for the protection of the safety of life and property;

¹ Replaces Resolution No. Mar2 - 15 of the World Maritime Administrative Radio Conference, Geneva, 1974.

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 guardbands and in the bands allocated exclusively to that service, except under the conditions expressly specified in Nos. 342, 518, 519, 522, or 956 to 958 of the Radio Regulations;
2. to continue to make every effort to identify and locate the source of any unauthorized emission capable of endangering human life and property, and to communicate their findings to the IFRB;
3. to participate in the monitoring programmes that the IFRB may organize pursuant to the present Resolution;
4. to request their governments to enact such legislation as is necessary to prevent stations located off their coasts operating in contravention of No. 2665 of the Radio Regulations;

to request the IFRB

1. to continue to organize monitoring programmes, at regular intervals, in the distress and safety channels and their guardbands, and, in the bands allocated exclusively to the maritime mobile service between 4 063 kHz and 26 175 kHz, with a view to identifying the stations of other services operating in these bands;
2. to take the necessary steps with a view to the elimination of the emissions of stations of other services operating in these bands, which cause or are likely to cause harmful interference to the maritime mobile service;
3. to seek, as appropriate, the cooperation of administrations in identifying the sources of those emissions by all available means and in securing the cessation of those emissions.

RESOLUTION No. 310

**Relating to Frequency Provisions for Development and
Future Implementation of Ship Movement Telemetry,
Telecommand and Data Exchange Systems**

The World Administrative Radio Conference, Geneva, 1979,

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 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 short-range 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)* the findings of the Special Preparatory Meeting of the CCIR that frequencies in the region of 10 GHz appeared satisfactory for short-range automated systems of this nature;
- b)* that further operational and technical information is needed in deciding the most effective frequency utilization and sharing criteria;

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resolves

1. that the next competent world administrative radio conference shall review possible frequency provisions in the light of additional studies;
2. that the CCIR shall examine and advise on bandwidths and data formats in coordination with administrations developing and testing these digital transmission systems;

requests the Secretary-General

to refer this Resolution to the Inter-Governmental Maritime Consultative Organization (IMCO), inviting it to define the operational requirement for data exchange with ships using digital transmission techniques and to make appropriate recommendations to assist administrations in preparing for a future conference.

RESOLUTION No. 311

Relating to the Introduction of a Digital Selective Calling System to Meet the Requirements of the Maritime Mobile Service¹

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that there is an urgent need for a single digital selective calling system to provide for the worldwide requirements of the maritime mobile service;
- b)* that the Inter-Governmental Maritime Consultative Organization (IMCO)² indicated to the World Maritime Administrative Radio Conference, Geneva, 1974, as well as to the CCIR, its requirements for a general purpose selective calling system capable of facilitating the transmission and reception of all communications;
- c)* that Articles 25, 60, 62 and 65 of the Radio Regulations provide for the use of such a system;
- d)* that the studies, in response to CCIR Question 9-3/8, concerning the operational and technical characteristics of such a system, are in an advanced stage;
- e)* that in the Radio Regulations, the technical provisions relating to systems are mainly based upon the Recommendations of the CCIR;

¹ Replaces Resolution No. Mar2 – 19 of the World Maritime Administrative Radio Conference, Geneva, 1974.

² IMCO Resolution No. A.420 (XI).

f) that Plenary Assemblies of the CCIR are held triennially, whereas administrative radio conferences, which are empowered to modify the Radio Regulations making substantial use of the Recommendations of the CCIR, are held less frequently and less regularly;

is of the opinion

a) that the Plenary Assemblies of the CCIR are likely to make appropriate Recommendations as to the operational and technical characteristics of a single digital selective calling system;

b) that administrations should be afforded the opportunity to take advantage of the current CCIR Recommendations on selective calling systems for the maritime mobile service;

therefore resolves that

1. the CCIR be invited, in response to Question 9-3/8, to complete its studies and establish as soon as possible Recommendations for the operational and technical characteristics of a digital selective calling system;

2. each Plenary Assembly of the CCIR should arrange for the Secretary-General of the ITU to be informed of those Recommendations of the CCIR which affect the operational and technical criteria relating to the introduction of a single digital selective calling system for the maritime mobile service;

3. following the distribution to administrations of the relevant CCIR texts, the Secretary-General shall write to administrations asking them to indicate within four months which of the CCIR Recommendations, or which specific operational and technical criteria defined in the Recommendations referred to in paragraph 1 above, they agree to use in applying the pertinent provisions of the Radio Regulations;

4. after this period the Secretary-General shall distribute to administrations a summary of the replies received.

RESOLUTION No. 312

**Relating to the Introduction of New Calling Procedures
for HF A1A Morse Telegraphy¹**

The World Administrative Radio Conference, Geneva, 1979,

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 improve the effectiveness of calling in the HF A1A Morse telegraphy bands;
- c)* that the World Maritime Administrative Radio Conference, Geneva, 1974 adopted a new calling procedure for the HF A1A Morse telegraphy bands (Article 63 and Appendix 34);
- d)* that the effectiveness of the new calling procedure requires agreement between administrations with respect to the groups specified in Appendix 34 in accordance with a planned distribution of coast stations on a regional and traffic basis;
- e)* that the administrations at the 1974 Conference 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;

¹ Replaces Resolution No. **Mar2** – 5 of the World Maritime Administrative Radio Conference, Geneva, 1974.

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

1. to circulate this Resolution to all administrations which are responsible for coast stations in countries or areas designated in the Distribution Plan in order to obtain their agreement to the Plan or an adjustment of the Plan to meet their needs;
2. in the light of the foregoing consultation with the administrations concerned, to update the Distribution Plan which is annexed to the List of Coast Stations;
3. that, in advance of the publication of any revision of the Distribution Plan in the List of Coast Stations, any variation in the Plan should be notified through the Operational Bulletin.

ANNEX TO RESOLUTION No. 312

**Distribution Plan for Group Channels
HF A1A Morse Coast Stations by Countries and Areas**

Group 1*
Azores Angola (People's Republic of) Bahamas (Commonwealth of the) Bahrain (State of) Bangladesh (People's Republic of) Bermuda Brazil (Federative Republic of) Canada (West Coast and Western Arctic) Chile Ivory Coast (Republic of the) Djibouti (Republic of) Ecuador Spain (Canary Islands) United States of America (East Coast) Ethiopia France India (Republic of) (West) Ireland Israel (State of) Kenya (Republic of) Liberia (Republic of) Madagascar (Democratic Republic of) Martinique (French Department of) Mauritius New Caledonia and Dependencies New Hebrides Oman (Sultanate of) Philippines (Republic of the) French Polynesia Puerto Rico Reunion (French Department of) Roumania (Socialist Republic of) United Kingdom of Great Britain and Northern Ireland Sao Tome and Principe (Democratic Republic of) Singapore (Republic of) Switzerland (Confederation of) Union of Soviet Socialist Republics (Ukraine and South Asia)

* *Note by the General Secretariat:* In January 1981, the Administration of Nicaragua requested to be included in Group 1 of the Plan.

ANNEX TO RESOLUTION No. 312 (cont.)

Group 2

Algeria (Algerian Democratic and Popular Republic)
Netherlands Antilles
Saudi Arabia (Kingdom of) (West)
Barbados
Belgium
Benin (People's Republic of)
Cameroon (United Republic of)
Cape Verde (Republic of)
Christmas Islands (Indian Ocean)
Cyprus (Republic of)
Colombia (Republic of)
Congo (People's Republic of the)
Cook Islands
Costa Rica
Cuba
Dominican Republic
Egypt (Arab Republic of)
United States of America (Gulf Coast)
Falkland Islands and Dependencies (Malvinas)
France
Gabon Republic
Gambia (Republic of the)
Greece
Hongkong
Hungarian People's Republic
Italy
Democratic Kampuchea
Lebanon
Martinique (French Department of)
Mexico
New Caledonia and Dependencies
New Hebrides
Panama (Republic of)
Paraguay (Republic of)
Netherlands (Kingdom of the)
Peru
Poland (People's Republic of)
French Polynesia
Republic of Korea
Reunion (French Department of)
United Kingdom of Great Britain and Northern Ireland (22 MHz only)
Sudan (Democratic Republic of the)
Sri Lanka (Democratic Socialist Republic of)
Czechoslovak Socialist Republic
Thailand
Union of Soviet Socialist Republics (North West and Far East)
Yemen Arab Republic

ANNEX TO RESOLUTION No. 312 (*cont.*)

Group 3

Alaska (State of)
Argentine Republic
Burma (Socialist Republic of the Union of)
Canada (East Coast and Eastern Arctic)
China (People's Republic of)
Denmark
United States of America (West Coast)
Finland
Ghana
Guam
Guinea-Bissau (Republic of)
Guinea (Revolutionary People's Republic of)
Guyana
Hawaii (State of)
Iran (Islamic Republic of)
Iceland
Jamaica
Libya (Socialist People's Libyan Arab Jamahiriya)
Madeira
Mariana Islands
Morocco (Kingdom of)
Mozambique (People's Republic of)
Nauru (Republic of)
Nigeria (Federal Republic of)
Norway
Pakistan (Islamic Republic of)
German Democratic Republic
Sweden
Trinidad and Tobago
Turkey
Union of Soviet Socialist Republics (Far East and European Area)
Venezuela (Republic of)
Yugoslavia (Socialist Federal Republic of)

ANNEX TO RESOLUTION No. 312 (*cont.*)

Group 4

Albania (Socialist People's Republic of)
Germany (Federal Republic of)
Saudi Arabia (Kingdom of) (East)
Australia
Bulgaria (People's Republic of)
China (People's Republic of) (Province of Taiwan)
Spain (except the Canary Islands)
Fiji
Equatorial Guinea (Republic of)
India (Republic of) (East)
Indonesia (Republic of)
Iraq (Republic of)
Japan
Jordan (Hashemite Kingdom of)
Kuwait (State of)
Malaysia
Malta (Republic of)
Mauritania (Islamic Republic of)
New Zealand
Papua New Guinea
Pitcairn Island
Portugal
Syrian Arab Republic
Solomon Islands
American Samoa
Senegal (Republic of the)
Seychelles (Republic of)
Sierra Leone
South Africa (Republic of)
Suriname (Republic of)
Togolese Republic
Tunisia
Union of Soviet Socialist Republics (European Area and Arctic)
Uruguay (Oriental Republic of)
Viet Nam (Socialist Republic of)
Yemen (People's Democratic Republic of)
Zaire (Republic of)

RESOLUTION No. 313

**Relating to the Introduction of a New System for Identifying Stations
in the Maritime Mobile and Maritime Mobile-Satellite Services
(Maritime Mobile Service Identities)**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the need for an identity unique to each ship for safety and telecommunication purposes;
- b) the need for this identity to be usable in automatic systems;
- c) that, in the interest of having a common address format for automatic systems, identities assigned to ship stations, ship earth stations, coast stations, coast earth stations and those used for group calls should be of a similar nature when transmitted over the radio path;

considering further

- a) that it is highly desirable that the code which forms the ship station identity or part thereof be able to be used by subscribers to the public switched networks for calling ships automatically;
- b) that the public switched networks in some countries have limitations, with respect to the maximum number of digits that may be dialled or keyed to indicate ship station identity;

c) that a CCITT Recommendation ¹ describes a ship station identification method which provides for this contingency;

d) that whatever restrictions may be required should, in the interests of the development of automatic shore-to-ship operations, be as few as possible;

noting

that the CCIR is studying the implementation of the new system of identities for stations in the maritime mobile and maritime mobile-satellite service;

resolves

that, for those administrations which use this form of identification for stations in the maritime mobile service and the maritime mobile-satellite service, the allocation of identities shall be made in accordance with the provisions of Appendix 43 pending the appropriate decisions of the next competent world administrative radio conference;

invites administrations

to continue to participate in the studies of the CCIR and CCITT in this matter;

requests the Secretary-General

to prepare the Table of National Identification Digits (NID), in close collaboration with the CCIR and CCITT, and to present this Table for consideration to the next competent world administrative radio conference for inclusion in Appendix 43.

¹ CCITT Recommendation E.210/F.120.

RESOLUTION No. 314

**Relating to the Establishment of a Coordinated Worldwide System
for the Collection of Data Relating to Oceanography¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the expressed desire for the establishment of a coordinated world-wide system for the collection of data relating to oceanography;
- b) that in each of the six high frequency bands allocated exclusively to the maritime mobile service, the World Administrative Radio Conference, Geneva, 1967, designated a frequency band for use in the collection of data relating to oceanography in accordance with Appendix 31 to the Radio Regulations;
- c) that use of these frequencies with maximum effectiveness is dependent upon cooperation and coordination among administrations;
- d) that certain administrations expressed the desire that a coordinated worldwide system for the transmission of data relating to oceanography be established on the basis of a coordinated plan in the bands allocated by this Conference;
- e) that, however, certain other administrations wish to use in the near future stations for the collection of data relating to oceanography within the framework of decisions taken on this matter by this Conference;
- f) that, consequently, a coordinated programme for the collection of data relating to oceanography should be established using the frequency bands referred to in b) above;

¹ Replaces Resolution No. Mar 20 of the World Administrative Radio Conference, Geneva, 1967.

g) that the Intergovernmental Oceanographic Commission (IOC) and the World Meteorological Organization (WMO) have been in consultation since 1962 with respect to cooperative efforts in the collection of data relating to oceanography (e.g. the WMO/IOC Panel of Experts on Coordination of Requirements, Geneva, 19-21 July, 1967);

resolves

1. that the IOC and WMO be invited to develop jointly, in consultation with the IFRB, and in consultation with administrations of the Members, as appropriate, a coordinated plan designed to meet existing and future requirements of all interested Members, for use by stations in the collection of data relating to oceanography in a worldwide system, within the framework of provisions made by this Conference for such a system; this plan to include the geographical distribution of oceanographic stations, their system of operation, the deployment of frequencies in the system and the manner in which oceanographic information is to be transmitted;
2. that administrations be encouraged to assign frequencies in conformity with the plan and the recommendations of IOC and WMO for the portion of the worldwide system over which they have jurisdiction;
3. that the IOC and WMO be invited further to assume jointly the responsibility, in consultation with the IFRB, for keeping such a plan current, in the light of changing requirements for data relating to oceanography;
4. that the plan developed under paragraphs 1 and 3 above shall be considered at the next administrative radio conference competent to deal with matters relating to the maritime mobile service, to determine what changes, if any, appear necessary to improve its effectiveness.

RESOLUTION No. 315

**Relating to the Eventual Abolition of Mobile Station Charges
for Public Correspondence in the Maritime Mobile Service**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the VIth Plenary Assembly of the CCITT, Geneva, 1976, adopted a draft Recommendation relating to charging, accounting and refunds in the maritime mobile service with the exception of the points relating, *inter alia*, to mobile station charges for public correspondence in the maritime mobile service;
- b) that the above draft Recommendation was subsequently amended, in the light of the decision of the VIth Plenary Assembly of the CCITT, Geneva, 1976, regarding mobile station charges and that this draft Recommendation has been approved by letter ballot;
- c) that the amended Recommendation includes the following provisions¹:

“Mobile station charges may be applied in the radiotelegram, radiotelephone, and radiotelex services, in the MF and HF bands. They shall not be applied in any of the VHF services, nor in any of the mobile-satellite services, nor in any service with automatic operation; however, mobile station charges may also be applied for radiotelegrams transmitted via VHF.”

¹ See CCITT Recommendation D.90/F.111 (paragraphs B12 and B13).

RES315-2

“Mobile station charges shall be abolished for traffic exchanged after 2359 hours GMT 31 December, 1987.”;

resolves

to adopt this recommended date for the abolition of mobile station charges for public correspondence in the maritime mobile service.

RESOLUTION No. 316

**Relating to Technical Cooperation with the Developing
Countries in Maritime Telecommunications¹**

The World Administrative Radio Conference, Geneva, 1979,

noting

that, in the field of maritime telecommunications, the assistance provided by the Union to developing countries, in collaboration with other organizations, in particular the Inter-Governmental Maritime Consultative Organization (IMCO), has been promising;

conscious of

- a) the need for the developing countries to increase their own shipping activities and attract foreign maritime traffic in order to develop their trade;
- b) the important role that telecommunications play in maritime activities throughout the world, from the economic and safety aspects;
- c) the possibility of providing adequate safety and improved economy in shipping activities by a relatively modest investment in the installation and operation of maritime telecommunication facilities;

¹ Replaces Resolution No. Mar2 – 18 of the World Maritime Administrative Radio Conference, Geneva, 1974.

considering

a) that in many developing countries there is a need to increase the efficiency of the services for:

- safety of navigation and safety of life at sea;
- commercially viable port operations;
- public correspondence for passengers and crews;

b) that in this regard the Union's technical cooperation activities could be extended to render very valuable assistance to these countries;

resolves

to request the Secretary-General

1. to offer the assistance of the Union to developing countries endeavouring to improve their maritime telecommunications, particularly by providing technical advice in the establishment, operation and maintenance of equipment and by assisting in training staff;
2. in this context, to seek the collaboration of IMCO, the United Nations Conference for Trade and Development (UNCTAD) and other specialized agencies of the United Nations, as appropriate;
3. to continue to give special attention to seeking the aid of the United Nations Development Programme and other sources of financial support, to enable the Union to render sufficient and effective technical assistance in the field of maritime telecommunications, when necessary in collaboration with other specialized agencies concerned;

to urge Member countries

to give priority in supporting, to the extent of their capabilities and their technical advancement, the Union's technical cooperation with developing countries in the field of maritime telecommunications by facilitating the recruitment of experts for missions to work in developing countries, by receiving students from developing countries who have been awarded a fellowship by the Union, by providing lecturers to seminars arranged by the Union and, upon request, by giving technical advice to the Union;

to invite the developing countries

to include maritime telecommunications projects as needed in their country programmes for external technical assistance and to support inter-country projects in this field.

RESOLUTION No. 400

**Relating to the Treatment of Notices Concerning Frequency
Assignments to Aeronautical Stations in the Bands Allocated
Exclusively to the Aeronautical Mobile (R) Service
Between 2 850 kHz and 22 000 kHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the Final Acts of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, entered into force on 1 September 1979;
- b) that the new Frequency Allotment Plan contained in Appendix 27 Aer2 will enter into force at 0001 hours UTC on 1 February 1983;
- c) that some administrations may wish to implement certain provisions of the new Frequency Allotment Plan in advance of the latter date when this may be done without causing harmful interference to stations operating in accordance with the present Frequency Allotment Plan;
- d) that it will therefore be necessary to provide an interim procedure to facilitate transition from the existing Frequency Allotment Plan to the new Frequency Allotment Plan;

¹ Replaces Resolution No. Aer2 - 4 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

resolves

1. that during the interim period between the date of entry into force of those Final Acts and the date of entry into force of the new Frequency Allotment Plan:

1.1 the provisions of Nos. 1334 to 1341 of the Radio Regulations shall continue to be applied in the examination of notices concerning frequency assignments to aeronautical stations in the aeronautical mobile (R) service in the allotments of the existing Plan;

1.2 all such assignments shall be recorded in the Master International Frequency Register in accordance with the findings reached by the IFRB;

1.3 frequency assignments in a channel of the new Plan shall be examined by the IFRB in order to determine whether the protection specified in Appendix 27 Aer2 (Part I, Section IIA, paragraph 5) is afforded to the allotments in the existing Plan. In so doing the Board shall assume that the frequency will be used in accordance with the sharing conditions between areas specified in Appendix 27 Aer2 (Part I, Section IIB, paragraph 4);

1.4 all such assignments mentioned in paragraph 1.3 having received a favourable finding shall be recorded in the Master International Frequency Register;

1.5 the date to be entered in Column 2a or 2b of the Master International Frequency Register shall be as follows:

- a) if the finding is favourable with respect to Nos. 1336 to 1339, the date of 29 April 1966 shall be entered in Column 2a;
- b) if the finding is favourable with respect to No. 1341, the date of 29 April 1966 shall be entered in Column 2b;
- c) for all other assignments (including those which may be in conformity with the new Frequency Allotment Plan but not in conformity with the present Frequency Allotment Plan) the date of receipt of the notice by the IFRB shall be entered in Column 2b;

1.6 any assignment which is in accordance with the new Frequency Allotment Plan shall be so indicated by the insertion by the IFRB of an appropriate symbol in the Remarks Column of the Master International Frequency Register;

2. that on the date of the entry into force of the new Frequency Allotment Plan, the IFRB shall examine those frequency assignments to aeronautical stations in the aeronautical mobile (R) service in the bands allocated exclusively to that service between 2 850 kHz and 22 000 kHz which are contained in the Master International Frequency Register from the point of view of their conformity with the new Frequency Allotment Plan, following the relevant parts of the procedure described in Nos. 1334 to 1341 of the Radio Regulations and shall record against them in the Master International Frequency Register a date in Column 2a or 2b as follows:

2.1 assignments with double-sideband emissions (A3E) already appearing in the Master Register on the date of the entry into force of the new Frequency Allotment Plan shall retain the date recorded in Column 2a or 2b, as appropriate, until 1 February 1983. A date in Column 2a for a frequency assignment using double-sideband emissions (A3E) shall be transferred to Column 2b on 2 February 1983. On 1 January 1987 the IFRB shall review the entries and, in consultation with the administrations concerned, cancel those entries which are no longer in use, retaining the others for information only, without a date in Column 2b;

2.2 assignments found favourable with respect to Nos. 1335 to 1339 shall have the date of 5 March 1978 entered in Column 2a;

2.3 assignments found favourable with respect to Nos. 1335 and 1341 shall have the date of 5 March 1978 entered in Column 2b;

2.4 all other assignments shall have the date of 6 March 1978 entered in Column 2b;

3. that, on the date of the entry into force of the new Frequency Allotment Plan, the allotments contained therein shall replace in the Master International Frequency Register the allotments appearing in the existing Frequency Allotment Plan;

invites administrations

to notify to the IFRB as soon as possible the cancellation of frequency assignments released as a consequence of bringing into use the allotments in the new Plan.

RESOLUTION No. 401

**Relating to the Implementation of the Frequency
Allotment Plan in the Bands Allocated
Exclusively to the Aeronautical Mobile (R) Service
Between 2 850 kHz and 22 000 kHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the bands allocated exclusively to the aeronautical mobile (R) service between 2 850 kHz and 22 000 kHz by the Administrative Radio Conference, Geneva, 1959, were modified by the Extraordinary Administrative Radio Conference, Geneva, 1966;
- b) that the Extraordinary Administrative Radio Conference, Geneva, 1966, established procedures to be followed by administrations relating to the implementation of the modifications;
- c) that the necessary arrangements were made for the IFRB to carry out these procedures;

recognizing

- a) that the aeronautical mobile (R) service is primarily a safety service;
- b) that the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, further modified the said bands to provide for single-sideband techniques;

¹ Replaces Resolution No. Aer2 – 5 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

c) that there is a need for all administrations to implement the modifications made by that Conference with a view to avoiding any harmful interference to the services rendered by stations operating in accordance with the Radio Regulations;

resolves

1. that, not later than three months before the entry into force of the new Plan, administrations shall notify the IFRB of the modifications necessary to bring the assignments existing in the Master Register into conformity with this Plan;

2. that the assignments existing in the Master Register on 1 February 1983 which are not in conformity with the decisions of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, on that date shall be treated as follows:

2.1 within thirty days from 1 February 1983, the IFRB will send relevant extracts from the Master Register to the administrations concerned advising them that, in accordance with the terms of the present Resolution, the assignments in question are to be transferred to the appropriate frequencies within a period of six months after the dispatch of the extracts;

2.2 if an administration fails to notify the IFRB of the transfer within the prescribed period, the original entry will be retained in the Master Register without a date in Column 2 and with a suitable remark in the Remarks Column. The administrations will be advised of this action;

3. that, if an administration so desires, the IFRB will provide it with all necessary assistance. In so doing, the IFRB will apply the provisions of Nos. 1445 to 1449 of the Radio Regulations.

RESOLUTION No. 402

**Relating to the Implementation of the New Arrangement
Applicable to Bands Allocated Exclusively to
the Aeronautical Mobile (R) Service Between
2 850 kHz and 22 000 kHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the use of each of the frequency bands between 2 850 kHz and 22 000 kHz allocated exclusively to the aeronautical mobile (R) service by the Administrative Radio Conference, Geneva, 1959, was modified by the Extraordinary Administrative Radio Conference, Geneva, 1966;
- b) that the 1966 Conference resolved that administrations shall effect, as soon as possible, a progressive conversion of their radiocommunications in the aeronautical mobile (R) service from double-sideband to single-sideband operation, in consequence of which the use of the above bands has been further modified by the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, to provide single-sideband techniques;
- c) that a considerable number of frequency assignments of both aircraft and aeronautical stations will be transferred from existing frequencies to the new frequencies and channels designated by that Conference;

¹ Replaces Resolution No. Aer2 – 3 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

- d) that changes in frequency assignments should be made as soon as possible so that the advantages of the new channels designated by that Conference may be realized at the earliest opportunity;
- e) that the transfer of assignments should be made with the least possible disruption of the service rendered by each station;
- f) that the transfer of assignments should be made so as to avoid harmful interference between the stations involved during the implementation period;
- g) that the Final Acts of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, entered into force on 1 September 1979;
- h) that the new Frequency Allotment Plan contained in Appendix 27 Aer2 will enter into force on 1 February 1983;

recognizing

- a) that the aeronautical mobile (R) service is primarily a safety service;
- b) that some frequencies have been allotted for worldwide use;
- c) that the implementation of the decisions made by the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, relating to the new arrangement of the frequency bands allocated to the aeronautical mobile (R) service between 2 850 kHz and 22 000 kHz should follow an orderly procedure for the transfer of existing services from the old to the new assignments;

resolves

1. that between the entry into force of the Final Acts of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, on 1 September 1979 and the entry into force of the new Frequency Allotment Plan contained in Appendix 27 Aer2 on 1 February 1983, channel utilization for any new single-sideband operation shall be in accordance with the following provisions:

- 1.1 the carrier (reference) frequency of the single-sideband channel in the upper half of the previous double-sideband channel shall be the same as the carrier (reference) frequency of that channel;
 - 1.2 the carrier (reference) frequency of the single-sideband channel in the lower half of the previous double-sideband channel shall be 3 kHz lower than the carrier (reference) frequency of that channel;
 - 1.3 that, prior to 1 February 1983, aeronautical and aircraft stations fitted with single-sideband equipment may employ either half of the previous double-sideband channel (the single-sideband carrier (reference) frequency being that in paragraphs 1.1 and 1.2 above);
 - 1.4 channels in the new Plan may be used by any administration provided that no harmful interference occurs to users of channels in the present Plan. For the operational use of the channels concerned administrations should take into account the provisions of No. 27/20 of Appendix 27 Aer2 to the Radio Regulations;
2. that, on 1 February 1983, the frequencies appearing in Appendix 27 to the Radio Regulations shall be replaced by the frequencies appearing in Appendix 27 Aer2 (Part II, Section II, Article 2);
 3. that it is necessary for administrations to take all appropriate measures with a view to converting to single-sideband operation as soon as possible by not permitting the installation of new double-sideband equipment as from 1 April 1981. Aircraft and aeronautical stations shall be capable of single-sideband operation at the earliest possible date; furthermore, they shall discontinue double-sideband emissions as early as possible and, in any event, not later than 1 February 1983;
 4. that, until 1 February 1983, aeronautical and aircraft stations equipped for single-sideband operation shall also be equipped to transmit class H3E emissions where required to be compatible with reception by double-sideband equipment;

5. that, unless otherwise specified in the Final Acts of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, the use of classes of emission H2B, J3E, J2B, J2D and J9X only shall be authorized as of 1 February 1983. Double-sideband operation may, however, be continued for domestic use until 1 February 1987 provided this operation is conducted in accordance with Nos. 299 and 307 of the Radio Regulations and that no harmful interference is caused to the international aeronautical mobile (R) service operating in the single-sideband mode. Administrations requiring such an extension of the period of full implementation of single-sideband operation are, nevertheless, urged to cease double-sideband operation as soon as possible.

RESOLUTION No. 403

**Relating to the Use of Frequencies 3 023 kHz and 5 680 kHz
Common to the Aeronautical Mobile (R) and (OR) Services ¹**

The World Administrative Radio Conference, Geneva, 1979,

having noted

that some anomalies appeared to exist in the conditions prescribed in Appendix 26 to the Radio Regulations (Geneva, 1959) for the use of the frequencies 3 023.5 kHz and 5 680 kHz, as contained in Article 2 of the Frequency Allotment Plan, Column 3, clauses 2*a*) and 2*b*) and that steps have been taken to remove these anomalies;

considering

a) that the coordination of search and rescue operations at the scene of a disaster would be improved if the use of the frequencies 3 023 kHz (previously 3 023.5 kHz) and 5 680 kHz, in such operations, were extended to include communications between mobile stations and participating land stations;

b) that it would be in the general interests of the aeronautical mobile service if the same provisions relating to the use of the frequencies 3 023 kHz (previously 3 023.5 kHz) and 5 680 kHz were applied to operations both in the aeronautical mobile (R) service and the aeronautical mobile (OR) service;

¹ Replaces Resolution No. Aer2 – 1 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

resolves

to invite administrations to apply in the aeronautical mobile (OR) service, as from the date of the coming into force of the Frequency Allotment Plan adopted by the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, the provisions governing the use of the frequencies 3 023 kHz and 5 680 kHz, specified in Appendix 27 Aer2 (Part II, Section II, Article 3).

RESOLUTION No. 404

**Relating to the Implementation of the New Arrangement of Bands
Allocated Exclusively to the Aeronautical Mobile (R)
Service Between 21 924 kHz and 22 000 kHz**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that Recommendation No. Aer2 – 5 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, recommended that administrations study the problems relating to the future use of the band 21 924 - 22 000 kHz;
- b)* that the present Conference has allocated this band exclusively to the aeronautical mobile (R) service;

resolves

that there is a need to add a further frequency band to Appendix 27 Aer2, to provide worldwide frequencies suitable for long-range communications and to reduce congestion in the bands currently used;

instructs the Secretary-General

to publish the new Appendix 27 Aer2 adopted by the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, including a Plan for the band 21 924 - 22 000 kHz as indicated in the Annex to this Resolution;

recognizing

that harmful interference is liable to occur in the aeronautical mobile (R) service in this band unless on 1 February 1983 the existing assignments in the band 21 924 - 22 000 kHz are transferred either to the new frequencies for the aeronautical mobile (R) service or to other bands more suitable for frequency assignments to stations in the aeronautical fixed service;

resolves

1. that the implementation of the decisions made by this Conference relating to this band allocated to the aeronautical mobile (R) service shall follow the orderly procedure defined below for the transfer of the existing services from the old to the new assignments;

2. that the assignments referred to in the foregoing paragraph shall be dealt with as follows:

2.1 the IFRB shall send relevant extracts from the Master Register to the administrations concerned, within thirty days from 1 February 1982, advising them that, in accordance with the terms of this Resolution, the assignments concerned are to be transferred to the appropriate bands within a period of six months after the dispatch of the extracts;

2.2 if an administration does not notify the transfer within the prescribed period, the original entry shall be retained in the Master Register without a date in Column 2 and with a suitable remark in the Remarks Column. The administration concerned shall be advised of this action;

3. that, if an administration so desires, the IFRB shall give it all necessary assistance. In so doing, the IFRB shall apply the provisions of Nos. 1445 to 1449 of the Radio Regulations.

ANNEX TO RESOLUTION No. 404

**Outline of Changes to Be Made to
Appendix 27 Aer2 to the Radio Regulations**

A. APPENDIX 27 Aer2

Table of Contents *Part II. In the title, replace 17 970 kHz by 22 000 kHz.*

No. 27/10 *Replace 17 970 kHz by 22 000 kHz.*

No. 27/16 *Add the following new frequencies to the Table of Frequencies:*

kHz	
21 924 - 22 000	
21 925	21 964
21 928	21 967
21 931	21 970
21 934	21 973
21 937	21 976
21 940	21 979
21 943	21 982
21 946	21 985
21 949	21 988
21 952	21 991
21 955	21 994
21 958	21 997
21 961	
25 channels	

No. 27/31A *In the title preceding the number 27/31A, replace 13 MHz and 18 MHz by between 13 MHz and 22 MHz;*

in the text, replace 13 MHz and 18 MHz by 13 MHz, 18 MHz and 22 MHz.

No. 27/31B *In the second line, replace 18 MHz band by the 18 MHz and 22 MHz bands;*

in the fourth line, after 18 MHz add and 22 MHz.

Part II *In the title replace 17 970 kHz by 22 000 kHz.*

No. 27/189 *Add a new column for the new 22 MHz band to the table as follows:*

Areas	Band (MHz)	Areas	Band (MHz)
	22		22
	kHz		kHz
W I	21 940	W III	21 949
	21 946		21 970
	21 952	W IV	21 955
	21 958		21 976
	21 967		21 991
	21 973		
	21 979	W V	21 943
	21 988		21 961
	21 997		21 982
W II	21 964		21 994
	21 985		

Immediately after No. 27/207, add a new table for the new 22 MHz band as follows:

ADD 27/207A bande/band/banda 21 924 — 22 000

22 MHz

1	2				3
21 940	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/I
21 943	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/V
21 946	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/I
21 949	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/III
21 952	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/I
21 955	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/IV
21 958	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/I
21 961	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/V
21 964	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/II
21 967	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/I
21 970	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/III
21 973	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/I
21 976	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/IV
21 979	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/I
21 982	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/V
21 985	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/II
21 988	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/I
21 991	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/IV
21 994	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/V
21 997	W	MONDIALE	WORLDWIDE	MUNDIAL	C100/I

RESOLUTION No. 405

**Relating to the Use of Frequencies of the Aeronautical
Mobile (R) Service ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, adopted and developed a new Frequency Allotment Plan for the use of HF channels for the aeronautical mobile (R) service (Appendix 27 Aer2 to the Radio Regulations);
- 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;

¹ Replaces Resolution No. Aer2 – 7 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

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;
3. to coordinate the use of families of frequencies necessary for a given route segment in accordance with the technical principles in Appendix 27 Aer2 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 No. 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 ¹**

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;

¹ Replaces Resolution No. Aer2 – 6 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

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 No. 407

**Relating to the Unauthorized Use of Frequencies
in the Bands Allocated to the Aeronautical Mobile (R) Service¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that monitoring observations of the use of the frequencies in the bands between 2 850 kHz and 22 000 kHz allocated exclusively to the aeronautical mobile (R) service show that a number of frequencies in these bands are still being used by stations of services other than the aeronautical mobile (R) service, notably by high-powered broadcasting stations, some of which are operating in contravention of No. 2665 of the Radio Regulations;
- b) that these stations are causing harmful interference to the aeronautical mobile (R) service and that a considerable number of emissions, the sources of which could not be positively identified, have been observed in these bands;
- c) that radio is the sole means of communication available to the aeronautical mobile (R) service and that this service is a safety service;

¹ Replaces Resolution No. Aer2 - 2 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

considering, in particular

d) that it is 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 aeronautical mobile (R) service refrain from using frequencies allocated to this service other than under the conditions specified in Nos. 342 and 956 of the Radio Regulations;

2. a) to make every effort to identify and locate the source of any unauthorized emission capable of causing harmful interference to the aeronautical mobile (R) service, thereby endangering this safety service;

b) and to communicate their findings to the IFRB;

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

4. to request their governments to enact such legislation as is necessary to prevent stations located on board aircraft from operating in contravention of No. 2665 of the Radio Regulations;

to request the IFRB

1. to continue to organize monitoring programmes in the bands exclusively allocated to the aeronautical mobile (R) service with a view to eliminating the emissions of the stations of other services operating in these bands which cause, or are likely to cause, harmful interference to the aeronautical mobile (R) service;

2. to take steps to eliminate the emissions of stations of other services operating in these bands which cause, or are likely to cause, harmful interference to the aeronautical mobile (R) service;
3. to seek, as appropriate, the cooperation of administrations in identifying the sources of those emissions by all available means and in securing the cessation of those emissions.

RESOLUTION No. 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 radionavigation station resulting therefrom shall be notified to the Board and upon receiving a favourable finding with respect to Nos. 1240 and 1241 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 12 with no change in the original date;

further resolves

that administrations shall inform the IFRB 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 IFRB

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 ICAO.

RESOLUTION No. 501

**Relating to Examination by the IFRB of the Notices Referring
to Stations in the Broadcasting Service in Region 2 in the
Band 535 - 1 605 kHz During the Period Preceding
the Entry into Force of the Final Acts of the
Regional Administrative MF Broadcasting Conference (Region 2)**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that a Regional Administrative MF Broadcasting Conference (Region 2) will be convened, in two sessions, to draw up a plan for the broadcasting service in the band 535 - 1 605 kHz;
- b)* that the first session of that Conference will be held in March 1980, and the second session in November 1981;
- c)* that the relevant provisions of Article 12 have been modified by the present Conference;
- d)* that the Regional Administrative MF Broadcasting Conference (Region 2) should adopt provisions to be applied by the Board for notification and recording in the Master Register of frequency assignments included in the plan;
- e)* that it is therefore necessary to establish a procedure to be applied by the Board for the examination of notices referring to broadcasting stations in Region 2 in the band 535 - 1 605 kHz in the period between the entry into force of the Final Acts of the World Administrative Radio Conference, Geneva, 1979, and the entry into force of the Final Acts of the Regional Administrative MF Broadcasting Conference (Region 2);

resolves

that between the date of entry into force of the Final Acts of the World Administrative Radio Conference, Geneva, 1979, and the date of entry into force of the Final Acts of the Regional Administrative MF Broadcasting Conference (Region 2), the Board shall not examine, with respect to the provisions of No. 1241, frequency assignment notices to a broadcasting station of Region 2 in the band 535 - 1 605 kHz and shall record them with no date in Column 2a or in Column 2b, the date in Column 2c being given for information only.

RESOLUTION No. 502

Relating to the Period Between the Entry into Force of the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, and the Date on Which the Provisions and Associated Plan Adopted by that Conference Are Annexed to the Radio Regulations¹

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, came into force on 1 January 1979;
- b) that, in its Resolution No. Sat – 4, the 1977 Conference requested the 1979 World Administrative Radio Conference to annex to the Radio Regulations the provisions and associated Plan established by it;
- c) that there will be an interim period between the date of entry into force of those Final Acts and the date on which the provisions and associated Plan are annexed to the Radio Regulations (Appendix 30);

considering further

that the Final Acts of the 1977 Conference are regarded as including a World Agreement and associated Plan in accordance with Resolution No. Spa2 – 2 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971;

¹ Replaces Resolution No. Sat – 3 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

resolves

1. that, both during this interim period and after the date on which they have been annexed to the Radio Regulations, the provisions and the associated Plan shall retain their integrity as a legal instrument;
2. that during this period the IFRB and the other appropriate organs of the Union shall be guided by the provisions of the Final Acts of the 1977 Conference and the Radio Regulations.

RESOLUTION No. 503

**Relating to the Coordination, Notification and Recording
in the Master International Frequency Register of
Frequency Assignments to Stations in the
Broadcasting-Satellite Service in Region 2¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that a plan will be established for the broadcasting-satellite service in Region 2 in accordance with Resolution 701;
- b)* that in Region 2 the broadcasting-satellite service should be operated on the basis of the principles contained in Article 12 and Annexes 6 and 7 of Appendix 30 to the Radio Regulations;
- c)* that some of the provisions adopted by the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, concerning the broadcasting-satellite service in Regions 1 and 3 may also be applied in Region 2 prior to the entry into force of the plan for that Region to be established pursuant to Resolution 701;
- d)* that, in the interim period, the procedures described in Resolution 33 will continue to apply in Region 2;

resolves

1. that an administration intending to bring into use a space station in the broadcasting-satellite service in Region 2 shall, for the purpose of coordination with space systems of other administrations, apply the

¹ Replaces Resolution No. Sat - 5 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

relevant provisions of Article 11 of the Radio Regulations, i.e. Nos. 1042 to 1056 inclusive;

2. that the relevant provisions of Resolution 33 shall apply to the coordination, notification and recording of stations in the broadcasting-satellite service in Region 2, wherever a station in the broadcasting-satellite service or the fixed-satellite service in Region 2 is involved;

2.1 that an administration notifying a frequency assignment to a space station in the broadcasting-satellite service in Region 2 under paragraph 4.1 of Resolution 33 shall also notify a typical receiving earth station;

3. that the coordination, notification and recording procedures for stations in the fixed-satellite service specified in Article 7 of Appendix 30 to the Radio Regulations shall also apply to stations in the broadcasting-satellite service in Region 2 with respect to stations in the broadcasting-satellite service for which a frequency assignment appears in the Plan whenever:

- any portion of the necessary bandwidth of the proposed frequency assignment in Region 2 falls within the necessary bandwidth of a frequency assignment in Region 1 or Region 3; and
- the power flux-density which would be produced by the proposed broadcasting-satellite frequency assignment in Region 2 exceeds the value specified in Annex 1 of Appendix 30;

4. that Annex 2 of Appendix 30 shall be used in supplying the information referred to in Section B of Resolution 33 and Section II of Article 7 of Appendix 30;

5. that an individual notice for each frequency assignment shall be drawn up as prescribed in Annex 2 of Appendix 30 for any frequency assignment notified under paragraph 4.1 of Resolution 33 or paragraph 2.1 of this Resolution or Section III of Article 7 of Appendix 30.

RESOLUTION No. 504

**Relating to the Final Acts of the
World Broadcasting-Satellite Administrative Radio Conference,
Geneva, 1977, with Respect to Region 2**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, adopted only interim provisions for Region 2;
- b)* that this Conference has adopted changes to the Table of Frequency Allocations for Region 2 that affect the conditions on which those interim provisions in the Final Acts of the 1977 Conference are based;
- c)* that this Conference has also decided to incorporate the provisions and associated Plan adopted by the 1977 Conference into the Radio Regulations as Appendix 30;
- d)* that a regional administrative radio conference will be convened in 1983 to carry out planning for the broadcasting-satellite service in Region 2 in accordance with Resolution 701;

resolves

1. that the provisions of Article 12 of Appendix 30 relating to arc segmentation in Region 2 are no longer applicable in the band 11.7 - 12.1 GHz and will not be applicable in the remainder of the band 11.7 - 12.2 GHz following the 1983 regional administrative radio conference;

2. that the remaining interim provisions relating solely to Region 2 in Appendix 30 shall continue to apply pending the decisions of the 1983 regional administrative radio conference after which time the final acts of the 1983 regional conference shall be regarded as superseding such interim provisions for Region 2 now contained in Appendix 30 subject to their formal adoption by the next competent world administrative radio conference.

RESOLUTION No. 505

**Relating to the Broadcasting-Satellite Service (Sound) in the
Frequency Range 0.5 GHz to 2 GHz**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that several administrations have made proposals concerning frequency band allocations for broadcasting-satellite service (sound) in the range 0.5 - 2 GHz;
- b)* that the frequency bands presently allocated to the broadcasting-satellite service do not provide the possibility of individual reception of sound programmes by portable receivers and receivers installed in automobiles;
- c)* that the introduction of the broadcasting-satellite service (sound) in the range 0.5 - 2 GHz is technically feasible and will afford the possibility of individual reception with portable and automobile receivers;
- d)* that simulated experiments have confirmed certain postulations made in theoretical studies; however, no working system has yet been demonstrated;
- e)* that further studies are necessary before the implementation of operational systems;
- f)* that CCIR has initiated studies concerning this service in accordance with Study Programme 34B/10;
- g)* that the appropriate frequency range for the service is limited at the lower end to 0.5 GHz (because of increasing man-made noise and transmit antenna size with decreasing frequency) and at the upper end to 2 GHz (because of decreasing effective area of the receive antenna with increasing frequency);

h) that, because of the high power flux-density requirement, sharing with terrestrial services seems extremely difficult;

noting

a) that there are proposals by administrations for the frequency range 1 429 - 1 525 MHz;

b) that the radio astronomy service has an allocation in a lower neighbouring band and that for that reason the lower part of the band 1 429 - 1 525 MHz may not be considered for an allocation to the broadcasting-satellite service (sound);

c) that in the experimental phase a bandwidth of a few hundred kHz would suffice;

resolves

1. that administrations shall be encouraged to carry out experiments with a broadcasting-satellite service (sound) within the band 0.5 - 2 GHz, in appropriately placed narrow sub-bands, subject to agreement of administrations concerned. One area where such a sub-band may be placed is the band 1 429 - 1 525 MHz;

2. that the CCIR shall continue and expedite studies relating to the technical characteristics of a satellite sound-broadcasting system for individual reception by portable and automobile receivers, the feasibility of sharing with terrestrial services, and the appropriate sharing criteria;

3. that the next world administrative radio conference dealing with space radiocommunication services in general or with a specific space radiocommunication service shall be authorized to consider the results of various studies and to take appropriate decisions regarding the allocation of a suitable frequency band;

4. that the aforementioned conference shall also develop appropriate procedures for protection, and if necessary re-accommodation in other bands, of assignments to stations of terrestrial services which may be affected.

RESOLUTION No. 506

Relating to the Use, by Space Stations Operating in the 12 GHz Frequency Bands Allocated to the Broadcasting-Satellite Service, of the Geostationary-Satellite Orbit and No Other ¹

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that a Plan designating frequency assignments in the above-mentioned frequency bands and positions in the geostationary-satellite orbit has been adopted by the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, for Regions 1 and 3;
- b)* that a similar plan for Region 2 is expected to result from a regional administrative radio conference in 1983;
- c)* that the operation of space radiocommunication services in the frequency bands concerned in orbits other than the geostationary-satellite orbit would be incompatible with the plans referred to in *a)* and *b)* above;

resolves

that administrations shall ensure that their space stations in these frequency bands are operated in the geostationary-satellite orbit and no other.

¹ Replaces Resolution No. Sat – 7 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

RESOLUTION No. 507

Relating to the Establishment of Agreements and Associated Plans for the Broadcasting-Satellite Service ¹

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, as the case may be, in which all the administrations concerned and the administrations whose services are liable to be affected may participate;

¹ Replaces Resolution No. Spa2 - 2 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

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2. that during the period before the entry into force of such agreements and associated plans the administrations and the IFRB shall apply the procedure contained in Resolution 33;

invites the Administrative Council

to keep under review the question of world administrative conferences, and/or regional administrative conferences, as required, with a view to fixing suitable dates, places and agenda.

RESOLUTION No. 508

**Relating to the Convening of a
World Administrative Radio Conference
for the Planning of the HF Bands
Allocated to the Broadcasting Service**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the existing situation in the HF bands allocated exclusively to the broadcasting service is not satisfactory;
- b) that it is important to ensure that all countries are guaranteed free and equal rights to the use of these bands;

resolves

1. that the use of the exclusive and shared HF bands allocated to the broadcasting service (excluding those bands reserved for broadcasting in the Tropical Zone) should be the subject of planning by a world administrative radio conference;
2. that the planning be based on DSB (double-sideband) emissions. Consideration should also be given to the manner in which an SSB (single-sideband) system could be introduced progressively without impairing the DSB emissions;
3. that the conference referred to in paragraph 1 should be held in two sessions;

4. that the first session:

4.1 is to establish the technical parameters to be used for planning and the principles governing the use of the HF bands allocated to the broadcasting service and in particular:

4.1.1 the power appropriate to HF broadcasting in conjunction with the other relevant technical factors;

4.1.2 the needs of each country for national and international broadcasting;

4.1.3 the maximum number of frequencies to be used for the broadcasting of the same programme to the same zone;

4.1.4 a specification of an SSB system suitable for future use for HF broadcasting;

4.2 should also decide the planning principles to be used and the method of planning to be adopted by the second session;

5. that, at its second session, to be held not sooner than twelve months nor later than eighteen months after the first session, the conference:

5.1 should carry out the planning according to the principles and the method established at the first session;

5.2 should review and, where necessary, revise the relevant provisions of the Radio Regulations relating to broadcasting in the HF bands;

urges administrations,

until the conference is held, to use no greater transmitter power than that required for satisfactory reception and to ensure that the number of frequencies used is the minimum necessary;

draws the attention of the Administrative Council

to the urgency of this conference;

and invites the Administrative Council

to take all necessary steps for the convening of the conference, the first session of which shall be held as soon as possible after the next CCIR Plenary Assembly and with the least possible delay as defined in Article 58 (No. 303) of the Convention;

requests the IFRB

to carry out the necessary engineering studies and preparations, including those envisaged in No. 1771 of the Radio Regulations;

requests the CCIR

to accelerate the studies described in Recommendations 500 and 501.

RESOLUTION No. 509

**Relating to the Convening of a Regional Broadcasting Conference
to Review and Revise the Provisions of the Final Acts of the
African VHF/UHF Broadcasting Conference, Geneva, 1963**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the last African VHF/UHF Plan was drawn up in Geneva in 1963 for Sound Broadcasting in Band II (87.5 - 100 MHz) and for Television Broadcasting in Band I (47 - 68 MHz), Band III (174 - 223 MHz), Band IV (470 - 582 MHz) and Band V (582 - 960 MHz);
- b)* that some of the African countries could not participate in the African VHF/UHF Broadcasting Conference, Geneva, 1963;
- c)* that many more sovereign African countries have emerged and will need to be included in a new plan;

noting

- a)* that for the band 87.5 - 108 MHz an FM sound-broadcasting planning conference is foreseen for Region 1 (see Resolution 510);
- b)* the extension of the primary allocation to the broadcasting service (television) in Region 1 from 174 - 223 MHz to 174 - 230 MHz;

realizing

that there is a need to update the existing Plan;

resolves

that a regional conference be convened as soon as possible, preferably by 1984, to review and revise the provisions of the existing Television Broadcasting VHF/UHF Plan (Geneva, 1963) for the African Broadcasting Area, taking into account the assignments contained in the Stockholm Plan, 1961;

invites the Administrative Council

to take all necessary steps for convening the conference and to fix the date and agenda for the conference;

requests the CCIR

to carry out the necessary technical studies;

requests the IFRB

to carry out the preparations for the conference.

RESOLUTION No. 510

**Relating to the Convening of a Planning Conference
for Sound Broadcasting in the Band 87.5 - 108 MHz
for Region 1 and Certain Countries Concerned in Region 3**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the extension of the primary allocation to the broadcasting service in Region 1 from 87.5 - 100 MHz to 87.5 - 108 MHz;
- b) that in Region 1 the band 100 - 108 MHz is at present allocated to the mobile, except aeronautical mobile (R), service and in some countries also to the fixed service;
- c) that several countries in Region 3 with land boundaries adjoining Region 1 also use this band for the broadcasting service;
- d) that for those countries in Region 1 which use or intend to use the band 87.5 - 100 MHz for frequency-modulated sound broadcasting, there is a need to establish a new sound-broadcasting plan for the whole of the band 87.5 - 108 MHz;
- e) that for other countries in Region 1 there is a need to establish a sound-broadcasting plan for the band 100 - 108 MHz;
- f) that this new plan should in no way affect existing or planned assignments to television stations in the band 87.5 - 100 MHz made in accordance with the Regional Agreement (Stockholm, 1961);
- g) that this new plan in the band 87.5 - 100 MHz should not result in the deterioration of the service areas of those existing sound-broadcasting stations operating in accordance with the Regional Agreement (Stockholm, 1961) which are situated in the coordination area with countries using this band for television in accordance with the Regional Agreement (Stockholm, 1961);

h) the requirement to introduce sound-broadcasting stations in the band 100 - 108 MHz in accordance with this plan at the earliest possible date;

i) that radio equipment used by aircraft for automatic landing purposes, which operates in the adjacent band 108 - 112 MHz, may be subject to harmful interference from nearby broadcasting stations operating in the band 87.5 - 108 MHz if the frequencies of the respective stations are not selected with care and that such interference can put human life at risk;

resolves

1. that a regional conference shall be convened before 31 December 1983 to draw up an agreement for Region 1 and the countries concerned in Region 3 and an associated plan for sound broadcasting in the band 87.5 - 108 MHz for Region 1 and for parts of Afghanistan and Iran which are contiguous with Region 1;

2. that this conference shall take place in two sessions:

- the first session will establish the technical bases for the preparation of the plan, including mutual criteria for sharing between sound broadcasting and other services, including television broadcasting, operating within the band 87.5 - 108 MHz;
- the second session, preferably to be separated from the first session by a period of more than six months, but not more than twelve months, will draw up the agreement and associated plan;

3. that countries concerned in Region 3 must be given the opportunity to participate in this conference;

requests the CCIR

to study, as a matter of urgency, the necessary technical bases required for planning and determining the protection criteria between sound-broadcasting stations and television-broadcasting stations and between sound-broadcasting stations and stations in the fixed and mobile, except aeronautical mobile (R), services;

invites the Administrative Council

to fix the dates and agenda for this conference;

calls upon administrations

to bear in mind the problems of compatibility with radionavigation systems operating in the adjacent band when planning the use of the band 87.5 - 108 MHz.

RESOLUTION No. 600

**Relating to the Use for the Radionavigation Service
of the Frequency Bands 2 900 - 3 100 MHz, 5 470 - 5 650 MHz,
9 200 - 9 300 MHz, 9 300 - 9 500 MHz, and 9 500 - 9 800 MHz**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that this Conference has adopted provisions relating to the development of shipborne transponders in the maritime radionavigation service in frequency bands 2 930 - 2 950 MHz, 5 470 - 5 480 MHz and 9 280 - 9 300 MHz;
- b) the growing demands already being made on the frequency allocations for the radionavigation service in the bands utilized for aeronautical and maritime radionavigation arising from:
 - i) the increasing number of shipborne radars which is reinforced by the demands being made for compulsory installation on an international basis;
 - ii) the increasing need for navigational aids and transponders working with primary radars;
 - iii) the need for the increasing utilization of this band by stations in the aeronautical radionavigation service noting that compulsory installation on board aircraft is also demanded on an international basis;
- c) the increase in harmful interference occurring in the 9 300 - 9 500 MHz band due to these factors;
- d) that these radar applications have important safety considerations;

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noting

- a) Recommendation 605;
- b) the conclusions of the Special Preparatory Meeting of the CCIR;
- c) the need for additional operational and technical information in deciding the most effective frequency utilization;

resolves

- 1. that the next competent world administrative radio conference shall:
 - 1.1 review footnotes to these radionavigation bands and make such changes as deemed appropriate in the light of additional studies;
 - 1.2 prepare regulatory recommendations as appropriate;
- 2. that the CCIR shall continue to consider the technical factors and make Recommendations;

invites

- 1. *the Administrative Council* to ensure that radionavigation matters of concern to the mobile services are included in the agenda of the next competent mobile conference;
- 2. *administrations* to study the use of these bands by the radionavigation services and to submit proposals for their efficient utilization;

requests the Secretary-General

to refer this Resolution to the IMCO and ICAO inviting their urgent consideration of the operational requirements for the maritime and aeronautical radionavigation services using these frequency bands, and to make appropriate recommendations to assist administrations in their preparation for the conference.

RESOLUTION No. 601

**Relating to the Recommendations and Standards for Emergency
Position-Indicating Radiobeacons Operating on the
Frequencies 121.5 MHz and 243 MHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that emergency position-indicating radiobeacons operating on the frequencies 121.5 MHz and 243 MHz are intended to facilitate search and rescue operations;
- b)* that the frequencies 121.5 MHz and 243 MHz are in common use by aircraft engaged in search and rescue operations;
- c)* that the International Civil Aviation Organization has established recommended signal characteristics and technical specifications for aircraft equipment operating on 121.5 MHz and/or 243 MHz;

resolves

that administrations authorizing the use of emergency position-indicating radiobeacons on 121.5 MHz and/or 243 MHz should ensure that such radiobeacons comply with the relevant recommendations and standards of the International Civil Aviation Organization and the International Radio Consultative Committee.

¹ Replaces Resolution No. Mar 7 of the World Administrative Radio Conference, Geneva, 1967.

RESOLUTION No. 640

**Relating to the International Use of Radiocommunications,
in the Event of Natural Disasters, in Frequency Bands
Allocated to the Amateur Service**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that in the event of natural disaster normal communication systems are frequently overloaded, damaged, or completely disrupted;
- b) that rapid establishment of communication is essential to facilitate worldwide relief actions;
- c) that the amateur bands are not bound by international plans or notification procedures, and are therefore well adapted for short-term use in emergency cases;
- d) that international disaster communications would be facilitated by temporary use of certain frequency bands allocated to the amateur service;
- e) that under those circumstances the stations of the amateur service, because of their widespread distribution and their demonstrated capacity in such cases, can assist in meeting essential communication needs;
- f) the existence of national and regional amateur emergency networks using frequencies throughout the bands allocated to the amateur service;
- g) that, in the event of a natural disaster, direct communication between amateur stations and other stations might enable vital communications to be carried out until normal communications are restored;

recognizing

that the rights and responsibilities for communications in the event of a natural disaster rest with the administrations involved;

resolves

1. that the bands allocated to the amateur service which are specified in No. 510 may be used by administrations to meet the needs of international disaster communications;
2. that such use of these bands shall be only for communications in relation to relief operations in connection with natural disasters;
3. that the use of specified bands allocated to the amateur service by non-amateur stations for disaster communications shall be limited to the duration of the emergency and to the specific geographical areas as defined by the responsible authority of the affected country;
4. that disaster communications shall take place within the disaster area and between the disaster area and the permanent headquarters of the organization providing relief;
5. that such communications shall be carried out only with the consent of the administration of the country in which the disaster has occurred;
6. that relief communications provided from outside the country in which the disaster has occurred shall not replace existing national or international amateur emergency networks;
7. that close cooperation is desirable between amateur stations and the stations of other radio services which may find it necessary to use amateur frequencies in disaster communications;
8. that such international relief communications shall avoid, as far as practicable, interference to the amateur service networks;

invites administrations

1. to provide for the needs of international disaster communications;
2. to provide for the needs of emergency communications within their national regulations.

RESOLUTION No. 641

**Relating to the Use of the Frequency Band
7 000 - 7 100 kHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the sharing of frequency bands by amateur and broadcasting services is undesirable and should be avoided;
- b)* that it is desirable to have worldwide exclusive allocations for these services in Band 7;
- c)* that the band 7 000 - 7 100 kHz is allocated on a worldwide basis exclusively to the amateur service;

resolves

that the broadcasting service shall be prohibited from the band 7 000 - 7 100 kHz and that the broadcasting stations operating on frequencies in this band shall cease such operation.

¹ Replaces Resolution No. 10 of the Administrative Radio Conference, Geneva, 1959.

RESOLUTION No. 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 11 and 13 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. 2741 of the Radio Regulations;

notes

that certain information specified in Appendices 3 and 4 cannot reasonably be provided for earth stations in the amateur-satellite service;

resolves

1. that when an administration (or one acting on behalf of a group of named administrations) intends to establish a satellite system in the amateur-satellite service and wishes to publish information with respect to earth stations in that system it may:

1.1 communicate to the IFRB all or part of the information listed in Appendix 3; the IFRB 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. 1488 to 1491 all or part of the information listed in Appendix 3; the IFRB 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 No. 700

**Relating to Sharing Between the Fixed-Satellite Service
in Regions 1 and 3 and the Broadcasting-Satellite Service
in Region 2 in the Band 12.2 - 12.7 GHz**

The World Administrative Radio Conference, Geneva, 1979,

recognizing

- a) that an allocation has been made at this Conference to the broadcasting-satellite service in the band 12.1 - 12.7 GHz in Region 2;
- b) that in the band 12.5 - 12.75 GHz in Regions 1 and 3 the allocation to the fixed-satellite service has been maintained and an additional allocation has been made in the band 12.2 - 12.5 GHz for Region 3;
- c) that in drawing up the Broadcasting-Satellite Plan (Geneva, 1977) for Regions 1 and 3 due account was taken of the future operational needs of the fixed-satellite service in Region 2 and that, in observing these needs, it was necessary to impose constraints on the preparation of the Plan and the associated modification procedure;

resolves

1. that, prior to the coming into force of appropriate provisions and an associated plan to be prepared by the regional conference for the planning of the broadcasting-satellite service in Region 2, the provisions of Resolution 33 together with Article 11 shall continue to apply with respect to the coordination between space stations in the broadcasting-satellite service in Region 2 and space stations in the fixed-satellite service in Regions 1 and 3;
2. that in the drawing-up of a plan (and any associated modification procedure) for the broadcasting-satellite service in Region 2 the requirements for satisfactory future operation of the fixed-satellite service in

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Regions 1 and 3 shall be observed and that, if constraints on the fixed-satellite service are considered necessary to ensure that no harmful interference is caused either to the fixed-satellite or the broadcasting-satellite services involved, they should not in any case be greater than those imposed on the fixed-satellite service in Region 2 by Appendix 30;

3. that, in order that the regional conference shall have the necessary guidance for achieving *resolves* 2, the CCIR should study urgently the technical provisions required, taking into account existing and proposed fixed-satellite systems for operation in the 12.5 - 12.7 GHz band in Region 1 and the 12.2 - 12.7 GHz band in Region 3.

RESOLUTION No. 701

**Relating to the Convening of a Regional Administrative
Radio Conference for the Detailed Planning of the
Broadcasting-Satellite Service in the 12 GHz Band
and Associated Feeder Links in Region 2¹**

The World Administrative Radio Conference, Geneva, 1979,

noting

- a)* that the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, adopted a Plan for the assignment of frequencies and orbital positions for the broadcasting-satellite service in the 12 GHz band for Regions 1 and 3;
- b)* that the 1977 Conference adopted interim provisions pending the establishment of a similar plan for Region 2;
- c)* that, following a consultation by the Administrative Council with Members of Region 2, it is envisaged that a Region 2 administrative radio conference for the broadcasting-satellite service will be convened in 1983;
- d)* that this Conference has adopted changes to the Table of Frequency Allocations that greatly affect the conditions on which the planning of the broadcasting-satellite service in the 12 GHz band by Region 2 will be based;

¹ Replaces Resolutions No. Sat - 8 and No. Sat - 9 and Recommendation No. Sat - 8 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

e) that this Conference has also decided to incorporate the provisions and associated Plan adopted by the 1977 Conference into the Radio Regulations as Appendix 30;

considering

a) that Annexes 8 and 9 of Appendix 30 contain technical data and sharing criteria used in establishing the provisions and the associated Plan;

b) that advantage should be taken of technological advances resulting from experiments carried out on broadcasting satellites since 1977;

c) that advantage should also be taken of recent studies by the CCIR;

d) that with respect to space services this Conference has allocated in Region 2 the band 12.3 - 12.7 GHz to the broadcasting-satellite service, and the band 12.1 - 12.3 GHz to the fixed-satellite service and the broadcasting-satellite service in accordance with the terms of No. 841 of the Radio Regulations;

e) that this Conference has identified the bands 14.5 - 14.8 GHz and 17.3 - 18.1 GHz for use as feeder link frequencies to broadcasting satellites;

f) that there are significant advantages in planning the feeder links together with the planning of 12 GHz broadcasting-satellite systems;

recognizing

a) that arc segmentation is no longer required in the band 11.7 - 12.1 GHz and will not be required in the band 12.1 - 12.3 GHz following the 1983 regional administrative radio conference;

b) that systems of the fixed-satellite service in the band 11.7 - 12.2 GHz shall not impose restrictions on the preparation of a Region 2 broadcasting-satellite plan, but that such systems developed by the time of the 1983 regional administrative radio conference, which are in accordance

with the provisions of the Final Acts of the 1971 World Administrative Radio Conference for Space Telecommunications and the 1977 World Broadcasting-Satellite Administrative Radio Conference, should be taken into account in the decisions of the 1983 regional administrative radio conference;

resolves

1. that the regional administrative radio conference (RARC) referred to in *noting c)* be held no later than 1983 to:

1.1 divide the band 12.1 - 12.3 GHz in two sub-bands and allocate the lower sub-band to the fixed-satellite service and the upper sub-band to the broadcasting-satellite, broadcasting, mobile except aeronautical mobile, and fixed services, all services being on a primary basis (see No. 841);

1.2 draw up a detailed frequency assignments and orbital positions plan for the broadcasting-satellite service for Region 2 in the band 12.3 - 12.7 GHz and in that portion of the band 12.1 - 12.3 GHz which it shall allocate to the broadcasting-satellite service;

1.3 plan feeder links in a part of the band 17.3 - 18.1 GHz, of a bandwidth equal to the total bandwidth allocated to the broadcasting-satellite service in the 12 GHz band. However, administrations may use broadcasting-satellite feeder links in frequency bands other than those planned, provided that such use does not necessitate any changes in the plan;

1.4 establish procedures to govern the use of the bands specified in paragraph 1.2 of this Resolution by the broadcasting-satellite service and, as necessary, procedures for the corresponding feeder links;

2. that planning shall take into account the pertinent provisions of Appendix 30, in particular those contained in Annexes 4 and 5, as well as other decisions of this Conference. In considering Annexes 6, 7 and 8 account should also be taken of the latest CCIR Recommendations and technological advances;

3. that the plan shall provide for the detailed assignment of the orbital positions and frequency channels available, ensuring that the broadcasting-satellite service requirements submitted by the various administrations are met in an equitable manner satisfactory to all the countries concerned. It should be laid down as a matter of principle that each administration in the Region should be guaranteed a minimum number of channels (4) for the operation of the broadcasting-satellite service. Above this minimum, the special characteristics of the countries (size, time zones, language differences, etc.) shall be taken into account;

4. that all administrations in Region 2 shall submit their broadcasting-satellite service requirements to the IFRB not later than one year before the start of the regional administrative radio conference responsible for planning this service in Region 2. Each administration may update these requirements as it considers necessary. "Requirements" are understood to include the number and boundaries of service areas and the number of channels requested for each of them. Six months before the deadline for submitting requirements, the IFRB shall remind administrations of the need to submit them by means of a circular letter and/or telegram;

5. that planning shall be based on individual reception, but each administration may use the reception system which best meets its requirements (individual or community reception, or both);

6. that, in planning, it shall be borne in mind that systems should be designed with a view to reducing to a minimum technical differences and incompatibilities with the systems of other Regions;

7. that planning should respect the provisions of Resolutions 31 and 700, concerning the matter of inter-regional sharing;

invites the Administrative Council

to make preparations for convening the said regional administrative radio conference using the provisions of this Resolution as a basis for the agenda of the conference;

invites the CCIR

to carry out the necessary studies with a view to presenting, at the appropriate time, the technical information likely to be required as a basis for the work of the regional conference (see also Recommendation 101);

invites the IFRB

1. to request all administrations in Region 2 to submit their broadcasting-satellite service requirements in accordance with *resolves* 4 above;
2. to assemble the information submitted by administrations in a form permitting a comparative study thereof and to communicate it to the Secretary-General for publication and dispatch to administrations not later than nine months prior to the said regional administrative radio conference.

RESOLUTION No. 702

**Relating to the Convening of a Regional Administrative Radio Conference
to Establish Criteria for the Shared Use of the VHF and UHF Bands
Allocated to Fixed, Broadcasting and Mobile Services in Region 3**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that frequency allocations in the VHF and UHF bands have been substantially revised at this Conference, resulting in sharing mainly between the fixed, broadcasting and mobile services;
- b) that the uncoordinated development of the services which share this spectrum throughout the Region may lead to unorderedly and inefficient spectrum utilization;
- c) that there are no well-established criteria for sharing the spectrum between these services to which these bands are allocated;
- d) that within Region 3 there is no regional arrangement governing the establishment of broadcasting stations in these bands;
- e) that it is not clear at this stage whether an assignment plan for Region 3 would be needed;

noting

the priority given by the World Administrative Radio Conference, 1979, to the convening of future administrative radio conferences;

resolves

1. that a regional administrative radio conference be convened at an appropriate time;

2. that this regional conference should establish the technical criteria for sharing between the fixed, broadcasting and mobile services to which the bands concerned are allocated;
3. that, after establishing the technical criteria, the conference should also decide upon the consequential action to be taken;

invites the Administrative Council

to make preparations for convening the said regional administrative radio conference using the provisions of this Resolution as a basis for the agenda of the conference;

invites the CCIR

to carry out the necessary studies with a view to presenting, at the appropriate time, the technical information likely to be required as a basis for the work of the regional conference;

invites administrations

to make appropriate contributions to the studies of the CCIR.

RESOLUTION No. 703

**Relating to the Calculation Methods and Interference Criteria
Recommended by the CCIR for Sharing Frequency Bands Between
Space Radiocommunication and Terrestrial Radiocommunication Services
or Between Space Radiocommunication Services¹**

The World Administrative Radio Conference, Geneva, 1979,

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 paragraphs *a)* and *b)* above are based upon CCIR 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, each CCIR Plenary Assembly subsequent to the Xth Plenary Assembly (Geneva, 1963) has

¹ Replaces Resolution No. **Spa2** – 6 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

improved upon some of the technical criteria recommended by the preceding Plenary Assembly;

e) that CCIR Plenary Assemblies are held triennially, whereas administrative radio conferences, which are competent to modify the Radio Regulations making substantial use of CCIR Recommendations, are in practice held less frequently and with much less regularity;

f) that the International Telecommunication Convention (Malaga-Torremolinos, 1973) recognizes the right of Members of the Union to make special agreements on telecommunication matters; however, such agreements shall not be in conflict with the terms of the Convention or of the Regulations annexed thereto as far as harmful interference to the radio services of other countries is concerned;

is of the opinion

a) that subsequent Plenary Assemblies of the CCIR 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 CCIR Recommendations;

c) that the administrations should whenever possible apply the current CCIR 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 the CCIR

a) to request its Study Groups to prepare, at their final meetings before the Plenary Assembly, a provisional list identifying relevant parts of drafts of revised and new CCIR Recommendations 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;

b) to request the Director of the CCIR to forward this list together with texts of these drafts of revised and new Recommendations to administrations and to the IFRB within thirty days following the final Study Group meetings;

resolves that

1. the IFRB shall immediately distribute the information mentioned in *invites b)* above to all administrations, so that it reaches them as soon as possible before the convening of the subsequent Plenary Assembly. This should be accompanied by a notice indicating that the enclosed texts are subject to approval at the next CCIR Plenary Assembly;
2.
 - a)* each CCIR Plenary Assembly, having adopted any or all of the relevant Recommendations and approved the appropriate portions of the list mentioned in *invites a)* above, should arrange for the Secretary-General to be informed of the list and those Recommendations which affect the appropriate calculation methods and the interference criteria to be employed;
 - b)* the Secretary-General shall forward this list and the appropriate texts to all administrations within thirty days, asking them to indicate within four months those CCIR Recommendations or specific technical criteria defined in the Recommendations referred to in paragraph 2.*a)* above to which they agree for use in the application of the pertinent provisions of the Radio Regulations;

3. the administrations which do not reply to the Secretary-General's consultation within four months shall be sent a telegram asking for their decision on the application of these Recommendations under the relevant provisions of the Radio Regulations. If no reply is received within thirty days from the date of dispatch of the telegram, it shall be concluded that the administration does not wish to express an opinion at that time;

4. should an administration, in its reply to the Secretary-General's consultation, indicate that a given CCIR Recommendation or technical criterion defined in those Recommendations is unacceptable, or should an administration not reply to the Secretary-General's consultation as in paragraph 3 above, the relevant calculation methods and the interference criteria defined in the Radio Regulations shall continue to apply with respect to cases involving that administration;

5. the Secretary-General shall publish, for the information of all administrations, a list, prepared by the IFRB on the basis of the replies to the enquiry, of the CCIR 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. This consolidated list shall also include the administrations mentioned in paragraph 3 above;

6. the IFRB shall take into account:

- a) the applicability of the CCIR calculation methods and the 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 the interference criteria defined in the Radio Regulations in accordance with the consolidated list referred to in paragraph 5 above, when making technical examinations with respect to cases involving the other administrations;

7. the Secretary-General of the ITU shall annually remind administrations which have not previously replied to communicate their decision in pursuance of paragraph 3 above;

8. if, at a later date, questions arise concerning the application of the relevant calculation methods and interference criteria to a case involving the administrations mentioned in paragraph 3 above, the IFRB shall enquire of the administrations concerned whether or not they would agree to the application of the methods and criteria defined in the relevant CCIR Recommendations referred to in paragraph 2 above;

9. the consolidated list published pursuant to paragraph 5 above shall be updated on the basis of the replies received in accordance with paragraphs 7 and 8 above.

RECOMMENDATIONS

Note by the General Secretariat:

The Recommendations are arranged in order and numbered along the lines of the grouping and numbering system below. As some Recommendations in one group have direct relationship to Recommendations in other groups, this has been reflected, as far as possible, to facilitate consultation.

	Numbers
RECOMMENDATIONS OF GENERAL APPLICATION	1 – 99
– Principles, general procedures and cooperation	1 – 20
– Specific procedures	30 – 39
– Technical matters	60 – 69
<i>See also: Nos. 8, 31</i>	
<i>No. 100</i>	
<i>No. 505</i>	
<i>No. 711</i>	
– Equipment/Terminology	70 – 79
<i>See also: Nos. 67, 69</i>	
FIXED SERVICE/FIXED-SATELLITE SERVICE	100 – 199
<i>See also: No. 12</i>	
<i>Nos. 703, 706</i>	
MOBILE SERVICE/MOBILE-SATELLITE SERVICE	200 – 299
<i>See also: No. 12</i>	
<i>Nos. 703, 706</i>	
MARITIME MOBILE SERVICE/MARITIME MOBILE-SATELLITE SERVICE	300 – 399
<i>See also: Nos. 7, 9</i>	
<i>Nos. 200, 201, 202, 203, 204</i>	
<i>No. 604</i>	
AERONAUTICAL MOBILE SERVICE/AERONAUTICAL MOBILE-SATELLITE SERVICE	400 – 499
<i>See also: Nos. 7, 9</i>	
<i>Nos. 202, 204</i>	
<i>No. 604</i>	
<i>No. 709</i>	
BROADCASTING SERVICE/BROADCASTING-SATELLITE SERVICE	500 – 599
<i>See also: Nos. 9, 12</i>	
<i>No. 101</i>	
<i>Nos. 704, 705, 712</i>	
OTHER SERVICES	600 – 699
<i>See also: No. 12</i>	
<i>Nos. 701, 703, 704, 707, 710</i>	
RELATING TO MORE THAN ONE SERVICE	700 – 799
<i>See also: Nos. 2, 3, 12, 61, 65</i>	

In this respect, see also the Analytical Index of Recommendations.

RECOMMENDATION No. 1

**Relating to the Use of Space Radiocommunication Systems
in the Event of Natural Disasters, Epidemics, Famines
and Similar Emergencies ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that, in the case of natural disasters, epidemics, famines and similar emergencies, lives can be saved by prompt and effective relief;
- b)* that rapid and reliable telecommunications are essential for relief operations;
- c)* that, through damage or from other causes, the normal telecommunications facilities in disaster areas are often inadequate for relief operations and cannot be restored or supplemented quickly through local resources;
- d)* that use of space radiocommunication systems is one of the means by which rapid and reliable telecommunications could be provided for relief operations;

noting

- a)* that known planning of space radiocommunication systems makes no provision for specific frequencies or channels for emergency communications;

¹ Replaces Recommendation No. Spa2 - 13 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

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- b) that in the absence of such planning it is not feasible to proceed with specifications for rapidly transportable, universally operable earth stations;
- c) that CCIR Report 554-1 gives current results of studies of transportable earth stations for relief operations;

recommends

1. that administrations, individually or in collaboration, provide for the needs of possible relief operations in planning their space radiocommunication systems and identify for this purpose preferred radio-frequency channels and facilities which could quickly be made available for relief operations;
2. that administrations concerned waive the coordination procedures provided for in the Radio Regulations in the case of transportable earth stations used for relief operations;

invites the CCIR

to continue its study of the standard specifications and preferred frequencies for transportable earth stations and for compatible mobile and transportable fixed radiocommunications equipment for relief operations.

RECOMMENDATION No. 2

**Relating to the Examination by World Administrative Radio
Conferences of the Situation with Regard to Occupation
of the Frequency Spectrum in Space Radiocommunications ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the frequency bands available for space applications are limited in number and size;
- b)* that the possible positions for a satellite whose main purpose is to establish telecommunication links are limited in number and that certain positions are more favourable than others for certain links;
- c)* that all administrations should be enabled to establish the space links which they deem necessary;
- d)* that the scale and cost of space networks or systems are such that their operation and development must be hindered as little as possible;
- e)* that technology is steadily and rapidly evolving and that the best possible use should be made of resources in space radiocommunications;
- f)* that administrations should ensure that frequency assignments for space applications are utilized in the most efficient manner possible consistent with developing technology and that such assignments are relinquished when no longer in use;

¹ Replaces Recommendation No. **Spa2** - 1 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

g) that despite the provisions of Article 11 of the Radio Regulations and the principles adopted by the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971, which provide for full consultation and coordination between administrations with a view to the optimum accommodation of all space systems, it is possible that, as the use of frequencies and orbital positions increases, administrations may encounter undue difficulty in one or more frequency bands in meeting their requirements for space radiocommunication;

recommends

that the next appropriate world administrative radio conference be empowered to deal with the situation described in *considering g)*, if it arises;

invites the Administrative Council

in the event of such situations arising, to include in the agenda for the next appropriate world administrative radio conference specific provisions enabling it to examine all aspects of the use of the frequency band(s) concerned including, *inter alia*, the relevant frequency assignments recorded in the Master International Frequency Register and to find a solution to the problem.

RECOMMENDATION No. 3

**Relating to the Transmission of Electric Power
by Radio Frequencies from a Spacecraft**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that it may become technically feasible in the future to convert some portions of the sun's radiation into electric power on board a spacecraft and to transmit that power to Earth by means of radio transmissions and that such power could augment the world's energy resources;
- b) that the possibility of such high power radiation may adversely affect the propagation of radio waves for other services through the ionosphere;

recognizing

- a) that it would be necessary to ensure that the radio transmission of electric power from space did not give rise to harmful interference to radiocommunication services;
- b) that an assessment needs to be made of any likely ecological and biological effects of radio transmissions of power from space, including in particular to aircraft passing through antenna beams used for such transmissions;

noting

that the Special Preparatory Meeting report to the World Administrative Radio Conference, Geneva, 1979, recognized the technical possibility of a solar power satellite;

noting also

the provisions of Article 6 of the Radio Regulations referring to the obligations on administrations not to cause harmful interference to radiocommunication services operating in accordance with the Regulations;

recommends that the CCIR

undertake appropriate studies on all aspects of the effects of such radio transmissions of power from space on radiocommunication services and make appropriate recommendations taking into account the ecological and biological implications;

invites the Secretary-General

to send this Recommendation to the Secretary-General of the United Nations.

RECOMMENDATION No. 4

**Relating to the More Efficient Consolidation of National
and International Radiocommunication Circuits Operating in the
Bands Between 4 000 kHz and 27 500 kHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the ever-increasing need for frequencies particularly in the bands between 4 000 kHz and 27 500 kHz;
- b) the present structure of national and international radiocommunication networks in these bands;
- c) the relatively light traffic load on some of the circuits of these networks;
- d) the provisions of the International Telecommunication Convention (Malaga-Torremolinos, 1973) concerning the rational use of frequencies and spectrum space (Article 33);

taking into account

- a) the fact that the efficiency of a group of circuits is higher than that of the total number of single circuits;
- b) that as a consequence the total number of frequencies needed may be reduced;
- c) that in certain parts of the world there are areas and countries interconnected by several circuits, both radio and cable;

¹ Replaces Recommendation No. 11 of the Administrative Radio Conference, Geneva, 1959.

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recommends

1. that, wherever possible, administrations should contribute to reducing the pressure on bands between 4 000 kHz and 27 500 kHz by a more efficient consolidation of lightly-loaded radio circuits;
2. that countries interconnected by telecommunication circuits should, whenever practicable, conclude special arrangements on the common use of existing international radio circuits, operating in the bands between 4 000 kHz and 27 500 kHz;
3. that, as a general rule, these arrangements should give to each participating country equal benefit with regard to operational and financial conditions;
4. that in planning new radio circuits or the extension of existing radio circuits, administrations should as far as possible take into account the principles stated in paragraphs 1 to 3 above.

RECOMMENDATION No. 5

**Relating to the Means of Reducing the Congestion
in Band 7 (3 - 30 MHz) ¹**

The World Administrative Radio Conference, Geneva, 1979,

recognizing

- a) that there is an urgent need to reduce the pressure on Band 7 of the radio frequency spectrum;
- b) that the utilization of modern developments in telecommunication techniques, particularly those involving the use of Band 8 and higher bands, coaxial cables, etc., can contribute to this reduction;
- c) that the utilization of these improved and alternative techniques would entail considerable expenditure whereas the continued use of Band 7 techniques would be less expensive and therefore some administrations would find it more difficult to introduce these new techniques than other administrations more favourably placed;

recommends

1. that all administrations take the necessary steps to reduce the pressure on Band 7 by adopting the new techniques to the maximum extent possible;
2. that the international organizations giving aid be requested to give special consideration to the supply of equipment to administrations which are not in a position to procure it themselves due to economic difficulties, for the purpose of enabling these administrations to change over to the alternative means of telecommunication, thus contributing towards greater economy in the use of Band 7.

¹ Replaces Recommendation No. 10 of the Administrative Radio Conference, Geneva, 1959.

RECOMMENDATION No. 6

**Relating to the Practical Needs of Countries
in Need of Special Assistance ¹**

The World Administrative Radio Conference, Geneva, 1979,

recommends

that all administrations should make special efforts to cooperate with the administrations of countries in need of special assistance by furnishing monitoring information and such technical assistance as may aid these countries in obtaining proper frequency assignments for their operations;

invites the IFRB

to provide administrations of countries in need of special assistance with the necessary information and technical data, including the detailed explanations of the Radio Regulations, which will permit these countries to choose and obtain proper frequency assignments for their operations.

¹ Replaces Recommendation No. 35 of the Administrative Radio Conference, Geneva, 1959.

RECOMMENDATION No. 7

**Relating to the Adoption of Standard Forms
for Ship Station Licences and Aircraft Station Licences ¹**

The World Administrative Radio Conference, Geneva, 1979,

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. 2027 of the Radio Regulations;

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);

¹ Replaces Recommendation No. 17 of the Administrative Radio Conference, Geneva, 1959.

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 No. 7

**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 exhibition 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, one working language of the Union.
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 the three working languages of the Union.

These principles were used in formulating the two standard forms which are given in Annexes 2 and 3.

ANNEX 2 TO RECOMMENDATION No. 7

(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 annexed to the International Telecommunication Convention 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	Call sign or other identification	Owner of ship	Public correspondence category

		a	b	c	d
	Equipment	Type	Power (watts)	Class of emission	Frequency bands or assigned frequencies
5	Transmitters				**
6	Ship's emergency transmitters				**
7	Survival craft transmitters				**
8	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 one of the three working languages of the Union.

** Specifically or by reference.

ANNEX 3 TO RECOMMENDATION No. 7
(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 annexed to the International Telecommunication Convention 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 (watts)	Class of emission	Frequency bands or assigned frequencies
5	Transmitters				**
6	Survival craft transmitters <i>(when applicable)</i>				**
7	Other equipment	<i>(Optional)</i>			

For the Issuing Authority:

.....

Place Date Authentication

* The words "Aircraft Station Licence" written in the national language, if this is not one of the three working languages of the Union.
** Specifically or by reference.

RECOMMENDATION No. 8

Relating to Automatic Identification of Stations

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) Article 25 of the Radio Regulations 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 25, as an alternative to the proliferation of many different systems and modulation techniques that might be used for this purpose;

recommends

that the CCIR 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 25, with due consideration to the needs of the different services and types of stations.

RECOMMENDATION No. 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. 2665 and 3603 of the Radio Regulations;
- 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 countries, 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;

¹ Replaces Recommendation No. 16 of the Administrative Radio Conference, Geneva, 1959.

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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 Members accordingly.

RECOMMENDATION No. 10

**Relating to the Presentation of Draft Amendments
to the Radio Regulations¹**

The World Administrative Radio Conference, Geneva, 1979,

having noted

- a)* that in the proposals submitted by some administrations a uniform method has been utilized for the presentation of modified texts (e.g. underlining of new texts, and crossing out of suppressed texts);
- b)* that this uniform method of presentation has proved itself to be very effective during the consideration of the proposed texts;
- c)* that if such a uniform method of presentation were followed in the different stages of preparing conference documents (sub-working groups, working groups) it would facilitate the work of delegations and may facilitate the work of the conference;
- d)* that the Secretary-General has taken steps to provide guidelines to administrations to assist them in the presentation of their proposals to administrative conferences in accordance with the provisions of the International Telecommunication Convention and in their coordinated presentation to conferences;

¹ Replaces Recommendation No. Mar2 - 20 of the World Maritime Administrative Radio Conference, Geneva, 1974.

recommends

1. that administrations be invited to present their proposals in a uniform manner;
2. that guidelines be issued by the Secretary-General to facilitate this presentation and that they should also be applied for future conferences;
3. that a uniform presentation be used, through the different stages of preparing texts at least up to working group level, at forthcoming administrative radio conferences.

RECOMMENDATION No. 11

Relating to the Marginal Numbering of the Radio Regulations

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the Radio Regulations have a logical paragraph and sub-paragraph numbering system within each article and that consecutive marginal numbering is added to each provision mainly for ease of reference;
- b)* that this marginal numbering is extensively used by administrations and the permanent organs of the Union;
- c)* that blocks of spare marginal numbers have been made available at the end of each article of the revised Radio Regulations (Geneva, 1979) to facilitate the addition by world administrative radio conferences of new provisions and in particular of new articles;

recognizing

- a)* that familiarization with new marginal numbers requires considerable effort and that, therefore, possible changes of marginal numbers by a world administrative radio conference undertaking a partial revision of the Radio Regulations could cause difficulties;
- b)* the fact that revision of the marginal numbering system should only be necessary at a future world administrative radio conference convened to undertake a general revision of the Radio Regulations;

recommends

1. that a future world administrative radio conference undertaking a partial revision of the Radio Regulations should use the spare marginal numbers only when it is appropriate to insert additional provisions at the end of articles;
2. that where it is necessary to insert one or more additional provisions within an article, supplementary alpha references should be used as a suffix to existing marginal numbers;
3. that when an existing provision is suppressed, the marginal number should not be re-used.

RECOMMENDATION No. 12

**Relating to the Convening of Future Administrative Radio
Conferences to Deal with Specific Services**

The World Administrative Radio Conference, Geneva, 1979,

noting

- a)* that item 2.10 of its terms of reference calls on the Conference to propose to the Administrative Council and to the Plenipotentiary Conference a programme for the convening of future administrative radio conferences to deal with specific services;
- b)* that several Resolutions and Recommendations of this Conference call for, or refer to, the convening of such future conferences;

considering

- a)* that, in drawing up a programme of future world administrative radio conferences, account needs to be taken of other conferences involving Members of the Union, including regional and sub-regional conferences, the Plenipotentiary Conference, and the meetings of the CCIR;
- b)* that conferences need to be spaced out sufficiently to allow adequate time for preparation for each conference by administrations and by the permanent organs of the Union;
- c)* that a number of individual subjects raised in the Resolutions and Recommendations referred to in *noting b)* should be treated by a competent conference and that it will be for the Administrative Council to take the necessary action at the appropriate time for each matter concerned to be included in the agenda of such a conference;

recommends that the Administrative Council and, as appropriate, the Plenipotentiary Conference

1. include the following world administrative radio conferences in the programme of future conferences:

- world administrative radio conference for the mobile services (see Resolution 202);
- world administrative radio conference for the planning of the HF bands allocated to the broadcasting service (see Resolution 508 and Recommendations 500 and 501);
- world administrative radio conference on the use of the geostationary-satellite orbit and the planning of space services utilizing it (see Resolution 3);

2. include the following regional administrative radio conferences, some of which are already arranged, in the programme of future conferences:

- final session, Region 2, medium frequency broadcasting conference (already arranged for November 1981);
- Region 2 broadcasting-satellite planning conference (already arranged for the second quarter of 1983 — see Resolution 701);
- planning conference for sound broadcasting in the band 87.5 - 108 MHz for Region 1 and certain countries concerned in Region 3 (see Resolution 510);
- conference to draw up agreements and associated plans for feeder links to broadcasting satellites operating in the 12 GHz band in Regions 1 and 3 (see Resolution 101);
- regional administrative radio conference to establish criteria for the shared use of the VHF and UHF bands allocated to fixed, broadcasting and mobile services in Region 3 (see Resolution 702);

- conference to revise the Plan annexed to the Copenhagen Convention, 1948, for the European Maritime Area – Region 1 (see also Recommendation 300 on this subject);
- conference to review and revise the provisions of the Final Acts of the African VHF/UHF Broadcasting Conference, Geneva, 1963 (see Resolution 509);
- planning conference for broadcasting in the band 1 605 - 1 705 kHz in Region 2 (see Recommendation 504);

3. take the necessary steps to convene each of these conferences as soon as practicable after the completion, in each case, of the necessary preparatory work, bearing in mind:

- a) the timing of the conferences, as expressed in the Recommendations and Resolutions mentioned in *recommends* 1 and 2;
- b) the need for the conferences to be adequately spaced so as to allow administrations and the permanent organs of the Union adequate time for preparation;
- c) the programme of planned or foreseen conferences, other than administrative radio conferences, involving Members of the Union;
- d) the resources which will need to be devoted by individual administrations and by the Union as a whole to the completion of this programme of conferences.

RECOMMENDATION No. 13

**Relating to a World Administrative Radio Conference
to Carry Out a General or Partial Revision of the
Radio Regulations**

The World Administrative Radio Conference, Geneva, 1979,

considering

that it has drawn up a programme of specialized world administrative radio conferences for the coming decade;

considering

the very rapid development of telecommunication technology and the consequences of the application of that technology, particularly with regard to the efficient use of the radio spectrum;

considering

the need for a general or partial revision of the Radio Regulations to ensure the harmonious development of several services not covered by the specialized conferences scheduled by this Conference;

recommends that the Administrative Council

consider, as from 1990, whether it is necessary to convene a world administrative radio conference to undertake a general or partial revision of the Radio Regulations.

RECOMMENDATION No. 30

Relating to International Monitoring¹

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the desirability of achieving a more effective use of the radio spectrum in order to assist administrations to satisfy their frequency 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 the radio spectrum;
- b) the provisions of the Radio Regulations (Geneva, 1979), under which the International Frequency Registration Board 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;
- c) that monitoring information should assist the Board in discharging that function;

recognizing

- a) that an international monitoring system cannot be fully effective unless it covers all areas of the world;
- b) that, at present, in certain areas of the world, monitoring facilities are either non-existent or insufficient to provide effective coverage;

¹ Replaces Recommendation No. 5 of the Administrative Radio Conference, Geneva, 1959.

invites the CCIR

in collaboration with the Board, to study and make technical recommendations concerning the additional facilities required to provide adequate coverage of the world with a view to implementing the Radio Regulations, more especially Articles 10, 11, 12, 13, 14 and 20;

and invites administrations

1. to make every effort to develop monitoring facilities as envisaged in Article 20 of the Radio Regulations bearing in mind the means which may be made available through the appropriate technical assistance organs of the United Nations;
2. to inform the Board of the extent to which they are prepared to cooperate in such monitoring programmes as may be requested by the Board.

RECOMMENDATION No. 31

**Relating to a Handbook for Computer-Aided
Techniques in Radio Frequency Management**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that, due to the growing demands on the radio frequency spectrum, there is a need to improve spectrum utilization;
- b)* that the solution of radio frequency management problems requires data storage, data retrieval, and analysis capabilities, and consequently is amenable to the application of computer methods;
- c)* that administrations are facing increasingly voluminous and complex tasks in radio frequency management;
- d)* that technological developments have made powerful computers and mini-computers available at reasonable cost;
- e)* that guidance is required by many administrations with respect to computer-aided techniques in radio frequency management;
- f)* that a certain degree of compatibility is desirable to facilitate coordination between administrations and the exchange of data with the IFRB;
- g)* that many administrations are interested in, and some are actively developing, computer systems for use in radio frequency management;
- h)* that the General Secretariat makes available computer resources and advice to all permanent organs of the Union and provides advice, as appropriate, to administrations;

recommends that the CCIR

1. prepare a handbook by 1982 describing the various aspects involved in applying computer-aided techniques to radio frequency management, discussing the approaches which have been made, providing guidelines for various levels of practical application and making recommendations for those aspects involving international cooperation;
2. periodically review and revise the handbook;

invites the General Secretariat and the IFRB

to participate in the preparation of this handbook.

RECOMMENDATION No. 60

Relating to the Technical Standards of the IFRB ¹

The World Administrative Radio Conference, Geneva, 1979,

recognizing

that the Technical Standards of the International Frequency Registration Board (IFRB) are in daily use in the technical examination of frequency assignment notices;

urges the CCIR

to expedite all phases of the programme of studies which will assist the IFRB in the further refinement of its Technical Standards;

and invites administrations,

in their participation in the work of the CCIR and its Study Groups, to give special priority to those studies.

¹ Replaces Recommendation No. 2 of the Administrative Radio Conference, Geneva, 1959.

RECOMMENDATION No. 61

**Relating to Technical Standards for the Assessment
of Harmful Interference in the Frequency Bands above 28 MHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the definition of harmful interference (No. 163 of the Radio Regulations), being of a qualitative nature, leads to a purely subjective estimation of the nuisance;
- b) that, for the accomplishment of its regulatory tasks, the IFRB has adopted in its Technical Standards, 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;

¹ Replaces Recommendation No. Spa2 – 12 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

noting

a) that the IFRB has been considering the maximum allowable values of interference given in the pertinent CCIR Recommendations to be values which ensure a satisfactory service;

b) that, however, the IFRB 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;

invites the CCIR

to continue to study this subject and to recommend the technical criteria for the frequency bands above 28 MHz, allocated to space radio-communication, radio astronomy, and the terrestrial radiocommunication services concerned, in order to enable the IFRB and administrations to apply such criteria for these bands.

RECOMMENDATION No. 62

**Supplementing the Additional Characteristics for
Classifying Emissions and Providing Additional Examples
for the Full Designation of Emissions,
Both as Given in Appendix 6¹**

The World Administrative Radio Conference, Geneva, 1979;

considering

- a)* that this Conference has adopted in Article 4 a new method for designating emissions based on CCIR Recommendation 507;
- b)* that an essential part of this new method is the classification of emissions;
- c)* that the new method of classifying emissions distinguishes between basic characteristics (first, second and third symbol) the use of which is mandatory, and additional characteristics (fourth and fifth symbol) the use of which is optional;
- d)* that the full classification of emissions consists of all of these five symbols;
- e)* that the list of the additional characteristics given in Appendix 6, Part A, may not be sufficiently complete to take account of future new technologies and may require relatively frequent supplementing;
- f)* that a CCIR Recommendation would provide a suitable means for such supplementing;

¹ Replaces Recommendation No. 8 of the Administrative Radio Conference, Geneva, 1959.

considering further

a) that a list of examples for the full designation of emissions is given in Appendix 6, Part B;

b) that this list, however, is not exhaustive and that for this reason No. 265 of the Radio Regulations stipulates that further examples may appear in the latest CCIR Recommendations and that these examples may also be published in the Preface to the International Frequency List;

invites the CCIR

1. to continue its studies on the classification of emissions with a view to supplementing the list of additional characteristics in order to cater for new technologies without, however, changing those additional characteristics which have already been agreed upon and which are contained in Appendix 6, Part A;

2. to provide examples for the full designation of emissions which are not contained in Appendix 6, Part B, also taking account of the supplementing mentioned in *invites 1* above;

requests the International Frequency Registration Board

to publish the supplementary additional characteristics and the additional examples mentioned in *invites 1* and *2* above in the Preface to the International Frequency List as soon as they are available in relevant CCIR Recommendations;

and recommends

that administrations use the additional characteristics referred to in *invites 1* above where appropriate.

RECOMMENDATION No. 63

**Relating to the Provision of Formulae and Examples
for the Calculation of Necessary Bandwidths**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that Article 4 of the Radio Regulations requires that the necessary bandwidth be part of the full designation of emissions;
- b)* that Appendix 6, Part B, 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 Appendix 6;
- 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 the CCIR

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 Appendix 6, Part B;

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2. study and provide values of supplementary K-factors required for the calculation of the necessary bandwidth for common classes of emission;

invites the IFRB

to publish examples of such calculations in the Preface to the International Frequency List.

RECOMMENDATION No. 64

**Relating to Protection Ratios and
Minimum Field Strengths Required ¹**

The World Administrative Radio Conference, Geneva, 1979,

recognizing

that the available information on protection ratios and minimum field strengths required for each one of the services needs further refinement in order to permit the most efficient planning of the use of the radio frequency spectrum;

invites the CCIR

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 Technical Standards used by the IFRB.

¹ Replaces Recommendation No. 3 of the Administrative Radio Conference, Geneva, 1959.

RECOMMENDATION No. 65

**Relating to the Technology for New Spectrum Sharing
and Band Utilization Schemes**

The World Administrative Radio Conference, Geneva, 1979,

recognizing

- a) that advances in technology, particularly digital radio techniques and new encoding, modulation and access schemes, are making practicable new sharing schemes that offer economical as well as technological advantages for increasing the efficiency of spectrum sharing and band utilization;
- b) that rapid advances are being made in the associated technology;

invites the CCIR

1. to carry out studies of the digital radio techniques and new encoding, modulation and access schemes; examples of areas for such studies are packet radiocommunication, spread-spectrum and multifunction techniques;
2. to develop new concepts in the use of a carrier on a time-sharing basis for different radiocommunication services, i.e. use of the same part of the spectrum by multiple services;
3. to submit Recommendations to appropriate future world administrative radio conferences relating to:
 - the technical criteria and specifications of the most efficient spectrum sharing schemes for the various services;
 - the technical and performance criteria for ensuring compatibility and interworking of systems;
 - the criteria on which to base spectrum management for these new technology systems.

RECOMMENDATION No. 66

**Relating to Studies of the Maximum
Permitted Levels of Spurious Emissions**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that Appendix 8 to the Radio Regulations 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, for the frequency bands below 17.7 GHz;
- b)* that the principal objective of Appendix 8 is to specify the maximum permitted levels of spurious emissions that, while being achievable, provide protection against harmful interference;
- c)* that excessive levels of spurious emissions may give rise to harmful interference;
- d)* that while Appendix 8 applies only to the mean power of the transmitter and the spurious emissions, there are a variety of emissions where the interpretation of the term "mean power" and its consequential measurement are difficult;
- e)* that whilst the CCIR is studying this problem, it has not yet furnished adequate Recommendations pertaining to Appendix 8 for frequency bands above 960 MHz;
- f)* that spurious emissions from transmitters operating in space stations may cause harmful interference, particularly in regard to intermodulation components from wide-band amplifiers which cannot be adjusted after launch;

g) that spurious emissions from earth stations also require particular study;

h) that no information is available from the CCIR regarding spurious emissions from stations employing digital modulation techniques in the frequency bands above 960 MHz;

noting

that in large metropolitan areas radio spectrum usage above 960 MHz is extensive and rapidly growing and that much of this growth in urban areas is now taking place above 10 GHz;

recommends that the CCIR

1. study as a matter of urgency the question of spurious emissions resulting from space services 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. 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 8;
3. establish appropriate measurement techniques for spurious emissions, including the determination of reference levels for wide-band transmissions as well as the applicability of reference measurement bandwidths;
4. study the categorizing of emissions and spurious emissions in terms of "mean power" and develop appropriate Recommendations to facilitate the interpretation and measurement of "mean power" as it applies to the various classes of emissions.

RECOMMENDATION No. 67

Relating to the Definitions of "Service Area" and "Coverage Area"

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the terms "service area" and "coverage area" are often used in the official texts of the ITU;
- b) that these two terms are used with the same meaning or with different meanings according to the different services;
- c) that there are no definitions of the terms "service area" and "coverage area" in Article 1 of the Radio Regulations;

noting

- a) that the term "service area" is already used in the texts of the Appendices 1, 3, 4, 5 and 25 of the Radio Regulations;
- b) that a definition of "service area" for broadcasting, based on the usable field strength, exists in CCIR Recommendation 499-1;
- c) that a definition very similar to that of Recommendation 499-1 is given in Annex 2 to the Final Acts of the Regional Administrative LF/MF Broadcasting Conference (Regions 1 and 3), Geneva, 1975;
- d) that a definition of "service area" for satellite broadcasting is given in Annex 8 to the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977. This definition is of an administrative nature. It is accompanied by a technical note, in which reference is made to an appropriate power flux-density and protection against interference based on the agreed protection ratio;

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e) that technical and administrative aspects are sometimes involved in the definition of “service area” and cannot easily be separated;

f) that a definition of “coverage area” for satellite broadcasting is given in the above-mentioned Annex 8, based on the value of a certain power flux-density which permits the wanted quality of reception in the absence of interference;

recognizing

that the existing definitions of “service area” and “coverage area” are related to the definitions of usable field strength or usable power flux-density, either in the presence or in the absence of interfering signals;

invites the CCIR

1. to specify a general definition for “coverage area”;
2. to specify the technical basis for a general definition of “service area” which takes into account the present usage of this term throughout all official ITU texts in order to enable future administrative conferences to determine the administrative aspects of such a definition.

RECOMMENDATION No. 68

**Relating to Studies and Prediction of Radio
Propagation and Radio Noise ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the efficient utilization of radio frequencies depends upon the use of the most reliable technical data and standards, especially in those parts of the radio frequency spectrum which are most congested;
- b)* that the satisfaction of new frequency requirements and the development of radiocommunication services can be facilitated by improvements, where these are necessary, in the Technical Standards at present used by the IFRB;
- c)* that former Appendix A of the Radio Regulations, 1968 edition, entitled "Studies and Prediction of Radio Propagation and Radio Noise", recognized the importance of radio propagation and radio noise data as vital for the maximum utilization of radio frequencies and efficient planning of radiocommunication services;
- d)* that a principal objective of that Appendix had been the establishment and operation of worldwide systems of observation stations to obtain data on radio noise and on ionospheric, tropospheric and other phenomena affecting radio propagation;

¹ Replaces Recommendation No. 4 of the Administrative Radio Conference, Geneva, 1959.

e) that administrations provide, by the best means possible, for the study, coordination and rapid dissemination of such data and of the predictions relating to these data; and endeavour as well to promote further studies on radio propagation and radio noise through the medium of the CCIR;

f) that the CCIR has adopted programmes of studies covering many of these problems;

g) that no radio propagation or radio noise measurements have been carried out in some parts of the world;

requests the CCIR

1. to encourage and assist in initiating the study of radio propagation and radio noise in those areas where an adequate system of observation stations has not yet been established;

2. to continue the studies of radio propagation and radio noise and to take measures for the coordination of the results of these studies carried out in different countries;

3. to give particular attention to those studies which will assist in the further refinement of the Technical Standards used by the IFRB;

4. to report regularly on these matters, even if the studies have not been completed;

5. to continue regular consultation with other organizations undertaking studies of propagation and radio noise, such as the International Scientific Radio Union, in order to attain the maximum possible degree of coordination;

recommends that administrations

1. initiate the study of radio propagation and radio noise in those areas where an adequate system of observation stations has not yet been established, and communicate the results of their studies to the CCIR;

2. continue to establish and to operate a worldwide system of observation stations to obtain data on radio noise and on ionospheric, tropospheric and other phenomena affecting radio propagation;
3. continue to provide, by the best means possible, for the study, coordination and rapid dissemination of such data and of the predictions relating to them;
4. take note, in formulating and carrying out their radio propagation and radio noise work, of the relevant CCIR Recommendations, Reports, Questions and Study Programmes, particularly regarding the conclusions so far reached, the planning of future studies and the recommended forms of presentation contained in these documents.

RECOMMENDATION No. 69

Relating to the Frequency Tolerances of Transmitters ¹

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that Appendix 7 to the Radio Regulations specifies the frequency tolerances for transmitters;
- b)* that the principal objective of Appendix 7 has been the reduction of frequency space required per channel by means of the tightening of frequency tolerances, and that in many cases considerable improvement in spectrum utilization can continue to be obtained by further tightening of frequency tolerances;
- c)* that for some services an improvement in frequency tolerance to the most stringent value possible in keeping with the state of the technique would be useful in order to increase the signal-to-noise ratio, improve intelligibility and reduce errors;
- d)* that in certain cases a more stringent frequency tolerance would not in practice increase the number of available channels;
- e)* that in particular frequency bands the frequency tolerances specified in Appendix 7 may already approach the minimum useful value for certain categories of station when using existing techniques and methods of operation;
- f)* that it will be of considerable assistance to administrations, in the future planning of services and provision of equipment, to know those frequency tolerances which can be considered to be the ultimate useful minimum value for stations when using existing techniques and methods of operation;

¹ Replaces Recommendation No. 1 of the Administrative Radio Conference, Geneva, 1959.

g) that in certain cases the achievement of more stringent frequency tolerances is subject to economic limitations, which should be known and taken into account;

invites the CCIR

1. to continue its study of frequency tolerances with a view to the reduction of the frequency space required for a given channel;
2. to consider whether or not in certain cases it is possible to predict ultimate values of tolerances, which it would not be necessary to make more stringent under currently known conditions of operation, and to state what these tolerance values might be;
3. to report upon the possibility of achieving such ultimate values of tolerances consistent with economic and design requirements and other practical considerations;
4. to indicate which, if any, of the tolerances specified in Appendix 7 have already attained these ultimate values.

RECOMMENDATION No. 70

Relating to Studies of the Technical Characteristics of Equipment ¹

The World Administrative Radio Conference, Geneva, 1979,

recognizing

that the available technical information concerning the various types of apparatus used for the reception of the different classes of emission in the several services needs to be more complete and more precise in order to permit the most efficient planning of the use of the radio frequency spectrum;

invites the CCIR

1. to continue to study, and to make Recommendations for the bandwidth, selectivity, sensitivity and stability characteristics of various types of apparatus used for the reception of the different classes of emission in the several services;
2. to continue to study practical methods of achieving the recommended characteristics;
3. to study the minimum practicable spacing between adjacent channels for the different classes of emission for the several services in the various bands;
4. to study other desirable conditions to be fulfilled by the complete systems employed by the different services in order to determine the required technical performance of the equipment, including the station terminal apparatus and the antennae;

¹ Replaces Recommendation No. 6 of the Administrative Radio Conference, Geneva, 1959.

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- 5. to study methods for determining whether the equipment satisfies the recommended requirements;**
- 6. to give particular attention to those studies which will assist in the further refinement of the Technical Standards used by the IFRB.**

RECOMMENDATION No. 71

Relating to the Standardization of the Technical and Operational Characteristics of Radio Equipment

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 CCIR, ICAO, IMCO, CISPR and the 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;

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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.

RECOMMENDATION No. 72

Relating to Terminology

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the discussions concerning certain technical terms and definitions in Article 1 have shown the existence of various problems which it has not been possible to settle in a fully satisfactory manner during this Conference;
- b) that technological development and modes of expression may call for the addition, amendment or possibly the deletion of particular definitions;

invites the CCIR and the CCITT,

each in its own field, to examine the definitions of technical terms in Article 1 and to propose any amendments they deem useful;

instructs the Secretary-General

to send the proposals prepared by the two organs to the administrative conferences concerned for consideration within the framework of their terms of reference.

RECOMMENDATION No. 73

Relating to the Use of the Term “Channel” in the Radio Regulations

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the term “channel” has been used extensively in the Radio Regulations in the frequency allotment plans of Appendices 16, 18, 25, 26, 27, 27 Aer2, 32, 33 and 34;
- b)* that the term “channel” has a different meaning in other provisions of the Radio Regulations and for the various radiocommunication services;
- c)* that there should not be any ambiguity in the meaning of the term “channel” in its usage throughout the Radio Regulations;

invites the CCIR

to define the term “channel” so that it may be used consistently and without confusion in the Radio Regulations in all working languages of the ITU.

RECOMMENDATION No. 74

**Relating to the Use of the Rationalized
"Système International d'Unités" (SI) ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that many difficulties associated with older systems of units are remedied by the SI system;
- b) that the International Organization for Standardization has approved the SI system and recommends it for general adoption;

recognizing

- a) that the SI system, already adopted by many international organizations, is recommended by the CCIR and the CCITT and widely used by the permanent organs of the Union;
- b) that the SI system has the status of a national standard in many countries;
- c) that, in countries where the SI system has not yet been adopted as the national standard, the SI system is also widely used by radio engineers, scientists and authors of radio publications;
- d) that the use of the SI system is continuing to spread in all parts of the world;

recommends

that administrations should use the SI system in their relations with the Union and its organs.

¹ Replaces Recommendation No. 9 of the Administrative Radio Conference, Geneva, 1959.

RECOMMENDATION No. 100

**Relating to Preferred Frequency Bands for Systems
Using Tropospheric Scatter**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971, requested the CCIR to study the preferred frequency bands for tropospheric scatter systems and proposed that a future world administrative radio conference should consider this matter;
- b)* the technical and operational difficulties pointed out by the CCIR (Report of the Special Preparatory Meeting, Geneva, 1978) in the bands shared by tropospheric scatter systems, space systems and other terrestrial systems;
- c)* the additional allocation of frequency bands which this Conference has made for the space services in view of their increasing development;
- d)* that the IFRB 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. 763, 2560 and 2564);

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 the space systems is bound to aggravate an already difficult situation;

recommends that the CCIR

1. continue studies, as a matter of urgency, of the frequency bands presenting more appropriate propagation features for systems using tropospheric scatter;
2. continue studying the possibilities and criteria for sharing between systems using tropospheric scatter and other systems, particularly space systems;
3. prepare, on the basis of these studies, and if possible before its next Plenary Assembly, a Recommendation concerning the specific frequency bands found preferable for such systems. The choice of these bands should take into account allocations to other services, particularly allocations to the space services;

recommends that administrations

1. collaborate with the CCIR, as a matter of urgency and within the limits of their possibilities, by sending it contributions relating to the aforementioned studies;
2. for the assignment of frequencies to new stations in systems using tropospheric scatter, take into account the latest information prepared by the CCIR to ensure that systems established in the future use a limited number of certain frequency bands;
3. in frequency assignment notifications to the IFRB, indicate expressly whether they relate to stations of tropospheric scatter systems;

invites the Administrative Council

to make the necessary arrangements for a future world administrative radio conference to consider the frequency bands of the fixed service which shall be used in preference by the new tropospheric scatter systems, taking into account the allocations to the space radiocommunication services and the relevant CCIR Recommendations.

RECOMMENDATION No. 101

**Relating to Feeder Links for the
Broadcasting-Satellite Service¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the need for ample information on the characteristics of feeder links for planning the broadcasting-satellite service;
- b) the studies being pursued by the CCIR under the appropriate Study Programme;
- c) that the carrier-to-noise ratios for the feeder links to broadcasting satellites should be of the order of ten times greater than those for the down-links;
- d) that, as regards feeder link interference between broadcasting satellites at different orbital positions, adequate up-link protection ratios (approximately 10 dB greater than those in the down-link) would appear to be readily achievable by antenna pattern discrimination in earth station transmitting antennae which would clearly have to be larger in diameter than the receiving antennae used in the down-links;

¹ Replaces Recommendation No. Sat - 5 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

e) that, where planning is based on isolation parameters such as radiation patterns for space station transmitting antennae, carrier interleaving, or polarization discrimination in meeting the down-link carrier-to-interference requirements between service areas served from a single orbital position, the increased carrier-to-interference requirements in the up-links serving the satellite(s) at that same orbital position will have to use the same isolation parameters, provided that this produces an improvement of about 10 dB in net isolation. The characteristics of the transmitting earth station will clearly not affect this isolation, apart from the purity of their on-beam polarization;

f) that in the implementation of broadcasting-satellite systems, consideration must be given to all aspects of associated space operation service functions (tracking, telemetry, telecommand and ranging) in connection with the operation of broadcasting satellites;

invites the CCIR

1. to continue the study of those radiation characteristics of receiving antennae of space stations in the broadcasting-satellite service which, singly or in combination with other means of discrimination, would give the necessary protection ratios for the feeder links of systems in the broadcasting-satellite service for (a) satellite(s) occupying a given position in the geostationary-satellite orbit;

2. to continue the study of those polarization characteristics of receiving antennae of space stations in the broadcasting-satellite service which, singly or in combination with other means of discrimination, would give the necessary protection ratios for the feeder links of systems in the broadcasting-satellite service for (a) satellite(s) occupying a given position in the geostationary-satellite orbit;

3. to continue the study of the technical feeder link characteristics required to implement the Plan for this service;

4. to study the technical and design characteristics and requirements which affect the provision of "space operation service functions" of space stations in the broadcasting-satellite service;
5. to study the requirements for adjacent-channel isolation in feeder links for (a) satellite(s) in the broadcasting-satellite service occupying a given position in the geostationary-satellite orbit.

RECOMMENDATION No. 102

**Relating to the Study of Modulation Methods
for Radio-Relay Systems in Relation to Sharing
with Fixed-Satellite Service Systems ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that Article 8 of the Radio Regulations permits the sharing of certain frequency bands by the fixed-satellite service and the fixed service;
- b)* that the sharing criteria to avoid mutual interference between the stations in these two services have been established in Articles 27 and 28;
- c)* that among many factors of overall efficiency of utilization of frequency bands it seems that the reduction of interference between two services is most important;

noting

- a)* that the overall efficiency of utilization of the frequency bands shared by the two services depends on the methods of modulation used by the systems concerned;
- b)* that studies of the preferred modulation characteristics for fixed-satellite service systems are to be carried out under Study Programme 2D-1/4 of the CCIR;

¹ Replaces Recommendation No. Spa 4 of the Extraordinary Administrative Radio Conference, Geneva, 1963.

recommends that the CCIR

should study especially, under the general framework of Question 2-3/4, modulation methods (such as pulse-code modulation using phase or frequency modulation) in particular for line-of-sight radio-relay systems in relation to sharing with fixed-satellite service systems.

RECOMMENDATION No. 103

**Relating to Carrier Energy Dispersal in Systems
in the Fixed-Satellite Service¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that use of carrier energy dispersal techniques in systems in the fixed-satellite service can result in a substantial reduction of interference to stations of a terrestrial service operating in the same frequency bands;
- b)* that the use of such techniques can result in a substantial reduction in the level of interference between systems in the fixed-satellite service operating in the same frequency bands and in a corresponding increase of efficiency in the utilization of the geostationary-satellite orbit;
- c)* that such techniques are being regularly and successfully employed in systems in the fixed-satellite service without noticeable deterioration of the quality of operation;

recommends

1. that systems in the fixed-satellite service employing angle modulation by analogue signals should use carrier energy dispersal techniques as far as is practicable with a view to spreading energy at all times and in a manner consistent with the satisfactory operation of the systems;
2. that systems in the fixed-satellite service employing digital modulation should use carrier energy dispersal techniques when this becomes technically feasible and is practical.

¹ Replaces Recommendation No. Spa2 – 11 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

RECOMMENDATION No. 200

**Relating to the Date of Entry into Force of the
10 kHz Guardband for the Frequency 500 kHz in
the Mobile Service (Distress and Calling)**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the radio frequency spectrum should be used in the most efficient way possible;
- b) that this Conference has adopted a guardband from 495 kHz to 505 kHz for the frequency 500 kHz, which is the international distress and calling frequency in radiotelegraphy in the mobile service;

recognizing

- a) that an adequate amortization period should be allowed for the radio equipment currently in service;
- b) that technical progress has led to the production of more stable and reliable equipment;

recommends

that the next competent world administrative radio conference decide on the date of entry into force of this new arrangement;

requests the Secretary-General

to forward this Recommendation to the Inter-Governmental Maritime Consultative Organization (IMCO) with a request to examine this subject as part of its study of the maritime distress and safety system and to submit to the above-mentioned conference a recommendation relating to the date of entry into force of the new guardband.

RECOMMENDATION No. 201

Relating to Distress, Urgency and Safety Traffic ¹

The World Administrative Radio Conference, Geneva, 1979,

having noted

that the Inter-Governmental Maritime Consultative Organization (IMCO):

- a)* has adopted a Resolution ² on the subject of the maritime distress system;
- b)* has under development a future global maritime distress and safety system, proposed improvements for the near future and the definition of requirements and proposed transitional measures for the distant future;

further noting

that studies having a bearing upon distress and safety measures as part of a maritime-satellite radiocommunication system form the subject of CCIR Questions and Study Programmes;

considering

- a)* that the IMCO requirement for the possible future fitting of automatic distress alerting, followed by the automatic transmission of additional information concerning the distress case, is of particular importance;

¹ Replaces Recommendation No. **Mar2** – 16 of the World Maritime Administrative Radio Conference, Geneva, 1974.

² IMCO Resolution A.420 (XI).

- b) that automatic distress alerting, followed by the automatic transmission of additional information concerning the distress case, should take place on one or more frequencies reserved for distress traffic;
- c) that adequate frequencies must be made available for associated requirements for safety calling and communications;
- d) that the transmission and the recorded reception of distress, urgency and safety messages should be able to take place without interruption and irrespective of human attendance;

recommends

1. that IMCO be invited to continue its studies with a view to early implementation of the future distress system;
2. that the CCIR continue its studies to determine the role of maritime-satellite radiocommunications in a coordinated distress system as well as in safety applications;
3. that administrations consider, in the light of continuing technological developments, the need to reserve one or possibly more frequencies for distress purposes;
4. that administrations consider, in the light of advancing techniques, the introduction of more automated telecommunication systems for the dissemination of distress, urgency and safety messages on a continuous basis, to replace Morse telegraphy and possibly radiotelephony;
5. that administrations have as an objective the taking of a decision in this matter at the next competent world administrative radio conference.

RECOMMENDATION No. 202

**Relating to the Improvement of Protection of Distress and Safety
Frequencies, and Those Related to Distress and Safety,
Against Harmful Interference**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* the importance of minimizing the danger of harmful interference to frequencies used for the safeguarding of human life;
- b)* the unanimous agreement by this Conference, in its consideration of Article 18 concerning interference, that improved protection against harmful interference should be given to distress and safety frequencies and those related to distress and safety;
- c)* that such improved protection could be achieved, *inter alia*, by including provisions in the Radio Regulations ensuring that all tests on these frequencies should be carried out on artificial antennae or with reduced power, wherever practicable;
- d)* that these provisions pertain to Article 38 concerning frequencies for distress and safety;

noting, however,

that this Conference is not competent to revise Article 38;

invites administrations

to study this matter and to submit proposals for consideration by the next competent world administrative radio conference.

RECOMMENDATION No. 203

Relating to the Future Use of the Band 2 170 - 2 194 kHz

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the frequency 2 182 kHz is the international distress frequency for radiotelephony;
- b) that, except for transmissions authorized on the carrier frequency 2 182 kHz, all transmissions on the frequencies between 2 173.5 kHz and 2 190.5 kHz are forbidden;
- c) that, in Region 1, the adjacent bands 2 170 - 2 173.5 kHz and 2 190.5 - 2 194 kHz are used, respectively, by coast stations calling ship stations (including selective calling), and by ship stations calling coast stations;

noting

- a) that this Conference has amended the Table of Frequency Allocations in order to reduce the guardband around the frequency 2 182 kHz to ± 8.5 kHz and has allocated the bands 2 170 - 2 173.5 kHz and 2 190.5 - 2 194 kHz exclusively to the maritime mobile service on a worldwide basis;
- b) that a need now exists to replan the entire band 2 170 - 2 194 kHz and to review the regulatory provisions, with particular reference to Articles 38 and 60;

recommends

that the next competent world administrative radio conference be invited:

1. to examine the allocations within the band 2 170 - 2 194 kHz;

2. to review the relevant technical and operational parameters with a view to reducing further the guardband around the frequency 2 182 kHz;
3. to develop any necessary regulatory provisions;
4. to develop from these considerations plans for the implementation of any new arrangement;
5. to determine the date of coming into force of such plans and provisions;

requests the Secretary-General

to send a copy of this Recommendation to the Secretary-General of the Inter-Governmental Maritime Consultative Organization (IMCO) for study by the competent body and for making recommendations;

invites administrations

to study this matter and to submit proposals for consideration by the next competent world administrative radio conference.

RECOMMENDATION No. 204

**Relating to the Application of Chapters NX, NXI and NXII
of the Re-Arranged Radio Regulations ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the Radio Regulations provide the basic regulatory framework for all the mobile services and that the provisions of the Radio Regulations should correspond as closely as possible with the needs and operational realities of these services;
- b) that this Conference has adopted the Re-Arrangement of the Radio Regulations as proposed by the Group of Experts, taking into account proposals made by a number of administrations for further refinement of the Re-Arrangement;
- c) that the separation of the previous mobile service provisions into specific chapters dealing with individual mobile services has highlighted certain anomalies in relation to each of the mobile services, and particularly in their applicability to the aeronautical mobile service and the land mobile service;
- d) that certain of these anomalies raise substantive operational issues with which this Conference is not competent to deal;
- e) that the aeronautical mobile service is concerned with the communications to ensure safe and regular operation of aircraft;
- f) that towards this objective the International Civil Aviation Organization has agreed upon standards and recommended practices adapted to the needs of aircraft operation which have been proven in practice and are well established in current use;

¹ Chapters X, XI and XII of the Radio Regulations.

recommends

that the next competent world administrative radio conference revise Chapters NX, NXI and NXII¹ to bring them into accord with the current needs and practices of the services concerned;

instructs the Secretary-General

to communicate the text of this Recommendation to ICAO and IMCO and to request the attention of these organizations to a study of the material contained in Chapters NX and NXI², respectively, with a view to assisting administrations in their preparations for that conference.

¹ Chapters X, XI and XII of the Radio Regulations.

² Chapters X and XI of the Radio Regulations.

RECOMMENDATION No. 300

**Relating to Planning the Use of Frequencies by the
Maritime Mobile Service in the Band 435 - 526.5 kHz in Region 1**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the allocations to the maritime mobile service in the 415 - 526.5 kHz band have been modified by this Conference;
- b) that this Conference has adopted Recommendations **200** and **309** concerning this band;
- c) that certain technical standards used in the maritime mobile service have been revised by this Conference;
- d) that some of the technical standards upon which the Assignment Plan for European countries contained in the Final Acts of the European Maritime Conference, Copenhagen, 1948, was based, have become out-of-date;
- e) that ships using frequencies within this band travel worldwide;
- f) that some countries have already assigned frequencies for other services operating in this band that may place constraints on the planning for the maritime mobile service;
- g) that there is consequently a need for detailed examination regarding the use and planning of this band which takes into account the latest technical developments and standards;

noting

that this Conference has recommended the convening of an administrative radio conference for the mobile services;

recommends that the Administrative Council

ensure that the conference for mobile services is competent to take decisions regarding the planning and use of frequencies in this band in Region 1;

requests the CCIR

to undertake, as a matter of urgency, the study of the technical and operational aspects of these matters including the need for criteria for sharing with other services;

invites

1. *the Secretary-General* to send this Recommendation to the Inter-Governmental Maritime Consultative Organization (IMCO) with a request for the urgent consideration of the operational requirements for the maritime mobile service using this frequency band, and to make such recommendations as may be appropriate;
2. *administrations of Region 1* to study this matter and to submit proposals for consideration by the conference for mobile services.

RECOMMENDATION No. 301

**Relating to Planning for the Use of Frequencies in the
Bands Between 1 606.5 kHz and 3 400 kHz Allocated to the
Maritime Mobile Service in Region 1**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the allocations to the maritime mobile service in the bands between 1 606.5 kHz and 3 400 kHz have been modified by this Conference;
- b)* that this Conference has adopted Recommendation 203 and Resolution 38 concerning these bands;
- c)* that it is desirable to achieve the most efficient use of these bands in the implementation of the revised Table of Frequency Allocations;
- d)* that ships using frequencies within these bands travel worldwide;
- e)* that existing plans are limited to regional use;
- f)* that there is consequently a need for detailed examination regarding the use and planning of these bands;

noting

that this Conference has recommended the convening of an administrative radio conference for the mobile services;

recommends that the Administrative Council

ensure that the conference for mobile services is competent to take decisions regarding planning and use of frequencies in these bands in Region 1;

requests the CCIR

to undertake, as a matter of urgency, the study of the technical and operational aspects of these matters including the need for criteria for sharing with other services;

invites

1. *the Secretary-General* to send this Recommendation to the Inter-Governmental Maritime Consultative Organization (IMCO) with a request for the urgent consideration of the operational requirements for the maritime mobile service using these frequency bands, and to make such recommendations as may be appropriate;

2. *administrations of Region 1* to study this matter and to submit proposals for consideration by the conference for mobile services.

RECOMMENDATION No. 302

**Relating to the Improved Use of the HF Radiotelephone
Channels for Coast Stations in the Bands Allocated Exclusively
to the Maritime Mobile Service ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that a large number of requests for HF radiotelephony allotments was submitted to the World Maritime Administrative Radio Conference, Geneva, 1974;
- b)* that the number of channels resulting from the revision of Appendix 16 is not sufficient to satisfy these requirements in optimum conditions;
- c)* that the resulting sharing patterns have been formed mainly by operational considerations;
- d)* that after the present Conference the optimal use of the HF radiotelephony channels in the bands allocated exclusively to the maritime mobile service will be of even greater importance;
- e)* that, on each channel, administrations should afford one another an equivalent quality of service;
- f)* that the efforts to develop technical means to facilitate the common use of frequencies by neighbouring coast stations of different administrations, or by a coast station operating on behalf of more than one administration, should be continued;

¹ Replaces Recommendation No. Mar2 - 7 of the World Maritime Administrative Radio Conference, Geneva, 1974.

recommends that administrations

1. make every effort to reach mutually satisfactory operational arrangements, which may include:
 - different time-sharing arrangements;
 - differentiated hours of opening;
 - on a voluntary and regional basis, the use of HF radiotelephone channels in an order of overflow priority;
2. employ every practicable means, which may include those mentioned above, to ensure that the best possible use is made of the HF coast radiotelephone channels in the bands allocated to the maritime mobile service;

invites administrations

1. when assigning frequencies in the HF bands to coast stations, to take into account the special rules contained in No. 954 and the provisions of No. 1804 of the Radio Regulations;
2. to ensure that coast stations:
 - use the frequency band and the minimum power appropriate to the propagation conditions and the nature of the service;
 - use directional antennae whenever possible;
 - give appropriate instructions to ship stations in accordance with No. 5056 of the Radio Regulations;

invites the CCIR

to continue its study with a view to improving all technical and operational sharing criteria relating to the use of HF coast radiotelephone channels in the bands allocated exclusively to the maritime mobile service, including the choice of available channels by electronic or other means to facilitate multiple access to the channels.

RECOMMENDATION No. 303

**Relating to the Use of the Carrier Frequencies 4 125 kHz
and 6 215.5 kHz to Supplement the Carrier Frequency 2 182 kHz
for Distress and Safety and for Call and Reply Purposes
in the Zone of Regions 1 and 2 South of Latitude 15° N,
but Including Mexico, and in the Zone of Region 3
South of Latitude 25° N¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that in some areas of the world it is not practicable to provide reliable coverage for distress and safety purposes on the international radiotelephony distress frequency 2 182 kHz, because of the great distances between coast stations keeping watch on this frequency;
- b) that a large number of ships equipped only for radiotelephony make voyages in these areas during which they are often out of range of coast stations keeping watch on the carrier frequency 2 182 kHz;
- c) that to overcome this problem many administrations in the above-mentioned zones have established watches at their coast stations for distress and safety and for call and reply purposes on the carrier frequencies 4 125 kHz and 6 215.5 kHz; and that these watches have proved to be effective supplements to those kept on 2 182 kHz;
- d) that provision is made in the Radio Regulations for the carrier frequency 4 125 kHz to be used in the zone of Regions 1 and 2 south of latitude 15° N, including Mexico, and in the zone of Region 3 south of latitude 25° N and also for the carrier frequency 6 215.5 kHz to be

¹ Replaces Recommendation No. Mar2 - 4 of the World Maritime Administrative Radio Conference, Geneva, 1974.

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used in the zone of Region 3 south of latitude 25° N as supplementary frequencies to 2 182 kHz for distress and safety and for call and reply purposes;

e) that it could be in the interests of ships equipped only for radiotelephony and operating in these zones to have facilities to send and receive on the carrier frequencies 4 125 kHz and 6 215.5 kHz when calls on 2 182 kHz might be ineffective;

recommends

1. that administrations bring to the notice of the operators of ships under their jurisdiction which are equipped only for radiotelephony that certain land stations as indicated in the List of Coast Stations provide facilities for distress and safety and for call and reply purposes on the carrier frequency 4 125 kHz to supplement the carrier frequency 2 182 kHz in the zone of Regions 1 and 2 south of latitude 15° N, including Mexico, and in the zone of Region 3 south of latitude 25° N and also for the carrier frequency 6 215.5 kHz to be used in the zone of Region 3 south of latitude 25° N;

2. that administrations whose ships are equipped only for radiotelephony consider that, although it is not mandatory for ship and coast stations to provide facilities for sending and receiving on the carrier frequencies 4 125 kHz and 6 215.5 kHz, it may be essential for the safety of radiotelephony ships operating in the above-mentioned zones to have such facilities.

RECOMMENDATION No. 304

**Relating to the Frequencies in Appendix 16, Section B,
of the Radio Regulations, Provided for Worldwide Use by
Ships of All Categories and by Coast Stations ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the frequencies indicated in the table of single-sideband transmitting frequencies for simplex (single-frequency) operation and for inter-ship cross-band (two-frequency) operation are not yet in worldwide use for communications between ship and coast stations;
- b) that there is a worldwide need for ocean-going vessels to be able to communicate with coast stations of any administration;

recommends

that, as far as possible, administrations provide a service on these frequencies at their main coast radiotelephone stations and notify to the Secretary-General the particulars of these services for publication in the List of Coast Stations.

¹ Replaces Recommendation No. Mar2 - 6 of the World Maritime Administrative Radio Conference, Geneva, 1974.

RECOMMENDATION No. 305

**Relating to the Use of Channels 15 and 17 of Appendix 18
by On-Board Communication Stations¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that channels 15 and 17 of Appendix 18 were provided by the World Administrative Radio Conference, Geneva, 1967, for use for internal operational communications on board ships within territorial waters and with an effective radiated power not in excess of 0.1 W, and that this power limit was raised to 1 W by the World Maritime Administrative Radio Conference, Geneva, 1974;
- b) that considerable use is made of these channels by a number of administrations;
- c) that some administrations have not used these channels for on-board communication because of the shortage of VHF channels for other maritime mobile needs;
- d) that, for the same reason, these administrations wish to have the use of these channels for on-board communication discontinued;
- e) that the present Conference has retained the relevant provisions in the Table of Frequency Allocations;

noting

that the CCIR has adopted Recommendation 542 and Report 589-1;

¹ Replaces Recommendation No. Mar2 – 11 of the World Maritime Administrative Radio Conference, Geneva, 1974.

recognizing

- a) that several common channels for on-board communication are necessary internationally to meet worldwide requirements in the future;
- b) that there may be a need for frequencies to provide for the use of repeater stations on large vessels, such as container ships, tankers, etc.;
- c) that additional experience concerning the application and effectiveness of the UHF channels maintained for this purpose by the present Conference may be required;

recommends

1. that the next competent world administrative radio conference determine whether the use of channels 15 and 17 of Appendix 18 is still necessary for on-board communication and, if it is not, the date by which such use should cease;
2. that the same conference review the UHF channels being used for on-board communication stations to determine whether the number of channels and their location in the radio spectrum are satisfactory and meet the requirements of such stations;
3. that the same conference consider the need for additional allocations for use by on-board communication stations on a worldwide basis, including the territorial waters of all countries;
4. that due consideration be given by administrations to the technical standards and functioning of such stations to ensure their mutual compatibility in an effective international system of operation.

RECOMMENDATION No. 306

**Relating to the Establishment of a Watch by Coast Stations
for Distress Purposes on the Frequency 156.8 MHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the frequency 156.8 MHz has been designated as the international distress frequency for stations in the maritime mobile service operating in the authorized bands between 156 MHz and 174 MHz;
- b)* that this frequency is most useful for short-range communication and its use in distress situations will materially improve the safety of life at sea, particularly in areas of heavy traffic where an efficient listening watch can be maintained;
- c)* that many administrations already provide radio coverage of their coasts on frequencies in the band 156 - 174 MHz;
- d)* that, however, it would be impracticable or unnecessary for some administrations in their prevailing circumstances to provide sufficient coverage of their coasts in the band 156 - 174 MHz to enable an effective watch to be kept on 156.8 MHz for distress purposes;

recommends

that administrations, where they consider it necessary and practicable, take steps to establish a watch for distress purposes on the coasts of their countries on the frequency 156.8 MHz.

¹ Replaces Recommendation No. Mar2 - 10 of the World Maritime Administrative Radio Conference, Geneva, 1974.

RECOMMENDATION No. 307

**On the Choice of a Frequency in the Maritime
Mobile Bands Between 1 605 kHz and 3 800 kHz
to Be Reserved for Safety Requirements¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

a) that MF radiotelephony is of increasing usefulness for the safety of ships since:

- i) the International Convention on Safety of Life at Sea (London, 1960) requires that cargo ships of 300 tons gross tonnage and upwards but less than 1 600 tons gross tonnage, unless fitted with a radiotelegraph station, shall be fitted with a radiotelephone station;
- ii) the Inter-Governmental Maritime Consultative Organization (IMCO) recommends² that ships compulsorily fitted with either a radiotelegraph (i.e. 1 600 tons gross tonnage and upwards) or a radiotelephone installation shall have in addition facilities for listening continuously, while at sea, on the radiotelephone distress frequency; that the fitting of radiotelegraph ships with a radiotelephone transmitter capable of operating in the 2 MHz band should be encouraged; and that each administration should consider introducing a national requirement that ships to which the Convention on Safety of Life at Sea (London, 1960) does not apply should be fitted with a radiotelephone distress frequency watch receiver;

¹ Replaces Recommendation No. Mar2 – 2 of the World Maritime Administrative Radio Conference, Geneva, 1974.

² IMCO Resolution A.217 (VII).

- b) that, notwithstanding, in many areas the watch on the MF radiotelephone distress frequency is very difficult because of the large number of routine traffic calls sent on that frequency;
- c) that similar difficulties would occur even if watch and alarm systems more advanced than those used at present were adopted;
- d) that in some areas MF radiotelephone traffic is constantly increasing;

invites the CCIR

to undertake, as a matter of urgency, the study of the technical and operational aspects of these matters;

recommends

that the next appropriate world administrative radio conference determine, in the light of the results of the work of the CCIR:

1. a frequency reserved for transmitting — to the exclusion of any routine traffic calls — distress calls and messages and, possibly, urgency signals and messages, safety signals and certain safety messages;
2. a frequency, different from the preceding, for voice or selective calling for routine traffic;
3. suitable guardbands for both these frequencies.

RECOMMENDATION No. 308

**Relating to the Designation of Common Frequencies
in the Medium Frequency Bands for Use by
Coast Radiotelephone Stations for
Communicating with Ships of Other Nationalities ¹**

The World Administrative Radio Conference, Geneva, 1979,

noting

- a)* that, on small ships fitted with single-sideband equipment, a crystal-controlled fixed frequency receiver is essential to facilitate correct tuning;
- b)* that, if such ships make international voyages and communicate with coast stations of other nationalities, they need to be provided with a considerable number of additional crystals;
- c)* that, by reducing the number of receiver crystals required, the cost of single-sideband receivers can be kept to a satisfactory level;

considering

- a)* that international working frequencies should be assigned to all coast stations for working with ships of other nationalities, without precluding their use for national purposes;

¹ Replaces Recommendation No. Mar 5 of the World Administrative Radio Conference, Geneva, 1967.

b) that, according to the Master International Frequency Register, no frequencies appear to be available for common use by all coast stations for working with ships of other nationalities, either on a worldwide or on a regional basis;

recommends

- 1. that administrations study this question at the earliest opportunity with a view to formulating proposals for consideration by the next administrative radio conference competent to deal with the matter;**
- 2. that, in the meantime, countries should explore the possibility of concluding regional, bilateral or multilateral arrangements to provide common frequencies for coast stations working with ship stations of other nationalities.**

RECOMMENDATION No. 309

**Relating to the Designation of a Frequency in the Band
435 - 495 kHz or 505 - 526.5 kHz (525 kHz in Region 2) on a
Worldwide Basis for the Transmission by Coast Stations
of Navigational and Meteorological Warnings to Ships,
Using Narrow-Band Direct-Printing Telegraphy**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that for the purpose of improving the existing provisions of the present maritime distress and safety system the Inter-Governmental Maritime Consultative Organization (IMCO) has recommended¹ that administrations should introduce narrow-band direct-printing telegraphy broadcasts for the purpose of promulgating navigational and meteorological warnings to shipping;
- b)* that such transmissions would enhance the safety of life at sea;
- c)* that the CCIR has recommended² an automated direct-printing telegraph system for transmission of navigational and meteorological information to ships;
- d)* that in some countries in Europe, administrations are already providing such transmissions on an experimental basis, using the frequency 518 kHz;
- e)* that a number of administrations have proposed to this Conference that the frequency 518 kHz be designated on a worldwide basis for this purpose;

¹ See IMCO Resolution A.420 (XI).

² See CCIR Recommendation 540.

f) that this Conference considers this to be a matter for the next competent world administrative radio conference;

g) that there is a continuing need for transmission of navigational and meteorological warnings to ships by means of normal Morse telegraphy;

recommends

that the next competent world administrative radio conference should consider this matter and take action as required to designate a suitable international frequency for the purpose of promulgating navigational and meteorological warnings to shipping using narrow-band direct-printing telegraphy, whilst maintaining provisions for the continuation of existing normal Morse telegraphy for promulgating such warnings;

invites administrations

to study this matter with a view to submitting appropriate proposals to the next competent world administrative radio conference;

requests the Secretary-General

to send this Recommendation to the Inter-Governmental Maritime Consultative Organization (IMCO) with a request to continue its study on this matter and to make such recommendations as may be desirable.

RECOMMENDATION No. 310

**Relating to an Automated UHF Maritime Mobile
Radiocommunication System**

The World Administrative Radio Conference, Geneva, 1979,

recognizing

- a)* the continued growth of world population and the associate need for safe and efficient transportation of foodstuffs and other essential goods;
- b)* the need for a rapid and effective worldwide economic growth;
- c)* that the maritime fleets are increasingly engaged in trade and these fleets are growing substantially;

considering

- a)* that the international maritime mobile VHF band (Appendix 18) has become congested in many areas of the world;
- b)* that the future requirements for additional UHF radio telephone channels for port operations, ship movements and public correspondence in the maritime mobile service have been estimated to be as many as 200 to 240 duplex channels in some congested areas;
- c)* that it is highly desirable for the UHF maritime and other international mobile public correspondence systems to become fully automated to ensure the efficient utilization of the channels and the economic operation of the services, to the benefit of the users;

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- d)* that standardization is of great importance in the international mobile services;
- e)* that administrations may wish to use some or all of the channels designated for maritime use for other automated mobile services. Examples of such usage are joint or combined radiocommunications in ports, waterways and adjacent piers. In other areas where there is no need for mobile services, these channels could be used for other radio services;

noting

- a)* CCIR Report 587-1 on this subject in response to Question 23-2/8;
- b)* CCIR Decision 30 directing Interim Working Party 8/5 to study this subject further on the basis of Question 23-2/8, taking into account the results of studies in Report 587-1;
- c)* Inter-Governmental Maritime Consultative Organization (IMCO) COM Circular 73 stating short-range telecommunications requirements for 10 MHz of bandwidth for automated international maritime services;

recommends

that the next competent world administrative radio conference:

1. designate suitable bands having sufficient spectrum for a maritime mobile radiocommunication system, including public correspondence, from those allocated on a worldwide basis to the mobile service;
2. identify the means for establishing, as required, regional assignment plans which take into account the worldwide needs of the maritime mobile service and allow for compatibility with other radio services;

invites the CCIR

1. to study, as a matter of urgency, bands which are preferred from operational and sharing aspects and to issue a Recommendation or a Report before the next competent world administrative radio conference;
2. to study, in consultation with the CCITT, the technical and operational aspects of an integrated and automated maritime and land mobile system;

requests the Secretary-General

to communicate this Recommendation to the Inter-Governmental Maritime Consultative Organization (IMCO) for consideration and comments.

RECOMMENDATION No. 311

**Relating to the Introduction of an Additional Tone
after the Radiotelephone Alarm Signal Transmitted by
Coast Stations ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that coast stations receive numerous radiotelephone alarm signals which cannot be identified because no voice announcement follows the alarm or because the announcement is unintelligible owing to low modulation or interference;
- b) that coast stations have an obligation to take action to identify all alarm signals received and to alert search and rescue services for subsequent action;
- c) that many radiotelephone alarm signals which precede the MAYDAY RELAY announcement are from coast stations at considerable distances from the receiving coast stations;
- d) that it could be of considerable value if the radiotelephone alarm signal transmitted by coast stations were distinguishable from that transmitted by ship stations;

recognizing

- a) that no characteristics introduced to distinguish the radiotelephone alarm signal transmitted by coast stations from that transmitted by ship stations should affect the normal reception of the radiotelephone alarm signal;

¹ Replaces Recommendation No. Mar2 - 5 of the World Maritime Administrative Radio Conference, Geneva, 1974.

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- b) that proposals were made to the World Maritime Administrative Radio Conference, Geneva, 1974, to add a single tone following the radiotelephone alarm signal transmitted by coast stations, and that practical tests conducted in the North Sea area during that Conference indicated a 1 300 Hz tone for a period of 10 seconds to be suitable;
- c) that the cost of the necessary changes to existing equipment on coast stations would probably be small;

recommends

that the radiotelephone alarm signal transmitted by coast stations be followed by a single tone of 1 300 Hz, for a period of 10 seconds (see No. 3272).

RECOMMENDATION No. 312

Relating to Studies of the Interconnection of Maritime Mobile Radiocommunication Systems with the International Telephone and Telegraph Networks¹

The World Administrative Radio Conference, Geneva, 1979,

noting

- a)* that this Conference has adopted, and included in Article 62, provisions for the use of a digital selective calling system;
- b)* that the CCIR has adopted Question 9-3/8 on the subject of a selective calling system for future operational requirements of the maritime mobile service;
- c)* that the operational and technical characteristics for a digital selective calling system are in an advanced state of study by the CCIR;
- d)* that the CCIR has adopted Question 23-2/8 relating to automated VHF maritime mobile telephone systems;
- e)* that the CCITT has under study the interconnection of the different international mobile telephone services – mainly of the maritime mobile and the maritime mobile-satellite services – and the international telephone network;
- f)* that the study of new Questions 7/I and 4/X relating to the interconnection of maritime satellite communication services with the international telex network is proposed to the CCITT;

¹ Replaces Recommendation No. Mar2 – 19 of the World Maritime Administrative Radio Conference, Geneva, 1974.

considering

- a) that it is desirable that there be interconnection of radiocommunication systems in the maritime mobile service with the international public telephone and telegraph networks to permit automatic routing of ship-shore traffic to and from national networks;
- b) that such interconnection would greatly improve maritime radio-communications;

urges the CCIR and the CCITT

to undertake all required studies relating to compatibility between the maritime mobile radiocommunication systems and the international telephone and telegraph systems, including various quality-of-service criteria, to permit the full interconnection of the maritime mobile services with the international telephone and telegraph networks;

and invites administrations

to give priority to these studies in their participation in the work of the CCIR and the CCITT.

RECOMMENDATION No. 313

**Relating to Temporary Provisions Covering the
Technical and Operational Aspects of the
Maritime Mobile-Satellite Service ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that a minimum number of provisions to introduce the maritime mobile-satellite service in an orderly manner has been adopted;
- b)* that administrations have, as yet, little or no experience in operating a maritime mobile-satellite service;
- c)* that, consequently, it is impossible at the present time to establish comprehensive regulatory provisions covering in detail the technical and operational aspects of such a service;
- d)* that, nevertheless, temporary administrative, technical and operational provisions may become necessary before the next competent administrative radio conference;

recommends

that, whilst gaining experience to provide a basis for the adoption of detailed regulations by the next appropriate administrative radio conference, administrations participating in the maritime mobile-satellite service should agree to temporary administrative, technical and operational provisions, notify them to the Secretary-General, and invite other administrations to adopt them, without prejudice.

¹ Replaces Recommendation No. Mar2 - 15 of the World Maritime Administrative Radio Conference, Geneva, 1974.

RECOMMENDATION No. 400

**Relating to the Transition from the Present to
the New Frequency Allotment Plan in the
Bands Allocated Exclusively to the
Aeronautical Mobile (R) Service Between
2 850 kHz and 22 000 kHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the Final Acts of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, entered into force on 1 September 1979;
- b)* that the new Frequency Allotment Plan contained in Appendix 27 Aer2 will enter into force at 0001 hours UTC on 1 February 1983;
- c)* that some administrations may wish to implement certain provisions of the new Frequency Allotment Plan in advance of the latter date when this may be done without causing harmful interference to stations working in accordance with the present Frequency Allotment Plan;
- d)* that, following the Extraordinary Administrative Radio Conference, Geneva, 1966, the International Civil Aviation Organization (ICAO), under the provisions of No. 27/20 of Appendix 27 and within the spirit and framework of Resolution No. Aer 6 of that Conference, developed a transition programme for the aeronautical mobile (R) service to convert the Frequency Allotment Plan in Appendix 26 to that in Appendix 27;

¹ Replaces Recommendation No. Aer2 - 4 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

e) that the ICAO transition programme was subsequently provided to the International Frequency Registration Board for distribution to ITU Member administrations;

f) that it will be useful again to adopt a programme to facilitate transition from the existing to the new Frequency Allotment Plan;

recommends

1. that the ICAO be invited to develop a transition programme, within the framework of Appendix 27 Aer2, for the operational use by aeronautical stations of the frequencies contained in the Frequency Allotment Plan except for those Regional and Domestic Air Route Areas (RDARAs) which are not involved in international operations;

2. that the ICAO be invited to forward the transition programme for the new Frequency Allotment Plan to the IFRB for distribution to administrations;

3. that administrations implement the provisions of the transition programme in coordination with ICAO and in conformity with the principles set forth in No. 27/20 of Appendix 27 Aer2;

requests the Secretary-General

to bring this Recommendation to the attention of the International Civil Aviation Organization.

RECOMMENDATION No. 401

**Relating to the Efficient Use of
Aeronautical Mobile (R) Worldwide Frequencies ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

that the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, 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.

¹ Replaces Recommendation No. Aer2 - 2 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

RECOMMENDATION No. 402

**Relating to Cooperation in the Efficient Use
of Worldwide Frequencies in the Aeronautical Mobile (R) Service ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* the need to make the most efficient use of worldwide frequencies in the aeronautical mobile (R) service;
- b)* that a Plan has been adopted for the allotment by areas of world-wide 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 IFRB 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 IFRB in regulatory procedures under Article 12 of the Radio Regulations;
- f)* the role played by the International Civil Aviation Organization (ICAO) in the field of international aeronautical operations;

¹ Replaces Recommendation No. Aer2 – 3 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

invites

1. *administrations within a worldwide allotment area*, as they consider it appropriate, *and the ICAO*, to seek the advice of the IFRB 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 IFRB* 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 International Civil Aviation Organization.

RECOMMENDATION No. 403

**Relating to the Development of Techniques Which
Would Help to Reduce Congestion in the High Frequency Bands
Allocated to the Aeronautical Mobile (R) Service¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that several administrations are actively engaged in the development of communication techniques the wider use of which, in the aeronautical mobile (R) service, would help to reduce congestion in the high frequency bands allocated to that service; such developments include the use of higher frequencies with remotely controlled stations, directional antennae, space radiocommunication techniques and automatic data transmission;
- b)* that knowledge of these developments would be useful to other administrations in considering the application of these techniques to their aeronautical mobile (R) communication services;
- c)* that the International Civil Aviation Organization (ICAO) is actively engaged in coordinating the operational development of such techniques;

¹ Replaces Recommendation No. Aer2 - 1 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

recommends

that administrations engaged in the development of techniques which would help to reduce congestion in the HF bands inform the IFRB periodically of the progress achieved;

instructs the IFRB

to circulate periodically the information so obtained to administrations and to the ICAO.

RECOMMENDATION No. 404

**Relating to the Use of the Band 136 - 137 MHz by the
Aeronautical Mobile (R) Service¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the Table of Frequency Allocations as modified by this Conference includes allocations to the aeronautical mobile (R) service on a primary basis, and to the fixed and mobile, except aeronautical mobile (R), services on a secondary basis, in the band 136 - 137 MHz;
- b) that provision is also made for allocations to the space operation service (space-to-Earth), the meteorological-satellite service (space-to-Earth) and the space research service (space-to-Earth) on a primary basis up to 1 January 1990, and thereafter on a secondary basis, and that the aeronautical mobile (R) service can be introduced on a primary basis only after 1 January 1990, in conformity with internationally approved plans for that service;
- c) that on that date the aeronautical mobile (R) service may well be subject to interference harmful to the safety of air navigation and that it is of the utmost importance to protect this service against interference from stations in the fixed service, the mobile except aeronautical mobile (R) service, the space research service (space-to-Earth), the space operation service (space-to-Earth) and the meteorological-satellite service (space-to-Earth);

¹ Replaces Recommendation No. Spa 7 of the Extraordinary Administrative Radio Conference, Geneva, 1963.

recommends

1. that administrations of all Regions operating, or intending to operate, stations in the fixed service, the mobile except aeronautical mobile (R) service, the space operation service (space-to-Earth), the meteorological-satellite service (space-to-Earth) and the space research service (space-to-Earth) in the band 136 - 137 MHz after 1 January 1990 take all possible steps to give the required protection to the aeronautical mobile (R) service and to cease operation of stations of the other services to which the band is allocated on a secondary basis as and when the stations of the aeronautical mobile (R) service come into operation;
2. that administrations notify the International Frequency Registration Board (IFRB) of their plans to bring into operation the aeronautical stations of the aeronautical mobile (R) service;
3. that administrations notify the IFRB, preferably in advance of the date when stations authorized to operate on a secondary basis will cease operations, referring specifically to this Recommendation;

and requests the IFRB

to publish this information every six months as from 1 January 1985.

RECOMMENDATION No. 405

**Relating to a Study of the Utilization of
the Aeronautical Mobile-Satellite (R) Service ¹**

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 International Telecommunication Union 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;

¹ Replaces Recommendation No. Aer.2 of the Extraordinary Administrative Radio Conference, Geneva, 1966.

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;

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 CCIR has studied the application of space radiocommunication techniques in the aeronautical mobile (R) service but these studies may need revision;

invites the CCIR

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 No. 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;

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- 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 paragraph 6 above, particularly:

a) the environment within which the system must work;

b) the evolutionary process of introducing the system.

RECOMMENDATION No. 406

**Relating to the Revision of the Frequency Allotment
Plan for the Aeronautical Mobile (OR) Service ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the Frequency Allotment Plans for the aeronautical mobile service prepared by the International Administrative Aeronautical Radio Conference (IAARC), Geneva, 1949, and adopted by the Extraordinary Administrative Radio Conference, Geneva, 1951, were substantially adopted by the Administrative Radio Conference, Geneva, 1959, and included in the Radio Regulations;
- b)* that the Extraordinary Administrative Radio Conference responsible for revising the Allotment Plan for the Aeronautical Mobile (R) Service, Geneva, 1966, decided to include this Plan as Appendix 27;
- c)* that the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978, adopted technical principles for establishing the Frequency Allotment Plan for the Aeronautical Mobile (R) Service, in particular the use of the 3 kHz separation between carrier frequencies for certain classes of emission and powers which can be directly applied in establishing the allotment plan for the aeronautical mobile (OR) service;

¹ Replaces Resolution No. 13 of the Administrative Radio Conference, Geneva, 1959, and Recommendation No. Aer2 - 8 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

d) that the Allotment Plan for the Aeronautical Mobile (OR) Service has not been revised since the Administrative Radio Conference, Geneva, 1959;

e) that, since 1959, many countries have become Members of the Union;

f) that this Conference has adopted Resolution **403** relating to the use of the frequencies 3 023 kHz and 5 680 kHz common to the aeronautical mobile (R) and (OR) services;

g) that the International Telecommunication Convention (Malaga-Torremolinos, 1973) in Article 7, No. 44, provides that a world administrative radio conference may partially revise the Radio Regulations;

is of the opinion

that the Plan for the Aeronautical Mobile (OR) Service contained in Appendix **26** to the Radio Regulations will have to be reviewed and that administrations should urgently study the communication requirements of their national and international air operations in order to establish when, in the best interests of aviation, such a review shall be carried out;

recommends

that the Administrative Council should convene a world administrative radio conference to review Appendix **26** and the related provisions of the Radio Regulations.

RECOMMENDATION No. 407

**Relating to No. 27/123
of Appendix 27 Aer2 – Sub-Area 5B¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the discussions which took place on the proposed modification of No. 27/123 of Appendix 27 Aer2;
- b) that the interested administrations have agreed to continue consultations between themselves on the matter of Sub-Area 5B;

recommends

- 1. that consultations should be carried out by the interested administrations in order to arrive at a satisfactory solution;
- 2. that the administrations concerned report on the results of their consultations to the next competent world administrative radio conference in order to enable that conference to arrive at a definitive solution on No. 27/123.

¹ Replaces Recommendation No. Aer2 – 7 of the World Administrative Radio Conference on the Aeronautical Mobile (R) Service, Geneva, 1978.

RECOMMENDATION No. 500

**Relating to the Preparation of the Technical Information
Necessary for the World Administrative Radio Conference
for HF Broadcasting**

The World Administrative Radio Conference, Geneva, 1979,

considering

that a considerable amount of technical information relating to HF broadcasting is already available in CCIR texts; nevertheless there are some subjects needing further studies and, in some cases, the available information requires adaptation to make it suitable for use in planning;

noting in particular

a) that the CCIR has recommended a method of estimating field strength and transmission loss in Band 7 (HF) based on the best information available, and is developing a new computerized method which incorporates the special elements considered necessary for improving the accuracy of these estimations at medium and long distances and in equatorial and high latitude regions;

b) that there is insufficient information relating to propagation predictions in many equatorial areas;

c) that the use of directional antennae is essential for efficient use of the spectrum in Band 7 (HF) and that radiation in directions other than the desired direction may cause interference;

requests the CCIR

1. to complete its work in respect of the improved computerized prediction method (Recommendation 533) paying special attention to

medium- and long-distance transequatorial paths and to high latitude regions;

2. to adapt the present method of propagation predictions in order to make it more suitable for use in planning broadcasting and to recommend suitable values of solar indices;

3. to make Recommendations where these do not already exist concerning appropriate protection ratios to be adopted, including cases where the unwanted signals are of a different type, and the appropriate values of channel spacing; and the minimum signal-to-noise ratio required for satisfactory reception;

4. to ensure that the CCIR Book "Antenna Diagrams" includes all principal types of antennae in common use;

5. to prepare and present data on the practical performance of directional antennae in a form suitable for planning purposes;

invites administrations

to participate actively in these studies and to provide the CCIR with available data on the questions listed above and especially on field strength observations in Band 7 (HF) for comparison with predicted values.

RECOMMENDATION No. 501

**Relating to Studies for the Introduction of Single-Sideband (SSB)
Techniques in the HF Bands Allocated to the Broadcasting
Service, in Preparation for the World Administrative
Radio Conference for HF Broadcasting**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the use of SSB leads to a more efficient utilization of the spectrum;
- b) that the introduction of these techniques for broadcasting in the HF bands creates both technical and economic problems;

requests the CCIR

to accelerate the appropriate studies regarding the introduction of SSB techniques for broadcasting in the HF bands and the specification of a suitable SSB system, paying particular attention to the economic problems associated with transmitters and receivers;

invites administrations

to provide the CCIR with information on this subject.

RECOMMENDATION No. 502

Relating to Specifications of Low-Cost Television Receivers

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the potential of the television medium as an instrument for national development is being increasingly recognized;
- b)* that direct reception of television broadcasting from satellites is demonstrated to be technically feasible and economically attractive;
- c)* that, within the limited resources available to them, many developing countries might wish to exploit the television medium to the maximum advantage;
- d)* that the availability of an efficient, low-cost television receiver would be an important factor in the setting up and expansion of television broadcast services in developing countries;
- e)* that the need for both monochrome and colour receiver sets can be foreseen for receiving terrestrial and satellite transmissions;
- f)* that the CCIR is already studying specifications for low-cost monochrome television receivers for home and community use, as well as the characteristics of a receiving system for a broadcasting-satellite service (television);
- g)* that general agreement on the performance of suitable television receivers would considerably assist TV receiver manufacturers to produce suitable receivers of the desired types and adequate standards of performance at the lowest possible cost;

h) that the design and production of television receivers has to take account of rapid advances in technology as well as obsolescence;

invites the CCIR

1. to draw up performance specifications for one or more types of low-cost television receivers as in *considering e)* above, suitable for quantity production;
2. to collaborate as necessary, with other international bodies working in this field, with a view to finalizing the specifications for such low-cost sets in the shortest possible time;

requests the Secretary-General

to send the results of this work, together with suggestions as to the action to be taken, to the Secretary-General of the United Nations, in particular for the attention of the Director of the United Nations Industrial Development Organization, as well as to the Director-General of UNESCO for information.

RECOMMENDATION No. 503

Relating to HF Broadcasting

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the congestion of the HF broadcasting bands;
- b) the extent of adjacent channel interference;

noting

the possibility of improving the situation by implementing pertinent CCIR Recommendations;

recommends that administrations

1. pay special attention to the provisions for "out-of-band spectrum" contained in CCIR Recommendation 328-4;
2. encourage, to the maximum extent possible, manufacturers to design and build HF broadcasting receivers that conform to CCIR Recommendation 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 CCIR Recommendation 205-1;

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invites the CCIR

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 No. 504

**Relating to the Preparation of a Broadcasting Plan
in the Band 1 605 - 1 705 kHz in Region 2**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the band 1 605 - 1 705 kHz has been allocated to the broadcasting service in Region 2 by this Conference;
- b) that in accordance with No. 480, the use of this band by the broadcasting service is subject to a broadcasting plan to be established by a regional administrative radio conference;
- c) that, in the Table of Frequency Allocations in Region 2, the band 1 605 - 1 625 kHz is allocated exclusively to the broadcasting service, and the band 1 625 - 1 705 kHz is allocated to the broadcasting service on a shared basis with other services;

recognizing

the provisions of No. 346 of the Radio Regulations;

recommends

- 1. that a regional administrative radio conference be convened to establish a plan for the broadcasting service in the band 1 605 - 1 705 kHz in Region 2;
- 2. that such a conference be convened in 1985 at the latest;
- 3. that the exact dates of coming into force of the plan be decided at the said regional administrative radio conference. Nevertheless, the use of these bands by the broadcasting service should not commence before

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1 July 1987 for the frequencies between 1 625 kHz and 1 665 kHz, and
1 July 1990 for the frequencies between 1 665 kHz and 1 705 kHz;

invites

1. *the Administrative Council* to take the necessary steps for the convening of a Region 2 administrative radio conference to plan the use of the band 1 605 - 1 705 kHz by the broadcasting service;
2. *the CCIR* to perform the necessary technical studies relating to the Region 2 broadcasting conference bearing in mind the allocations to other services in Regions 1 and 3 and the need for sharing criteria;

encourages administrations of Region 2

to promote the development and availability of receivers suitable for the broadcast band extended to 1 705 kHz.

RECOMMENDATION No. 505

**Relating to Studies of Propagation at 12 GHz
for the Broadcasting-Satellite Service¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that the technical criteria adopted at the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, which drew up an assignment plan for the broadcasting-satellite service in Regions 1 and 3, included a maximum margin of 2 dB, at an elevation angle of 45°, for rainfall attenuation;
- b)* that some studies have indicated that the necessary margin in the Tropical Zone could be higher than 2 dB;
- c)* that the Special Preparatory Meeting of the CCIR, Geneva, 1978, recognized that, for the application of the technique suggested in CCIR Report 721, the available rain rate data are likely to underestimate the attenuation which will occur in tropical regions;
- d)* that there is also a need for ample information on the various other propagation factors to be taken into account in the planning of the broadcasting-satellite service;

¹ Replaces Recommendation No. Sat - 3 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

recommends that the CCIR

1. expedite the studies of the effects of rainfall attenuation in the tropical regions and specify, as early as possible, the attenuation values necessary for ensuring a satisfactory broadcasting-satellite service;
2. continue the studies of the effects of precipitation attenuation at low angles of incidence in all rain-climatic zones;
3. continue the studies of the effects of sand and dust storms;
4. examine the relationship between the propagation characteristics for 99% of the worst month and those for the year;
5. examine, for emissions using circular polarization, the level of the depolarized component relative to the polarized component;

requests that the Director of the CCIR

bring such values of rainfall attenuation as may be specified to the notice of all administrations.

RECOMMENDATION No. 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. 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 CCIR Recommendations.

¹ Replaces Recommendation No. Sat - 2 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

RECOMMENDATION No. 507

Relating to Spurious Emissions in the Broadcasting-Satellite Service ¹

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 CCIR under the appropriate Study Programme;

invites the CCIR

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 Replaces Recommendation No. Sat - 6 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

RECOMMENDATION No. 508

**Relating to Transmitting Antennae
for the Broadcasting-Satellite Service¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* the need for ample information on transmitting antennae for the planning of the broadcasting-satellite service;
- b)* the studies being pursued by the CCIR under the appropriate Questions and Study Programmes;

invites the CCIR

1. to continue the study of reference patterns for the co-polar and cross-polar components of transmitting antennae for the broadcasting-satellite service for both individual and community reception, and in particular the practicable means of achieving various degrees of improved side-lobe suppression and the economic implication thereof;
2. to continue the study of the technical characteristics designed to achieve a pointing accuracy for transmitting antennae such that:
 - the deviation of the antenna beam from its nominal direction of pointing shall not exceed 0.1° ;
 - the angle of rotation of the transmitting beam about its axis shall not exceed $\pm 2^\circ$.

¹ Replaces Recommendation No. Sat - 4 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.

RECOMMENDATION No. 600

Relating to the Use of the Frequency Band 9 300 - 9 500 MHz^{1, 2}

The World Administrative Radio Conference, Geneva, 1979,

noting

- a)* that there are in existence two main classes of airborne weather radar, using the bands 5 350 - 5 460 MHz and 9 300 - 9 500 MHz respectively;
- b)* that there is in existence a very considerable number of shipborne radars, the majority in the band 9 300 - 9 500 MHz;
- c)* that there are also ground-based radars of the maritime and aeronautical radionavigation services and of the meteorological service in the band 9 300 - 9 500 MHz;
- d)* that the use of the band 5 350 - 5 460 MHz allocated on a primary basis exclusively to the aeronautical radionavigation service is limited to airborne radars;
- e)* that shipborne radars share only with land-based radars the use of the bands 2 900 - 3 100 MHz and 5 470 - 5 650 MHz which are allocated on a primary basis solely to the radionavigation service and the maritime radionavigation service, respectively;
- f)* that it has proved necessary to allocate the band 9 300 - 9 500 MHz on an equality basis to both the aeronautical and the maritime radionavigation services;
- g)* that in the band 9 300 - 9 320 MHz, the use of shipborne radars is no longer permitted with a view to facilitating development of fixed-frequency radar beacons in this band;

¹ See also Resolution 600.

² Replaces Recommendation No. 12 of the Administrative Radio Conference, Geneva, 1959.

h) that in the band 9 320 - 9 500 MHz in the maritime radionavigation service, the use of fixed-frequency radar beacons on land or at sea is not permitted;

considering

a) that it is of the utmost importance to ensure that harmful interference is not caused to radionavigation services providing a safety of life function;

b) that the operating conditions of a safety of life service should be uniform throughout the world;

c) that an uncoordinated increase in the use of the band 9 300 - 9 500 MHz can only lead to an increase in the probability of harmful interference between the aeronautical and maritime radionavigation services;

recommends

1. that administrations, the International Civil Aviation Organization (ICAO) and the Inter-Governmental Maritime Consultative Organization (IMCO) study this matter at the earliest opportunity; and especially

2. that they determine whether, and to what extent, interference which is recognized to be technically possible between the two services becomes harmful in operational circumstances;

3. that they investigate, in the event that it is established that there may be harmful interference between the two services, the possibility of reducing such interference by technical, operational and procedural means, including the principle that new equipments should always be of the highest technical standard;

invites administrations, the International Civil Aviation Organization and the Inter-Governmental Maritime Consultative Organization

to communicate to the Union the results of their studies together with their views and proposals resulting therefrom.

RECOMMENDATION No. 601

**Concerning the Matter of Providing a Suitable Frequency
Allocation for a Collision Avoidance System
in the Aeronautical Radionavigation Service ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) the ever-increasing speed of modern aircraft and taking into account that an adequate collision avoidance system providing a means of enhancing safety in the air has not been developed but is urgently required;
- b) that if such a collision avoidance system, when developed, requires the use of radio frequencies, it should be accommodated in one of the frequency bands allocated to the aeronautical radionavigation service;
- c) that it is impossible to forecast at this time whether the bands allocated to the aeronautical radionavigation service will prove to be suitable for such a system;

recommends

that administrations and the International Civil Aviation Organization (ICAO) pay especial attention to the progress being made in developing a suitable collision avoidance system, noting that if radio frequencies are required, and if the bands allocated to the aeronautical radionavigation service are not suitable for such a system, international consideration of this matter will be necessary.

¹ Replaces Recommendation No. 20 of the Administrative Radio Conference, Geneva, 1959.

RECOMMENDATION No. 602

Relating to Maritime Radiobeacons

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that maritime radiobeacons in the European Maritime Area are governed by the "Regional Arrangement for Maritime Radiobeacons in the European Area of Region 1, Paris, 1951", hereinafter referred to as the "Paris Arrangement, 1951";
- b) that the Paris Arrangement, 1951, is largely based on the geographical disposition of radiobeacons existing before 1939 and on the state of maritime navigation at that time;
- c) that since the conclusion of the Paris Arrangement, 1951, the geographical disposition and certain characteristics of maritime radiobeacons have been changed by bilateral or multilateral agreements, particularly to take into account the changes which have occurred in the habits and rules of maritime navigation in the area in question;
- d) that the Paris Arrangement, 1951, is based essentially on the use of aural direction-finding receivers;
- e) that for several years there has been a considerable increase in the number of automatic direction-finding receivers which depend solely on the radiobeacon carrier and which do not use modulation to separate radiobeacons operating on the same frequency;
- f) that it is therefore desirable that, following a review of the technical operating characteristics of maritime radiobeacons to be conducted by a competent world administrative radio conference, a specialized conference should be convened under Article 32 of the International Telecommunication Convention (Malaga-Torremolinos, 1973), in order to revise the Paris Arrangement, 1951;
- g) that this review should concern both the extent of the area covered by the Arrangement and the technical characteristics and field-strength

value of the service range, the adjacent channel separation, the modulation depth and any other provision deemed necessary;

noting

a) the existence in Chapter VIII of the Radio Regulations (Article 35, Section IV, paragraph C "Maritime Radiobeacons") of provisions Nos. 2860 to 2866;

b) the existence in Chapter III (Article 8, Section I) of No. 405, which defines the European Maritime Area;

recommends

1. that the administrations concerned examine the question of the limits of the area covered by the Arrangement and submit relevant proposals to the next competent world administrative radio conference;

2. that all administrations and the CCIR study as a matter of urgency the technical characteristics of maritime radiobeacons and submit their conclusions to the next competent world administrative radio conference;

invites the Administrative Council

to take the necessary steps to arrange for questions relating to maritime radiobeacon stations, which are of interest to the mobile services, to be included in the agenda of the next world administrative radio conference for the mobile services, in such a way that the conference could envisage a modification of the relevant Articles of the Radio Regulations;

requests the Secretary-General

to communicate this Recommendation to the Inter-Governmental Maritime Consultative Organization (IMCO) and the International Association of Lighthouse Authorities (IALA).

RECOMMENDATION No. 603

**Relating to Technical Provisions for Maritime Radiobeacons
in the African Area ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

the need to facilitate the planning for new maritime radiobeacons in the band 283.5 - 315 kHz particularly in the neighbouring localities of the European and African Areas;

recommends

that the administrations of the countries of the African Area adopt provisions similar to those contained in the Regional Arrangement for Maritime Radiobeacons in the European Area of Region 1, Paris, 1951.

¹ Replaces Recommendation No. 21 of the Administrative Radio Conference, Geneva, 1959.

RECOMMENDATION No. 604

**Relating to the Future Use and Characteristics of
Emergency Position-Indicating Radiobeacons ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that according to Article 41 of the Radio Regulations the essential purpose of the emergency position-indicating radiobeacon (EPIRB) signals is to facilitate determining the position of survivors in search and rescue operations;
- b) that Inter-Governmental Maritime Consultative Organization (IMCO) Resolution A.91 (IV) provides that EPIRBs are intended primarily for homing; however, they may be used for alerting in appropriate circumstances;
- c) that IMCO Resolution A.217 (VII) recommends that administrations require all ships and vessels, where appropriate, to be equipped with EPIRBs operating on the most appropriate radio frequencies;
- d) that IMCO is considering compulsory fitting of EPIRBs on all passenger ships and cargo ships of 300 tons gross tonnage and upwards;

considering in particular

that IMCO has stressed in Resolution A.279 (VIII) the urgent need for unification of the characteristics of EPIRBs;

¹ Replaces Recommendation No. Mar2 – 12 of the World Maritime Administrative Radio Conference, Geneva, 1974.

recognizing

- a) that there are provisions in the Radio Regulations for EPIRBs on the frequencies 2 182 kHz, 121.5 MHz and 243 MHz;
- b) that the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971, in the case of EPIRBs, reserved the frequency band 406 - 406.1 MHz for the mobile-satellite service solely for the use and development of low-power EPIRB systems using space techniques;
- c) that IMCO Resolution A.91 (IV) recommends the carrier frequency 2 182 kHz as the first choice operational frequency for EPIRBs;
- d) that the technical characteristics of EPIRBs operating on the carrier frequency 2 182 kHz are contained in Article 41 and Appendix 37 of the Radio Regulations and CCIR Recommendation 439;
- e) that Resolution 601 resolved that EPIRBs operating on the frequencies 121.5 MHz and 243 MHz shall comply with the relevant CCIR Recommendations and the standards and recommended practices of the International Civil Aviation Organization (ICAO);

recommends

1. that, in view of their inter-relationship in this matter, IMCO and ICAO be invited, as a matter of urgency, to review their concepts for EPIRBs in regard to search and rescue operations and the safety of life at sea;
2. that the CCIR be requested, when IMCO and ICAO have stated their concepts, to study technical and operating questions for EPIRBs, including the preferred frequencies, with particular attention to the prime requirements for homing and the technical characteristics of such beacons with regard to the requirement for unification.

RECOMMENDATION No. 605

**Relating to Technical Characteristics and Frequencies
for Shipborne Transponders^{1, 2}**

The World Administrative Radio Conference, Geneva, 1979,

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 radiotelephone 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;

¹ A receiver-transmitter which emits a signal automatically when it receives the proper interrogation.

² Replaces Recommendation No. Mar2 - 14 of the World Maritime Administrative Radio Conference, Geneva, 1974.

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 CCIR

to recommend, after consultation with appropriate international organizations, the most suitable order of frequencies and bandwidth required for this purpose, and the technical parameters to be met by such devices taking into account electromagnetic compatibility with other services having allocations in the same frequency band;

invites administrations and the Inter-Governmental Maritime Consultative Organization (IMCO)

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 administrative radio conference to make the necessary provisions for the use of such devices.

RECOMMENDATION No. 620

**Relating to the Meteorological Aids Service
in the Band 27.5 - 28 MHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

recommends

that administrations whose stations in the meteorological aids service operate in the band 27.5 - 28 MHz should arrange, as soon as possible, for the transfer of these operations to higher frequency bands which are allocated to the meteorological aids service;

invites the World Meteorological Organization

to study this question and to proceed with such coordination among administrations as appears necessary.

¹ Replaces Recommendation No. 33 of the Administrative Radio Conference, Geneva, 1959.

RECOMMENDATION No. 700

**Relating to the Utilization and Sharing of Frequency Bands
Allocated to Space Radiocommunications¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

Resolutions 1721 (XVI) part D and 1802 (XVII) part IV paragraph 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 UNESCO in accordance with the decision of the 12th session of its General Conference in December 1962;

recognizing

that all Members of the International Telecommunication Union have an interest in and a right to an equitable and rational use of frequency bands allocated to space radiocommunications;

¹ Replaces Recommendation No. Spa 10 of the Extraordinary Administrative Radio Conference, Geneva, 1963.

recommends to the Members of the Union

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 No. 701

**Relating to the Use of the Frequency Band 1 330 - 1 400 MHz
by the Radio Astronomy Service**

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 administrative radio 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.

RECOMMENDATION No. 702

**Relating to the Use of the Frequency Bands
1 400 - 1 727 MHz, 101 - 120 GHz and 197 - 220 GHz
for Search for Intentional Emissions
of Extraterrestrial Origin**

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 extraterrestrial 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 administrative radio 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;

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 CCIR.

RECOMMENDATION No. 703

**Relating to the Need to Cease Operations of the Fixed and
Mobile Services in the Bands 149.9 - 150.05 MHz
and 399.9 - 400.05 MHz Allocated to the
Radionavigation-Satellite Service ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the frequency bands 149.9 - 150.05 MHz and 399.9 - 400.05 MHz have been allocated to the radionavigation-satellite service on an exclusive worldwide basis;
- b) that many administrations require an extended period of time to re-accommodate existing fixed and mobile operations in other appropriately allocated bands;
- c) that early implementation of the radionavigation-satellite service will be of benefit to all administrations, particularly in its application to marine navigation;
- d) that interference to users of the radionavigation-satellite service could constitute a hazard to the safety of life and property;
- e) that the CCIR is studying the feasibility of sharing frequency bands between the radionavigation-satellite service and terrestrial services but has not yet been able to reach a conclusion in this regard;

¹ Replaces Recommendation No. Spa 8 of the Extraordinary Administrative Radio Conference, Geneva, 1963.

recommends

1. that, pending an affirmative determination by the CCIR that sharing is possible and practicable between stations of the radionavigation-satellite service and the fixed and mobile services, administrations take all possible steps to protect from harmful interference the operations of mobile earth stations using the radionavigation-satellite service;
2. that, in the light of paragraph 1 above, administrations be urged to cease operation of their fixed and mobile stations in the bands 149.9 - 150.05 MHz and 399.9 - 400.05 MHz as soon as practicable, with particular emphasis on those stations located in coastal areas.

RECOMMENDATION No. 704

**Relating to the Compatibility Between the
Broadcasting Service in the Band 100 - 108 MHz and the
Aeronautical Radionavigation Service
in the Band 108 - 117.975 MHz**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* the increasing use of VHF broadcasting, with relatively high powers, in the band 100 - 108 MHz;
- b)* that the band 108 - 117.975 MHz is used on a worldwide basis for internationally agreed aeronautical radionavigation systems;
- c)* that the portion of the band 108 - 111.975 MHz is used for Instrument Landing Systems (ILS) which are used by aircraft for automatic landing purposes;
- d)* that the band 108 - 117.975 MHz is used for the VHF Omnidirectional Radio Range (VOR) system;
- e)* that interference problems between the broadcasting and aeronautical radionavigation services have occurred in parts of Regions 2 and 3;

recognizing

- a)* that intermodulation products from combinations of broadcasting transmissions may fall in the aeronautical radionavigation band 108 - 117.975 MHz;
- b)* that intermodulation products may be formed in the radionavigation receiver;
- c)* that high power broadcasting transmissions could result in blocking of the radionavigation receivers;

d) that the emissions of the aeronautical radionavigation service may cause interference to the broadcasting service;

requests the CCIR

- 1. to study, as a matter of urgency, the problem of interference between the two services;**
- 2. to establish suitable criteria for the protection of both services;**

invites the International Civil Aviation Organization (ICAO) and other appropriate international organizations

to study the problem, as a matter of urgency, and communicate the results of these studies to the CCIR;

recommends

that administrations, in assigning frequencies to the broadcasting service in the band 100 - 108 MHz and to the aeronautical radionavigation service in the band 108 - 117.975 MHz, should take note of the potential interference problems that could exist and apply appropriate protective measures.

RECOMMENDATION No. 705

**Relating to the Criteria to Be Applied for Frequency Sharing
Between the Broadcasting-Satellite Service and the Terrestrial
Broadcasting Service in the Band 620 - 790 MHz ¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that, within the band 620 - 790 MHz, assignments may be made to television stations using frequency modulation in the broadcasting-satellite service;
- b) that it is necessary to have a power flux-density limit which will provide adequate protection to the terrestrial broadcasting service;

taking into account

- a) that the conclusions of the Special Joint Meeting of the 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 (in degrees);

¹ Replaces Recommendation No. **Spa2** - 10 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

b) that additional tests carried out by one administration after the Special Joint Meeting of the CCIR indicated that the following more conservative power flux-density limits may be necessary:

$$\begin{array}{ll} -130 \text{ dB(W/m}^2\text{)} & \text{for } \delta \leq 20^\circ \\ -130 + 0.4 (\delta - 20) \text{ dB(W/m}^2\text{)} & \text{for } 20^\circ < \delta \leq 60^\circ \\ -114 \text{ dB(W/m}^2\text{)} & \text{for } 60^\circ < \delta \leq 90^\circ \end{array}$$

where δ is the angle of arrival above the horizontal plane (in degrees);

c) that CCIR Report 631-1 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 VSB television signal for both the 625- and 525-line systems;

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 CCIR Recommendation 417-2;

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 CCIR Recommendation 417-2), by a space station in the broadcasting-satellite service in the band 620 - 790 MHz should not exceed:

$$\begin{array}{ll} -129 \text{ dB(W/m}^2\text{)} & \text{for } \delta \leq 20^\circ \\ -129 + 0.4 (\delta - 20) \text{ dB(W/m}^2\text{)} & \text{for } 20^\circ < \delta \leq 60^\circ \\ -113 \text{ dB(W/m}^2\text{)} & \text{for } 60^\circ < \delta \leq 90^\circ \end{array}$$

where δ is the angle of arrival above the horizontal plane (in 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 CCIR 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 CCIR 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 CCIR should consider the advantages of energy dispersal techniques in the broadcasting-satellite service (television).

RECOMMENDATION No. 706

**Relating to 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 CCIR Report 694 could restrict the development of the fixed, mobile except aeronautical mobile and fixed-satellite services;

invites the CCIR

- 1. to review the content of CCIR Report 694 by all the Study Groups concerned (particularly Study Groups 4 and 9);
- 2. to continue the studies which gave rise to 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;

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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.

RECOMMENDATION No. 707

**Relating to the Use of the Frequency Band 32 - 33 GHz
Shared Between the Inter-Satellite Service
and the Radionavigation Service**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that the band 32 - 33 GHz is allocated to the inter-satellite service and the radionavigation service;
- b) that there are safety aspects associated with the radionavigation service;
- c) that No. 893 has been incorporated into Article 8;

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 CCIR

to carry out these studies;

recommends further

that a future competent world administrative radio conference review the CCIR Recommendations with a view to the inclusion of such sharing criteria in Article 28.

RECOMMENDATION No. 708

**Relating to Frequency Bands Shared Between Space
Radiocommunication Services and Between Space and
Terrestrial Radiocommunication Services¹**

The World Administrative Radio Conference, Geneva, 1979,

recognizing

- a) the value to the Conference of the material contained in the Report of the CCIR Special Preparatory Meeting, Geneva, 1978;
- b) that further studies on a wide range of problems dealing with space radiocommunications form the subject of CCIR Questions and Study Programmes approved by the XIVth Plenary Assembly;

considering however

- a) that certain CCIR Recommendations, listed below, call for further work and study:

Recommendation 355-2 "Frequency sharing between systems in the fixed-satellite service and terrestrial radio services in the same frequency bands"

Recommendation 465-1 "Reference earth station radiation pattern for use in coordination and interference assessment in the frequency range from 2 to about 10 GHz"

¹ Replaces Recommendation No. **Spa2** – 15 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

Recommendation 466-2 “Maximum permissible level of interference in a telephone channel of a geostationary satellite network in the fixed-satellite service employing frequency modulation with frequency-division multiplex, caused by other networks of this service”;

b) that the deliberations of this Conference, particularly in relation to the provisions of Articles 27, 28 and 29, and of other relevant Articles of the Radio Regulations, have shown that further information is required to reply to the following current Questions and Study Programmes of the CCIR:

Question 1-2/4 “Antennae for systems in the fixed-satellite service”

Question 2-3/4 “Technical characteristics of systems in the fixed-satellite service”

Study Programme 2A-3/4 “Feasibility of frequency sharing between systems in the fixed-satellite service and terrestrial services”

Study Programme 2J-2/4 “Technical factors influencing the efficiency of use of the geostationary-satellite orbit by radio-communication satellite networks sharing frequency bands allocated to the fixed-satellite service”;

c) that it would be useful to have specific numerical values of power flux-density from space stations of the broadcasting-satellite service which would permit differentiation between “individual reception” and “community reception” in the broadcasting-satellite service;

d) that frequency sharing between the radionavigation service and the fixed-satellite service (Earth-to-space) has been adopted in the frequency band 14 - 14.3 GHz;

recommends

1. that administrations, recognized private operating agencies, and other participants in the work of the CCIR consider as a matter of priority the submission of contributions on these subjects, so that draft Recommendations on them can be prepared at the meetings of the relevant Study Groups for consideration by the Plenary Assembly of the CCIR;
2. that the CCIR study or, as appropriate, continue to study:
 - 2.1 the reference antenna patterns for earth station antennae, which may be appropriate for setting minimum standards of performance with a view to recommending specific patterns for this purpose, in order to improve utilization of the bands shared between the fixed-satellite service and terrestrial radiocommunication services, and of the bands shared by space radiocommunication services, and to improve the utilization of the geostationary-satellite orbit;
 - 2.2 the reference antenna patterns for satellite antennae, which may be appropriate for setting minimum standards of performance, particularly outside the main beam, in order to improve the utilization of the geostationary-satellite orbit and to increase the possibilities for frequency re-use;
 - 2.3 the reference cross-polarization antenna patterns which may be appropriate for setting minimum standards of performance and, in this connection, further study:
 - 2.3.1 the portions of the spectrum within which linear-orthogonal or circular-orthogonal polarizations might be most appropriate;
 - 2.3.2 the relative desirability, taking into account technical and orbit utilization factors, of using orthogonal polarizations within a single satellite as against with two satellites;
 - 2.4 the necessary limitation of spurious emissions and the frequency tolerances to be observed in both the terrestrial and space

radiocommunication services insofar as they may affect sharing of frequency bands;

2.5 the criteria of permissible interference for the various space radiocommunication services and terrestrial radiocommunication services sharing the frequency bands allocated by this Conference, in order to permit the determination of:

2.5.1 the coordination distance and the probability of interference between stations within that distance;

2.5.2 the necessary limits of power flux-density set up at the Earth's surface by space stations;

2.6 the maximum permissible level of interference into a geostationary-satellite link from any other single interfering geostationary-satellite network and from the aggregate of all other geostationary-satellite networks, particularly in the case of:

2.6.1 frequency-modulated telephony signals,

2.6.2 frequency-modulated television signals,

2.6.3 digitally-modulated signals,

and the most appropriate manner in which permissible interference should be specified in these and other cases;

2.7 the interference criteria applicable to frequency sharing between non-geostationary-satellite networks and geostationary-satellite networks;

2.8 the possibility of establishing a technical criterion for expressing the efficiency of use of the geostationary-satellite orbit;

2.9 the possibility of improving and simplifying the method of determining the coordination area as described in Appendix 28 to the Radio Regulations;

2.10 the conditions for frequency sharing in those bands allocated to the broadcasting-satellite service by this Conference with a view

to issuing appropriate Recommendations as soon as possible so that administrations and the IFRB shall have the necessary technical data required to carry out examination procedures, in particular regarding Articles 11, 12 and 13 of the Radio Regulations and those in Resolution 33;

2.11 the power flux-densities required for individual and community reception in the broadcasting-satellite service, with a view to specifying numerical values which will differentiate between these types of reception;

2.12 the criteria for frequency sharing between the radionavigation service and the fixed-satellite service (Earth-to-space) in the frequency band 14 - 14.3 GHz.

RECOMMENDATION No. 709

**Relating to Sharing Frequency Bands Between the
Aeronautical Mobile Service and the Inter-Satellite Service**

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. 909, the text of which is reproduced below)¹;

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;

¹ **909** In the bands 54.25 - 58.2 GHz, 59 - 64 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. 435).

REC709-2

requests the CCIR

to carry out these studies;

recommends further

that a future competent world administrative radio conference review the allocations of these bands, taking into account the results of the CCIR studies.

RECOMMENDATION No. 710

**Relating to the Use of Airborne Radars
in the Frequency Bands Shared Between
the Inter-Satellite Service and the Radiolocation Service**

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. 910, the text of which is reproduced below)¹;

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;

¹ 910 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. 435).

REC710-2

requests the CCIR

to carry out these studies;

recommends further

that a future competent world administrative radio conference review the allocations of these bands, taking into account the results of the CCIR studies.

RECOMMENDATION No. 711

Relating to the Coordination of Earth Stations¹

The World Administrative Radio Conference, Geneva, 1979,

considering

- a)* that under the terms of Article 11 of the Radio Regulations, 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 28 to the Radio Regulations 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 CCIR

to continue as a matter of urgency its study:

- a)* of data not included in Tables I and II of Appendix 28 to the Radio Regulations, relating to the space radiocommunication services and terrestrial radiocommunication services sharing frequency bands with equal rights;

¹ Replaces Recommendation No. Spa2 – 9 of the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971.

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 CCIR Recommendation, if applicable, for the values missing from Tables I and II of Appendix 28 to the Radio Regulations;

b) the methods of determining the coordination area for frequencies below 1 GHz and above 40 GHz, which may be the subject of a CCIR Recommendation.

RECOMMENDATION No. 712

**Relating to the Interdependence of
Receiver Design, Channel Grouping and Sharing Criteria
in the Broadcasting-Satellite Service¹**

The World Administrative Radio Conference, Geneva, 1979,

considering

- a) that receiver design, channel grouping and sharing criteria are interrelated and have a considerable influence on the development of a plan for the broadcasting-satellite service;
- b) that, so far, insufficient attention may have been given to these factors and to their influence on the implementation of such a plan;

invites the CCIR

to study the problem of the interdependence of receiver design, channel grouping and sharing criteria, together with the effects of these factors on the operation of the broadcasting-satellite service.

¹ Replaces Recommendation No. Sat - 7 of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977.