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INTERNATIONAL TELECOMMUNICATION UNION

RADIO REGULATIONS

A NOTE FROM THE ITU LIBRARY & ARCHIVES SERVICE

Update Pages to the Radio Regulations

This PDF includes only the update pages. It does not represent a complete edition of the *Radio Regulations*.

I.T.U.
General Secretariat

Geneva, April 1972

Pages to be inserted in the 1968 edition of the Radio Regulations to take account of the decisions made by the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971

The 1968 edition of the Radio Regulations is modified as follows:

Articles, appendices, etc.	Symbol	Pages	
		To be removed	To be inserted*
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Remark : The provisions of the Radio Regulations revised by the World Administrative Radio Conference for Space Telecommunications (Geneva, 1971) (marked Spa2), shall come into force on 1 January, 1973, on which date the provisions of the Radio Regulations which are cancelled or modified by this revision shall be abrogated.

Printed in Switzerland

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* Abrogated.

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* Abrogated.

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FOREWORD

(31 December 1971)

1. This edition of the Radio Regulations takes into account the partial revisions of the Radio Regulations (Geneva, 1959) made by :

a) the Extraordinary Administrative Radio Conference to allocate frequency bands for space radiocommunication purposes, Geneva, 1963 (referred to hereafter as "the 1963 Space Conference");

b) the Extraordinary Administrative Radio Conference for the preparation of a revised allotment plan for the Aeronautical Mobile (R) Service, Geneva, 1966 (referred to hereafter as "the Aeronautical Conference");

c) the World Administrative Radio Conference to deal with matters relating to the Maritime Mobile Service, Geneva, 1967 (referred to hereafter as "the Maritime Conference");

d) the World Administrative Radio Conference for Space Telecommunications, Geneva, 1971 (referred to hereafter as "the 1971 Space Conference").

The final signature clauses (Nos. **1632** and **2165**), the signatures themselves which follow the Radio Regulations (Geneva, 1959), and the text of the Additional Protocol to those Regulations have not been reproduced; nor have the signatures and the texts of the Additional Protocols contained in the Final Acts of the 1963 Space Conference and the Aeronautical Conference, and the signatures and text of the Final Protocols included in the Final Acts of the Maritime Conference and the 1971 Space Conference. To consult these texts, reference should be made to the volume containing the 1959 Radio Regulations and to the Final Acts of the afore-mentioned Conferences, which also contain the signatures.

2. The following symbols appear under the numbers of provisions that have been added or amended by one of the above-mentioned Conferences:

a) **Spa**
b) **Aer**
c) **Mar**
d) **Spa2**

2.1 In the case of the Table of Frequency Allocations from 10 kHz to 275 GHz (Article 5 of the Radio Regulations), the appropriate symbol appears at the top of the pages under the indication of the frequency range if the latter includes bands the allocation or conditions of use of which have been amended by one of the above-mentioned Conferences.

2.2 If an appendix to the Radio Regulations has been added or amended by one of the above-mentioned Conferences, the appropriate symbol appears under the number of the Appendix.

2.3 If a provision has been amended by more than one of these Conferences, only the symbol corresponding to the last Conference making an amendment has been indicated.

2.4 In a few cases, the General Secretariat has included references in certain provisions as a consequence of amendments made to other provisions by a Conference. In such cases the appropriate symbol under the number of the provision is followed by an asterisk.

3. References to provisions of the Convention have been brought into line with those of the International Telecommunication Convention (Montreux, 1965).

4. No change has been made to the numbering of the Resolutions and Recommendations of the Administrative Radio Conference, Geneva, 1959. On the other hand, in the interest of uniformity, the following numbering system has been used for the Resolutions and Recommendations adopted by the subsequent Conferences:

a) 1963 Space Conference: No. Spa 1, No. Spa 2, No. Spa 3, etc.*

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* The numbering adopted by the 1963 Space Conference was: No. 1A, No. 2A, No. 3A, etc

b) Aeronautical Conference : No. Aer 1, No. Aer 2, No. Aer 3, etc.
c) Maritime Conference : No. Mar 1, No. Mar 2, No. Mar 3, etc.
d) 1971 Space Conference : No. Spa2-1, No. Spa2-2, No. Spa2-3, etc.

5. Pages are separately numbered by article, appendix, resolution and recommendation*. The following symbols have been adopted for this numbering, which appears at the top of the pages :

RR = Radio Regulations
AP = Appendix
AR = Additional Radio Regulations
RES = Resolution
REC = Recommendation

For example :

RR5-14 = Article 5 of the Radio Regulations, page 14
AP13A-20 = Appendix 13A, page 20
RES Mar 12-4 = Resolution No. Mar 12, page 4.

6. It was considered desirable to insert in this edition :

a) in Article 19 of the Radio Regulations, a note indicating the international series of call signs allocated provisionally since 1959 by the Secretary-General, in accordance with the provisions of No. 749 of the Regulations;

b) after the title of Article 45 of the Radio Regulations, notes concerning the entry into force of the provisions of the Radio Regulations (1959) and of those which were revised by the Conferences mentioned in point 1 above;

c) after the title of Article 14 of the Additional Radio Regulations, notes concerning the entry into force of the provisions of the Additional Radio Regulations (1959) and of those which were revised by the Maritime Conference.

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* To enable this edition to be brought up to date following the 1971 Space Conference, it was necessary to abandon continuous numbering at the foot of each page.

CHAPTER I

Terminology

ARTICLE 1

Terms and Definitions

Preamble

1 For the purposes of these Regulations, the following terms shall have the meanings defined below. These terms and definitions do not, however, necessarily apply for other purposes.

Section I. General Terms

2 *Telecommunication:* Any transmission, emission or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, visual or other electromagnetic systems.

3 *General Network of Telecommunication Channels:* The whole of the existing telecommunication channels open to public correspondence, with the exception of the telecommunication channels of the mobile service.

4 *Simplex Operation:* Operating method in which transmission is made possible alternately in each direction, for example, by means of manual control.[1]

5 *Duplex Operation:* Operating method in which transmission is possible simultaneously in both directions.[1]

6 *Semi-duplex Operation:* Operating method which is simplex at one end of the circuit and duplex at the other.[1]

4.1 [1] In general, duplex and semi-duplex operation require two frequencies in radiocommunication; simplex may use either one or two.

7 *Radio Waves (or Hertzian Waves):* Electromagnetic waves of frequencies lower than 3 000 Gc/s, propagated in space without artificial guide.

8 *Radio:* A general term applied to the use of radio waves.

9 *Radiocommunication:* Telecommunication by means of radio waves.

10 *Telegraphy:* A system of telecommunication which is concerned in any process providing transmission and reproduction at a distance of documentary matter, such as written or printed matter or fixed images, or the reproduction at a distance of any kind of information in such a form. The foregoing definition appears in the Convention, but, for the purposes of these Regulations, telegraphy shall mean, unless otherwise specified, " A system of telecommunication for the transmission of written matter by the use of a signal code ".

11 *Frequency-Shift Telegraphy:* Telegraphy by frequency modulation in which the telegraph signal shifts the frequency of the carrier between predetermined values. There is phase continuity during the shift from one frequency to the other.

12 *Four-Frequency Diplex Telegraphy:* Frequency-shift telegraphy in which each of the four possible signal combinations corresponding to two telegraph channels is represented by a separate frequency.

13 *Telegram:* Written matter intended to be transmitted by telegraphy for delivery to an addressee; this term also includes radiotelegram unless otherwise specified. In this definition the term Telegraphy has the meaning defined in the Convention.

14 *Radiotelegram:* Telegram originating in or intended for a mobile station transmitted, on all or part of its route, over the radiocommunication channels of a mobile service.

15 *Telemetering:* The use of telecommunication for automatically indicating or recording measurements at a distance from the measuring instrument.

16 *Radiotelemetering :* Telemetering by means of radio waves.

17 *Telephony :* A system of telecommunication set up for the transmission of speech or, in some cases, other sounds.

18 *Radiotelephone Call :* A telephone call, originating in or intended for a mobile station, transmitted on all or part of its route over the radiocommunication channels of a mobile service.

19 *Television :* A system of telecommunication for the transmission of transient images of fixed or moving objects.

20 *Facsimile :* A system of telecommunication for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form.

Section II. Radio Systems, Services and Stations

21 *Station :* One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service. Each station shall be classified by the service in which it operates permanently or temporarily.

21A *Space Station*
Spa2

A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere.

21B *Earth Station*
Spa2

A station located either on the Earth's surface or within the major portion of the Earth's atmosphere intended for communication:

— with one or more space stations; or

— with one or more stations of the same kind by means of one or more passive satellites or other objects in space.

21C *Space Radiocommunication*
Spa2

Any radiocommunication involving the use of one or more space stations or the use of one or more passive satellites or other objects in space.

21D *Terrestrial Radiocommunication* [1]
Spa2

Any radiocommunication other than space radiocommunication or radio astronomy.

21E *Terrestrial Station* [2]
Spa2

A station effecting terrestrial radiocommunication.

22 *Fixed Service:* A service of radiocommunication between specified fixed points.

23 *Fixed Station:* A station in the fixed service.

24 *Aeronautical Fixed Service:* A fixed service intended for the transmission of information relating to air navigation, preparation for and safety of flight.

25 *Aeronautical Fixed Station:* A station in the aeronautical fixed service.

26 *Tropospheric Scatter:* The propagation of radio waves by scattering as a result of irregularities or discontinuities in the physical properties of the troposphere.

21D.1 [1] In these Regulations, unless otherwise stated, any radiocommunication
Spa2 service relates to terrestrial radiocommunication.

21E.1 [2] In these Regulations, unless otherwise stated, any station is a terrestrial
Spa2 station.

27 *Ionospheric Scatter:* The propagation of radio waves by scattering as a result of irregularities or discontinuities in the ionization of the ionosphere.

28 *Broadcasting Service:* A radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmissions.

29 *Broadcasting Station:* A station in the broadcasting service.

30 *Mobile Service:* A service of radiocommunication between mobile and land stations, or between mobile stations.

31 *Land Station:* A station in the mobile service not intended to be used while in motion.

32 *Mobile Station:* A station in the mobile service intended to be used while in motion or during halts at unspecified points.

33 *Aeronautical Mobile Service:* A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may also participate.

34 *Aeronautical Station:* A land station in the aeronautical mo-
Spa bile service. In certain instances an aeronautical station may be placed on board a ship or an earth satellite.

35 *Aircraft Station:* A mobile station in the aeronautical mobile
Spa service on board an aircraft or an air-space vehicle.

36 *Maritime Mobile Service:* A mobile service between coast stations and ship stations, or between ship stations, in which survival craft stations may also participate.

37 *Port Operations Service:* A maritime mobile service in or near
Mar a port, between coast stations and ship stations, or between ship stations, in which messages are restricted to those relating to the operational handling, the movement and the safety of ships and, in emergency, to the safety of persons. Messages which are of a public correspondence nature shall be excluded.

38 *Coast Station :* A land station in the maritime mobile service.

38A Mar *Port Station:* A coast station in the port operations service.

39 *Ship Station :* A mobile station in the maritime mobile service located on board a vessel, other than a survival craft, which is not permanently moored.

40 *Ship's Emergency Transmitter :* A ship's transmitter to be used exclusively on a distress frequency for distress, urgency or safety purposes.

41 *Survival Craft Station :* A mobile station in the maritime or aeronautical mobile service intended solely for survival purposes and located on any lifeboat, life-raft or other survival equipment.

42 *Land Mobile Service :* A mobile service between base stations and land mobile stations, or between land mobile stations.

43 *Base Station :* A land station in the land mobile service carrying on a service with land mobile stations.

44 *Land Mobile Station :* A mobile station in the land mobile service capable of surface movement within the geographical limits of a country or continent.

45 *Radiodetermination :* The determination of position, or the obtaining of information relating to position, by means of the propagation properties of radio waves.

46 *Radiodetermination Service :* A service involving the use of radiodetermination.

47 *Radiodetermination Station :* A station in the radiodetermination service.

48 *Radionavigation :* Radiodetermination used for the purposes of navigation, including obstruction warning.

49 *Radionavigation Service :* A radiodetermination service involving the use of radionavigation.

50 *Radionavigation Land Station :* A station in the radionavigation service not intended to be used while in motion.

51 *Radionavigation Mobile Station :* A station in the radionavigation service intended to be used while in motion or during halts at unspecified points.

52 *Aeronautical Radionavigation Service :* A radionavigation service intended for the benefit of aircraft.

53 *Maritime Radionavigation Service :* A radionavigation service intended for the benefit of ships.

54 *Radiolocation :* Radiodetermination used for purposes other than those of radionavigation.

55 *Radiolocation Service :* A radiodetermination service involving the use of radiolocation.

56 *Radiolocation Land Station :* A station in the radiolocation service not intended to be used while in motion.

57 *Radiolocation Mobile Station :* A station in the radiolocation service intended to be used while in motion or during halts at unspecified points.

58 *Radar :* A radiodetermination system based on the comparison of reference signals with radio signals reflected, or re-transmitted, from the position to be determined.

59 *Primary Radar :* A radiodetermination system based on the comparison of reference signals with radio signals reflected from the position to be determined.

60 *Secondary Radar :* A radiodetermination system based on the comparison of reference signals with radio signals re-transmitted from the position to be determined.

61 *Instrument Landing System (ILS) :* A radionavigation system which provides aircraft with horizontal and vertical guidance just before and during landing and, at certain fixed points, indicates the distance to the reference point of landing.

62 *Instrument Landing System Localizer:* A system of horizontal guidance embodied in the instrument landing system which indicates the horizontal deviation of the aircraft from its optimum path of descent along the axis of the runway.

63 *Instrument Landing System Glide Path:* A system of vertical guidance embodied in the instrument landing system which indicates the vertical deviation of the aircraft from its optimum path of descent.

64 *Marker Beacon:* A transmitter in the aeronautical radionavigation service which radiates vertically a distinctive pattern for providing position information to aircraft.

65 *Radio Altimeter:* A radionavigation equipment, on board an aircraft, which makes use of the reflection of radio waves from the ground to determine the height of the aircraft above the ground.

66 *Radio Direction-Finding:* Radiodetermination using the reception of radio waves for the purpose of determining the direction of a station or object.

67 *Radio Direction-Finding Station:* A radiodetermination station using radio direction-finding.

68 *Radiobeacon Station:* A station in the radionavigation service the emissions of which are intended to enable a mobile station to determine its bearing or direction in relation to the radiobeacon station.

68A Mar *Emergency Position-Indicating Radiobeacon Station:* A station in the mobile service the emissions of which are intended to facilitate search and rescue operations.

69 Spa2 *Safety Service*

A radiocommunication service used permanently or temporarily for the safeguarding of human life and property on the Earth's surface, in the air or in space.

70 – 73 SUP (Spa)

74 *Radio Astronomy:* Astronomy based on the reception of radio waves of cosmic origin.

75 *Radio Astronomy Service:* A service involving the use of radio astronomy.

75A *Radio Astronomy Station*

Spa A station in the radio astronomy service.

76 *Meteorological Aids Service:* A radiocommunication service used for meteorological, including hydrological, observations and exploration.

77 *Radiosonde:* An automatic radio transmitter in the meteorological aids service usually carried on an aircraft, free balloon, kite or parachute, and which transmits meteorological data.

78 *Amateur Service:* A service of self-training, intercommunication and technical investigations carried on by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

79 *Amateur Station:* A station in the amateur service.

80 *Standard Frequency Service:* A radiocommunication service for scientific, technical and other purposes, providing the transmission of specified frequencies of stated high precision, intended for general reception.

81 *Standard Frequency Station:* A station in the standard frequency service.

82 *Time Signal Service:* A radiocommunication service for the transmission of time signals of stated high precision, intended for general reception.

83 *Experimental Station:* A station utilizing radio waves in experiments with a view to the development of science or technique. This definition does not include amateur stations.

84 *Special Service:* A radiocommunication service, not otherwise defined in this Article, carried on exclusively for specific needs of general utility, and not open to public correspondence.

84AA 84AB SUP (Spa2)

Section IIA. Space Systems, Services and Stations

84AC — 84AE SUP (Spa2)

84AF *Space System*
Spa2

Any group of co-operating earth and/or space stations employing space radiocommunication for specific purposes.

84AFA *Satellite System*
Spa2

A space system using one or more artificial earth satellites.

84AFB *Satellite Network*
Spa2

A satellite system or a part of a satellite system, consisting of only one satellite and the co-operating earth stations.

84AFC *Satellite Link*
Spa2

A radio link between a transmitting earth station and a receiving earth station through one satellite.

A satellite link comprises one up-path and one down-path.

84AFD *Multi-Satellite Link*
Spa2

A radio link between a transmitting earth station and a receiving earth station through two or more satellites, without any intermediate earth station.

A multi-satellite link comprises one up-path, one or more satellite-to-satellite paths and one down-path.

84AG *Fixed-Satellite Service*
Spa2

A radiocommunication service:

— between earth stations at specified fixed points when one or more satellites are used; in some cases this service includes satellite-to-satellite links, which may also be effected in the inter-satellite service;

— for connection between one or more earth stations at specified fixed points and satellites used for a service other than the fixed-satellite service (for example, the mobile-satellite service, broadcasting-satellite service, etc.).

84AGA *Mobile-Satellite Service*
Spa2

A radiocommunication service:

— between mobile earth stations and one or more space stations; or between space stations used by this service;

— or between mobile earth stations by means of one or more space stations;

— and if the system so requires, for connection between these space stations and one or more earth stations at specified fixed points.

84AGB *Aeronautical Mobile-Satellite Service*
Spa2

A mobile-satellite service in which mobile earth stations are located on board aircraft. Survival craft stations and emergency position indicating radiobeacon stations may also participate in this service.

84AGC *Maritime Mobile-Satellite Service*
Spa2

A mobile-satellite service in which mobile earth stations are located on board ships. Survival craft stations and emergency position indicating radiobeacon stations may also participate in this service.

84AGD *Land Mobile-Satellite Service*
Spa2

A mobile-satellite service in which mobile earth stations are located on land.

84AH – 84AO SUP (Spa2)

84AP *Broadcasting-Satellite Service*
Spa2

A radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception [1] by the general public.

84AP.1 [1] In the broadcasting-satellite service, the term "direct reception" shall
Spa2 encompass both individual reception and community reception.

84APA *Individual reception* (in the broadcasting-satellite service)
Spa2

The reception of emissions from a space station in the broadcasting-satellite service by simple domestic installations and in particular those possessing small antennae.

84APB *Community reception* (in the broadcasting-satellite service)
Spa2

The reception of emissions from a space station in the broadcasting-satellite service by receiving equipment, which in some cases may be complex and have antennae larger than those used for individual reception, and intended for use:

— by a group of the general public at one location; or

— through a distribution system covering a limited area.

84APC *Radiodetermination-Satellite Service*
Spa2

A radiocommunication service involving the use of radiodetermination and the use of one or more space stations.

84AQ *Radionavigation-Satellite Service*
Spa2

A radiodetermination-satellite service used for the same purposes as the radionavigation service; in certain cases this service includes transmission or retransmission of supplementary information necessary for the operation of radionavigation systems.

84AQA *Aeronautical Radionavigation-Satellite Service*
Spa2

A radionavigation-satellite service in which mobile earth stations are located on board aircraft.

84AQB *Maritime Radionavigation-Satellite Service*
Spa2

A radionavigation-satellite service in which mobile earth stations are located on board ships.

84AR **84AS** **SUP** **(Spa2)**

84ASA *Earth Exploration-Satellite Service*
Spa2

A radiocommunication service between earth stations and one or more space stations in which:

— information relating to the characteristics of the Earth and its natural phenomena is obtained from instruments on earth satellites;

— similar information is collected from air-borne or earth-based platforms;

— such information may be distributed to earth stations within the system concerned;

— platform interrogation may be included.

84AT *Meteorological-Satellite Service*
Spa2

An earth exploration-satellite service for meteorological purposes.

84ATA *Amateur-Satellite Service*
Spa2

A radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur service.

84ATB *Standard Frequency-Satellite Service*
Spa2

A radiocommunication service using space stations on earth satellites for the same purposes as those of the standard frequency service.

84ATC *Time Signal-Satellite Service*
Spa2

A radiocommunication service using space stations on earth satellites for the same purposes as those of the time signal service.

84ATD *Space Research Service*
Spa2

A radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes.

84ATE *Space Operation Service*
Spa2

A radiocommunication service concerned exclusively with the operation of spacecraft, in particular tracking, telemetry and telecommand.

These functions will normally be provided within the service in which the space station is operating.

84ATF *Inter-Satellite Service*
Spa2

A radiocommunication service providing links between artificial earth satellites.

84AU **84AV** **SUP** **(Spa2)**

84AW *Space Telemetering*

Spa

The use of telemetering for the transmission from a space station of results of measurements made in a spacecraft, including those relating to the functioning of the spacecraft.

84AX *Maintenance Space Telemetering*

Spa

Space telemetering relating exclusively to the electrical and mechanical condition of a spacecraft and its equipment together with the condition of the environment of the spacecraft.

84AY *Space Telecommand*

Spa

The use of radiocommunication for the transmission of signals to a space station to initiate, modify or terminate functions of the equipment on a space object, including the space station.

84AZ *Space Tracking*

Spa

Determination of the orbit, velocity or instantaneous position of an object in space by means of radiodetermination, excluding primary radar, for the purpose of following the movement of the object.

Section IIB. Space, Orbits and Types of Objects in Space

84BA *Deep Space*

Spa2

Space at distances from the Earth approximately equal to, or greater than, the distance between the Earth and the Moon.

84BAA *Spacecraft*

Spa2

A man-made vehicle which is intended to go beyond the major portion of the Earth's atmosphere.

84BAB *Satellite*
Spa2

A body[1] which revolves around another body of preponderant mass and which has a motion primarily and permanently determined by the force of attraction of that other body.

84BAC *Active Satellite*
Spa2

An earth satellite carrying a station intended to transmit or retransmit radiocommunication signals.

84BAD *Passive Satellite*
Spa2

An earth satellite intended to transmit radiocommunication signals by reflection.

84BB *Orbit*
Spa2

1. The path, relative to a specified frame of reference, described by the centre of mass of a satellite or other object in space, subjected solely to natural forces, mainly the force of gravity.

2. By extension, the path described by the centre of mass of an object in space subjected to natural forces and occasional low-energy corrective forces exerted by a propulsive device in order to achieve and maintain a desired path.

84BC *Inclination of an Orbit* (of an earth satellite)
Spa2

The angle determined by the plane containing an orbit and the plane of the Earth's equator.

84BD *Period* (of a satellite)
Spa2

The time elapsing between two consecutive passages of a satellite or planet through a characteristic point on its orbit.

84BAB.1 [1] A body so defined which revolves around the Sun is called a planet or planetoid.
Spa2

84BE *Altitude of the Apogee (Perigee)*
Spa2

The altitude of the apogee (perigee) above a specified reference surface serving to represent the surface of the Earth.

84BF **SUP** **(Spa2)**

84BFA *Geosynchronous Satellite*
Spa2

An earth satellite whose period of revolution is equal to the period of rotation of the Earth about its axis.

84BG *Geostationary Satellite*
Spa2

A satellite, the circular orbit of which lies in the plane of the Earth's equator and which turns about the polar axis of the Earth in the same direction and with the same period as those of the Earth's rotation.

The orbit on which a satellite should be placed to be a geostationary satellite is called the "geostationary satellite orbit".

84BH **SUP** **(Spa2)**

Section III. Technical Characteristics

85 *Assigned Frequency:* The centre of the frequency band assigned to a station.

86 *Characteristic Frequency:* A frequency which can be easily identified and measured in a given emission.

87 *Reference Frequency:* A frequency having a fixed and specified position with respect to the assigned frequency. The displacement of this frequency with respect to the assigned frequency has the same absolute value and sign that the displacement of the characteristic frequency has with respect to the centre of the frequency band occupied by the emission.

88 *Frequency Tolerance:* The maximum permissible departure by the centre frequency of the frequency band occupied by an emission from the assigned frequency or, by the characteristic frequency of an emission from the reference frequency. The frequency tolerance is expressed in parts in 10^6 or in cycles per second.

89 *Assigned Frequency Band:* The frequency band the centre of which coincides with the frequency assigned to the station and the width of which equals the necessary bandwidth plus twice the absolute value of the frequency tolerance.

90 *Occupied Bandwidth:* The frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0·5 % of the total mean power radiated by a given emission. In some cases, for example multi-channel frequency-division systems, the percentage of 0·5 % may lead to certain difficulties in the practical application of the definitions of occupied and necessary bandwidth; in such cases a different percentage may prove useful.

91 *Necessary Bandwidth:* For a given class of emission, the minimum value of the occupied bandwidth sufficient to ensure the transmission of information at the rate and with the quality required for the system employed, under specified conditions. Emissions useful for the good functioning of the receiving equipment as, for example, the emission corresponding to the carrier of reduced carrier systems, shall be included in the necessary bandwidth.

92 *Spurious Emission:* Emission on a frequency or frequencies which are outside the necessary band, and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions and intermodulation products, but exclude emissions in the immediate vicinity of the necessary band, which are a result of the modulation process for the transmission of information.

93 *Harmful Interference:* Any emission, radiation or induction which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with these Regulations.

94 *Power:* Whenever the power of a radio transmitter, etc., is referred to, it shall be expressed in one of the following forms:

— peak envelope power (P_p);

— mean power (P_m);

— carrier power (P_c).

For different classes of emissions, the relationships between peak envelope power, mean power and carrier power, under the conditions of normal operation and of no modulation, are contained in Recommendations of the C.C.I.R., which may be used as a guide.

95 *Peak Envelope Power of a Radio Transmitter:* The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle at the highest crest of the modulation envelope, taken under conditions of normal operation.

96 *Mean Power of a Radio Transmitter:* The power supplied to the antenna transmission line by a transmitter during normal operation, averaged over a time sufficiently long compared with the period of the lowest frequency encountered in the modulation. A time of 1/10 second during which the mean power is greatest will be selected normally.

97 *Carrier Power of a Radio Transmitter:* The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle under conditions of no modulation. This definition does not apply to pulse modulated emissions.

98 *Effective Radiated Power:* The power supplied to the antenna multiplied by the relative gain of the antenna in a given direction.

98A *Equivalent Isotropically Radiated Power (e.i.r.p.)*
Spa2

The product of the power of an emission as supplied to an antenna and the antenna gain in a given direction relative to an isotropic antenna.

99 *Gain of an Antenna:* The ratio of the power required at the input of a reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field at the same distance. When not specified otherwise, the figure expressing the gain of an antenna refers to the gain in the direction of the radiation main lobe. In services using scattering modes of propagation the full gain of an antenna may not be realizable in practice and the apparent gain may vary with time.

100 *Isotropic or Absolute Gain of an Antenna:* The gain (G_{is}) of an antenna in a given direction when the reference antenna is an isotropic antenna isolated in space.

101 *Relative Gain of an Antenna:* The gain (G_d) of an antenna in a given direction when the reference antenna is a half-wave loss free dipole isolated in space and the equatorial plane of which contains the given direction.

102 *Gain Referred to a Short Vertical Antenna:* The gain (G_v) of an antenna in a given direction when the reference antenna is a perfect vertical antenna, much shorter than one quarter of the wavelength, placed on the surface of a perfectly conducting plane earth.

103 *Antenna Directivity Diagram:* A curve representing, in polar or cartesian co-ordinates, a quantity proportional to the gain of an antenna in the various directions in a particular plane or cone.

103A *Equivalent Satellite Link Noise Temperature*
Spa2

The noise temperature at the input of the earth station receiver corresponding to the radio-frequency noise power which

produces the total observed noise at the output of the satellite link excluding noise due to interference coming from satellite links using other satellites and from terrestrial systems.

103B *Co-ordination Distance*
Spa2

Distance from an earth station in a given azimuth within which a terrestrial station sharing the same frequency band may cause or be subject to more than a permissible level of interference.

103C *Co-ordination Contour*
Spa2

The line joining the points which are on all azimuths around an earth station at a distance from this station equal to the co-ordination distance corresponding to each azimuth.

103D *Co-ordination Area*
Spa2

Area around an earth station enclosed by the co-ordination contour.

Section III. Nomenclature of the Frequency and Wavelength Bands used in Radiocommunication

112 § 7. The radio spectrum shall be subdivided into nine frequency
Spa2 bands, which shall be designated by progressive whole numbers in accordance with the following table. Frequencies shall be expressed:

— in kilohertz (kHz) up to and including 3000 kHz

— in megahertz (MHz) thereafter up to and including 3000 MHz

— in gigahertz (GHz) thereafter up to and including 3000 GHz.

However, where adherence to these provisions would introduce serious difficulties, for example in connection with the notification and registration of frequencies, the lists of frequencies and related matters, reasonable departures may be made.

Band Number	Frequency Range (lower limit exclusive, upper limit inclusive)	Corresponding Metric Subdivision
4	3 to 30 kHz	Myriametric waves
5	30 to 300 kHz	Kilometric waves
6	300 to 3000 kHz	Hectometric waves
7	3 to 30 MHz	Decametric waves
8	30 to 300 MHz	Metric waves
9	300 to 3000 MHz	Decimetric waves
10	3 to 30 GHz	Centimetric waves
11	30 to 300 GHz	Millimetric waves
12	300 to 3000 GHz or 3 THz	Decimillimetric waves

Note 1: "Band Number N" extends from $0{\cdot}3 \times 10^N$ to 3×10^N Hz.

Note 2: Symbols and prefixes:
Hz = hertz
k = kilo (10^3), M = mega (10^6), G = giga (10^9), T = tera (10^{12}).

Note 3: Abbreviations for adjectival band designations:

Band 4 = VLF	Band 8 = VHF
Band 5 = LF	Band 9 = UHF
Band 6 = MF	Band 10 = SHF
Band 7 = HF	Band 11 = EHF

ARTICLE 5

Spa2

Frequency Allocations [1]
10 kHz to 275 GHz

Section I. Regions and Areas

125 § 1. For the allocation of frequencies the world has been
Spa2 subdivided into three Regions [2] (see Appendix 24).

126 *Region 1 :*

Region 1 includes the area limited on the East by line A (lines A, B and C are defined below) and on the West by line B, excluding any of the territory of Iran which lies between these limits. It also includes that part of the territory of Turkey and the Union of Soviet Socialist Republics lying outside of these limits, the territory of the Mongolian People's Republic, and the area to the North of the U.S.S.R. which lies between lines A and C.

127 *Region 2 :*

Region 2 includes the area limited on the East by line B and on the West by line C.

128 *Region 3 :*

Region 3 includes the area limited on the East by line C and on the West by line A, except the territories of the Mongolian People's Republic, Turkey, the territory of the U.S.S.R. and the area to the North of the U.S.S.R. It also includes that part of the territory of Iran lying outside of those limits.

129 The lines A, B, and C are defined as follows :

Spa2 [1] See Resolution No. 6.

125.1 [2] It should be noted that where the words "regions" or "regional" are without
Spa2 a capital "R" in these Regulations, they do not relate to the three Regions here defined for purposes of frequency allocation.

130 *Line A :*

Line A extends from the North Pole along meridian 40° East of Greenwich to parallel 40° North ; thence by great circle arc to the intersection of meridian 60° East and the Tropic of Cancer ; thence along the meridian 60° East to the South Pole.

131 *Line B :*

Line B extends from the North Pole along meridian 10° West of Greenwich to its intersection with parallel 72° North ; thence by great circle arc to the intersection of meridian 50° West and parallel 40° North ; thence by great circle arc to the intersection of meridian 20° West and parallel 10° South ; thence along meridian 20° West to the South Pole.

132 *Line C :*

Line C extends from the North Pole by great circle arc to the intersection of parallel 65° 30′ North with the international boundary in Behring Strait ; thence by great circle arc to the intersection of meridian 165° East of Greenwich and parallel 50° North ; thence by great circle arc to the intersection of meridian 170° West and parallel 10° North ; thence along parallel 10° North to its intersection with meridian 120° West ; thence along meridian 120° West to the South Pole.

133 § 2. The " European Broadcasting Area " is bounded on the West by the Western boundary of Region 1, on the East by the meridian 40° East of Greenwich and on the South by the parallel 30° North so as to include the western part of the U.S.S.R. and the territories bordering the Mediterranean, with the exception of the parts of Arabia and Saudi-Arabia included in this sector. In addition, Iraq is included in the European Broadcasting Area.

134 The " European Maritime Area " is bounded on the North by a line extending along parallel 72° North from its intersection with meridian 55° East to its intersection with meridian 5° West,

then along meridian 5° West to its intersection with parallel 67° North, thence along parallel 67° North to its intersection with meridian 30° West; on the West by a line extending along meridian 30° West to its intersection with parallel 30° North; on the South by a line extending along parallel 30° North to its intersection with meridian 43° East; on the East by a line extending along meridian 43° East to its intersection with parallel 60° North, thence along parallel 60° North to its intersection with meridian 55° East and thence along meridian 55° East to its intersection with parallel 72° North.

135 The "Tropical Zone" (see Appendix 24) is defined as:

a) the whole of that area in Region 2 between the Tropics of Cancer and Capricorn;

b) the whole of that area in Regions 1 and 3 contained between the parallels 30° North and 35° South with the addition of:

1) the area contained between the meridian 40° East and 80° East of Greenwich and the parallels 30° North and 40° North;

2) that part of Libya north of parallel 30° North.

136 In Region 2, the Tropical Zone may be extended to parallel 33° North, subject to appropriate special agreements between the countries concerned in that Region.

Section II. Categories of Services and Allocations

Primary Services, Permitted Services and Secondary Services

137 Where, in a box of the Table in Section IV of this Article, a band is indicated as allocated to more than one service, either on a world-wide or Regional basis, such services are listed in the following order:

a) services, the names of which are printed in "small capitals" (example: FIXED); these services are called "primary" services;

b) services, the names of which are printed in "grotesque light" (example: Radiolocation); these are "permitted" services (see No. **138**);

c) services, the names of which are printed in "italics" (example: *Mobile*); these are "secondary" services (see No. **139**).

138 Permitted and primary services have equal rights, except that, in the preparation of frequency plans, the primary service, as compared with the permitted service, shall have prior choice of frequencies.

139 Stations of a secondary service:

a) shall not cause harmful interference to stations of primary or permitted services to which frequencies are already assigned or to which frequencies may be assigned at a later date;

b) cannot claim protection from harmful interference from stations of a primary or permitted service to which frequencies are already assigned or may be assigned at a later date;

c) can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

140 Where a band is indicated in a footnote to the Table as allocated to a service "on a secondary basis" in an area smaller than a Region, or in a particular country, this is a secondary service (see No. **139**).

141 Where a band is indicated in a footnote to the Table as allocated to a service "on a primary basis", or "on a permitted basis" in an area smaller than a Region, or in a particular country, this is a primary service or a permitted service only in that area or country (see No. **138**).

Additional services

142 Where a band is indicated in a footnote to the Table as "also allocated" to a service in an area smaller than a Region, or in a particular country, this is an "additional" service, i.e. a service which is added in this area or in this country to the service or services which are indicated in the Table (see No. **143**).

143 If the footnote does not include any restriction on an additional service apart from the restriction to operate only in a particular area or country, stations of this service shall have equality of right to operate with stations of the other service or services, the names of which are printed in "small capitals" in the Table.

144 If restrictions are imposed on an additional service in addition to the restriction to operate only in a particular area or country, this is indicated in the footnote to the Table.

Alternative allocations

145 Where a band is indicated in a footnote to the Table as "allocated" to one or more services in an area smaller than a Region, or in a particular country, this is an "alternative" allocation, i.e. an allocation which replaces, in this area or in this country, the allocation indicated in the Table (see No. **146**).

146 If the footnote does not include any restriction on stations of the service or services concerned, apart from the restriction to operate only in a particular area or country, these stations shall

have an equality of right to operate with stations of the service or services, the names of which are printed in " small capitals " in the Table, and to which the band is allocated in other areas or countries.

147 If restrictions are imposed on stations of a service to which an alternative allocation is made, in addition to the restriction to operate only in a particular country or area, this is indicated in the footnote.

Miscellaneous Provisions

148 Where it is indicated in these Regulations that a service may operate in a specific frequency band subject to not causing harmful interference, this means also that this service cannot claim protection from harmful interference caused by other services to which the band is allocated under Chapter II of these Regulations.

149 Except if otherwise specified in a footnote, the term " fixed service ", where appearing in Section IV of this Article, does not include systems using ionospheric scatter propagation.

Section III. Description of the Table of Frequency Allocations

150 The heading of the Table in Section IV of this Article includes three columns, each of which corresponds to one of the Regions (see No. **125**). Where an allocation occupies the whole of the width of the Table or only one or two of the three columns, this is a world-wide allocation or a Regional allocation, respectively.

151 The frequency band referred to in each allocation is indicated in bold type in the left hand top corner of the part of the Table concerned.

152 Within each of the categories specified in No. **137**, services are listed in alphabetical order according to the French language. The order of listing does not indicate relative priority within each category.

153 The footnote references which appear in the Table below the allocated service or services apply to the whole of the allocation concerned.

154 The footnote references which appear to the right of the name of a service are applicable only to that particular service.

155 In certain cases, the names of countries appearing in the footnotes have been simplified in order to shorten the text.

Spa2 Section IV. Table of Frequency Allocations – 10 kHz to 275 GHz

156 This Table is shown on pages RR5-8 to RR5-117 following.

kHz
10—70

Allocation to Services		
Region 1	Region 2	Region 3
Below 10	(Not allocated) 157	
10—14	RADIONAVIGATION *Radiolocation*	
14—19·95	FIXED MARITIME MOBILE 158 159	
19·95—20·05	STANDARD FREQUENCY 160 159	
20·05—70	FIXED MARITIME MOBILE 158 159 161	

157 Administrations authorizing the use of frequencies below 10 kc/s for special national purposes shall ensure that no harmful interference is caused thereby to the services to which the bands above 10 kc/s are allocated (see also Article 14, No. **699**).

158 Limited to coast radiotelegraph stations (A1 and F1 only). Exceptionally,
Mar the use of class A7J emissions is permissible subject to the necessary bandwidth not exceeding that normally used for class A1 or F1 emissions in the bands concerned.

159 The stations of services to which the bands between 14 and 70 kc/s are allocated may transmit standard frequency and time signals. Such stations shall be afforded protection from harmful interference. In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the frequencies 25 kc/s and 50 kc/s will be used for this purpose under the same conditions.

160 The standard frequency is 20 kc/s.

161 In the U.S.S.R., frequencies in the band 60-80 kc/s may be used for industrial, scientific and medical purposes subject to the condition that interference is not caused to stations of services to which this band is allocated.

kHz
70—90

Allocation to Services		
Region 1	Region 2	Region 3
70—72 RADIONAVIGATION 162 161	**70—90** FIXED MARITIME MOBILE 158 MARITIME RADIONAVIGATION 162 *Radiolocation*	**70—90** FIXED MARITIME MOBILE 158 RADIONAVIGATION 162
72—84 FIXED MARITIME MOBILE 158 RADIONAVIGATION 162 161 163		
84—86 RADIONAVIGATION 162 163		
86—90 FIXED MARITIME MOBILE 158 RADIONAVIGATION 162 163	164	165

162 Limited to continuous wave systems.

163 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 80-150 kc/s is allocated on a secondary basis to the aeronautical and land mobile services while within and between these countries these services shall have equal right to operate.

164 The establishment and operation of maritime radionavigation stations shall be subject to arrangements between administrations whose services, operating in accordance with the Table, may be affected. However, the fixed, maritime mobile and radiolocation services shall not cause harmful interference to maritime radionavigation stations established under such arrangements.

165 In the bands 70-72 kc/s and 84-86 kc/s, the radionavigation service is the primary service and the fixed and maritime mobile services are secondary services, except in Japan and Pakistan.

kHz
90—110

Allocation to Services		
Region 1	Region 2	Region 3
90—110	**90—110**	**90—110**
FIXED	RADIONAVIGATION	FIXED
MARITIME MOBILE 158	*Fixed*	MARITIME MOBILE 158
RADIONAVIGATION	*Maritime mobile* 158	RADIONAVIGATION
163 166 167	166 167	166 167

166 The development and operation of long distance radionavigation systems are authorized in this band, which will become exclusively allocated, wholly or in part, to the radionavigation service for the use of any one such system as soon as it is internationally adopted. Other considerations being equal, preference should be given to the system requiring the minimum bandwidth for world-wide service and causing the least harmful interference to other services. If a pulse radionavigation system is employed, the pulse emissions shall nevertheless be confined within the band 90-110 kc/s and shall not cause harmful interference outside the band to stations operating in accordance with the Regulations. In Regions 1 and 3, during the period prior to the international adoption of any long distance radionavigation system, the operation of specific radionavigation stations shall be subject to agreements between administrations whose services, operating in accordance with the Table, may be affected. Once established under such agreements, radionavigation stations shall be protected from harmful interference.

167 **Mar** Only classes A1 or F1, A4 or F4 emissions are authorized in the band 90-160 kc/s for stations of the fixed and maritime mobile services. Exceptionally, class A7J emissions is also authorized in the band 90-160 kc/s for stations of the maritime mobile service.

kHz
110—130

Allocation to Services		
Region 1	Region 2	Region 3
110—112 FIXED MARITIME MOBILE RADIONAVIGATION 162 163 167 168	**110—130** FIXED MARITIME MOBILE MARITIME RADIONAVIGATION 162 *Radiolocation*	**110—130** FIXED MARITIME MOBILE RADIONAVIGATION 162
112—115 RADIONAVIGATION 162 163		
115—126 FIXED MARITIME MOBILE RADIONAVIGATION 162 163 167 168 169		
126—129 RADIONAVIGATION 162 163		
129—130 FIXED MARITIME MOBILE RADIONAVIGATION 162 163 167 168	164 167 168	167 168 170

168 Aeronautical stations may use frequencies in the bands 110-112 kc/s, 115-126 kc/s and 129-130 kc/s on a permitted basis for high-speed communications to aircraft.

169 In the band 115-117·6 kc/s the radionavigation service is the primary service and the fixed and maritime mobile services are secondary services. In the same band, in France and the F. R. of Germany the fixed and maritime mobile services are primary services and the radionavigation service is a secondary service.

170 In the bands 112-117·6 kc/s and 126-129 kc/s, the radionavigation service is the primary service and the fixed and maritime mobile services are secondary services, except in Japan and Pakistan.

kHz
130—160

Allocation to Services		
Region 1	Region 2	Region 3
130—150	**130—150**	
MARITIME MOBILE 172	FIXED	
Fixed	MARITIME MOBILE	
163 167 173	167	
150—160	**150—160**	
MARITIME MOBILE 167 174	FIXED	
BROADCASTING	MARITIME MOBILE	
175	167	

171 SUP (Mar)

172 Mar Limited to ship stations. However, the bands between 140 and 146 kc/s may also be used for coast stations on a permitted basis.

173 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 130-150 kc/s is allocated on a secondary basis to the radionavigation service while within and between these countries this service shall have equal right to operate.

174 The maritime mobile service shall not cause harmful interference to the reception of broadcasting stations within the boundaries of the national territories in which the broadcasting stations are situated.

175 By special agreement.

kHz
160—285

<table>
<tr><th colspan="3">Allocation to Services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td rowspan="2">160—255

BROADCASTING

176</td><td>160—200

FIXED

179</td><td>160—200

FIXED

Aeronautical radionavigation</td></tr>
<tr><td colspan="2" rowspan="2">200—285

AERONAUTICAL RADIONAVIGATION

Aeronautical mobile</td></tr>
<tr><td>255—285
MARITIME MOBILE 174
BROADCASTING
AERONAUTICAL RADIONAVIGATION
176 177 178</td></tr>
</table>

176 In the Belgian Congo and Ruanda Urundi, Ethiopia, the Portuguese Oversea Provinces in Region 1 south of the equator, Rhodesia and Nyasaland, and the Union of South Africa and the Territory of South West Africa, the band 160-200 kc/s is allocated to the fixed service; the band 200-285 kc/s is allocated to aeronautical mobile and aeronautical radionavigation services.

177 In the western part of the European Broadcasting Area, the band 255-285 kc/s is used solely by the aeronautical radionavigation service except that in the United Kingdom frequencies are also assigned, by special agreement, to stations of the maritime mobile service.

178 Norwegian stations of the aeronautical fixed service situated in northern areas subject to auroral disturbances are allowed to continue operation on one frequency in the band 255-285 kc/s.

179 In northern areas which are subject to auroral disturbances the aeronautical fixed service is the primary service.

kHz
285—405

Allocation to Services		
Region 1	Region 2	Region 3
285—315		
	MARITIME RADIONAVIGATION (radiobeacons) *Aeronautical radionavigation*	
315—325 AERONAUTICAL RADIONAVIGATION 180	**315—325** MARITIME RADIONAVIGATION (radiobeacons) *Aeronautical radionavigation*	
325—405		
	AERONAUTICAL RADIONAVIGATION *Aeronautical mobile* 181	

180 In the U.S.S.R. and the Black Sea areas of Bulgaria, Roumania and Turkey, the band 315-325 kc/s is also allocated to the maritime radionavigation service under the following conditions:

a) Stations of this service shall not cause interference to stations of the aeronautical radionavigation service in the North Sea area.

b) In the Black Sea and White Sea areas, the maritime radionavigation service is the primary service and the aeronautical radionavigation service is the permitted service.

c) In the Baltic Sea area, the assignment of frequencies in this band to new stations in the maritime or aeronautical radionavigation services shall be subject to prior consultation between the administrations concerned.

181 Norwegian fixed stations situated in northern areas subject to auroral disturbances are allowed to continue operation on two frequencies in the band 385-395 kc/s for transmissions chiefly composed of weather messages.

kHz
405—510

Allocation to Services		
Region 1	Region 2	Region 3
405—415	**405—415**	**405—415**
MOBILE except aeronautical mobile AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radio direction-finding) 182 183 184	MARITIME RADIONAVIGATION (radio direction-finding) Aeronautical radionavigation *Aeronautical mobile* 182	RADIONAVIGATION *Aeronautical mobile* 182
415—490	MARITIME MOBILE 185 186	
490—510	MOBILE (distress and calling) 187	

182 The frequency 410 kc/s is designated for the maritime radionavigation service (radio direction-finding). Other allocated services in the band 405-415 kc/s shall not cause harmful interference to radio direction-finding. In the band 405-415 kc/s no frequency shall be assigned to coast stations.

183 The use of the band 405-415 kc/s by the radionavigation service is limited to radio direction-finding except in the Baltic and North Sea areas where this band may also be used for the maritime radionavigation service for radiobeacon stations of mean power not exceeding 10 watts and subject to not causing harmful interference to radio direction-finding.

184 In Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 405-415 kc/s is also allocated, on a secondary basis, to the aeronautical mobile service.

185 In the European Maritime Area, subject to the conditions specified in the Final Acts of the European Maritime Conference (Copenhagen 1948), and any subsequent revision of that agreement, the administrations concerned may keep in the bands 415-485 kc/s and 515-525 kc/s such of the following broadcasting stations as will not cause harmful interference to the maritime mobile service: Hamar, Innsbruck, Oestersund, Oulu.

186 Limited to radiotelegraphy.

187 The frequency 500 kc/s is the international distress and calling frequency for radiotelegraphy. The conditions for its use are prescribed in Article 32.

kHz
510—1 605

Allocation to Services		
Region 1	**Region 2**	**Region 3**
510—525 MARITIME MOBILE 186 *Aeronautical radionavigation* 185	**510—525** MOBILE Aeronautical radionavigation 188	**510—525** MARITIME MOBILE *Aeronautical mobile* *Land mobile* 189
525—535 BROADCASTING 190	**525—535** MOBILE Broadcasting 191 Aeronautical radionavigation 188	**525—535** MOBILE Broadcasting
535—1 605 BROADCASTING		

188 In operating stations of the aeronautical radionavigation service, the administrations concerned shall take all the technical steps necessary to avoid harmful interference to the maritime mobile service.

189 In India, Iran and Pakistan, the band 510-525 kc/s is also allocated, on a secondary basis, to the aeronautical radionavigation service.

190 In Rhodesia and Nyasaland, and the Union of South Africa and the Territory of South West Africa, the band 525-535 kc/s is allocated to the mobile service.

191 The carrier power of broadcasting stations in this band shall not exceed 250 watts.

kHz
1 605—2 000
(Spa2)

<table>
<tr><th colspan="3">Allocation to Services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td rowspan="2">1 605—2 000
FIXED
MOBILE except aeronautical mobile</td><td>1 605—1 800
FIXED
MOBILE
AERONAUTICAL RADIONAVIGATION
Radiolocation</td><td>1 605—1 800
FIXED
MOBILE
196 197</td></tr>
<tr><td colspan="2">1 800—2 000
AMATEUR
FIXED
MOBILE except aeronautical mobile
RADIONAVIGATION
198</td></tr>
<tr><td>192 193 194 195</td><td colspan="2"></td></tr>
</table>

192 In the Tropical Zone of Region 1, with the exception of that part of Libya north of the parallel 30° N, the band 1 605-1 800 kc/s is also allocated, on a secondary basis, to the aeronautical radionavigation service (radiobeacons only).

193 Special agreements shall determine the conditions of operation of stations of the fixed and mobile services in order to protect these services from mutual harmful interference, having special regard to the difficulties of operation of stations of the maritime mobile service.

194 In Austria, Denmark, Finland, Ireland, Netherlands, F.R. of Germany, Rhodesia and Nyasaland, United Kingdom, Switzerland, Czechoslovakia, and the Union of South Africa and Territory of South West Africa, administrations may allocate up to 200 kc/s to their amateur service within the band 1 715-2 000 kc/s. However, when allocating bands within this range to their amateur service, administrations shall, after prior consultation with administrations of neighbouring countries, take such steps as may be necessary to prevent harmful interference from their amateur service to the fixed and mobile services of other countries. The mean power of any amateur station shall not exceed 10 watts.

195 The operation of Loran radionavigation stations is authorized temporarily on 1 950 kc/s (the band occupied being 1 925-1 975 kc/s) provided that, except for the stations comprising the North-East Atlantic Loran System (north of latitude 55° N), the establishment and operation of specific Loran stations shall be the subject of special agreements among administrations having operations that would be affected. All practicable measures shall be taken to reduce harmful interference from Loran transmissions to other services to which this band or adjacent bands are allocated.

196 In Japan, the band 1 605-1 800 kc/s is allocated on a permitted basis to the maritime radionavigation service using continuous wave systems with a mean power of not more than 50 watts.

197 Mar In Australia, North Borneo, Brunei, Sarawak, Singapore, China, Indonesia, Malaya, New Zealand and the Philippines, the band 1 605-1 800 kc/s is allocated on a permitted basis to the aeronautical radionavigation service, the stations of which shall use a mean power not exceeding 2 kW.[1]

198 In Region 2 the Loran system has priority. Other services to which the band is allocated may use any frequency in this band provided that they do not cause harmful interference to the Loran system.

In Region 3 the Loran system in any particular area operates either on 1 850 or 1 950 kc/s, the bands occupied being 1825-1875 kc/s and 1925-1975 kc/s respectively. Other services to which the band 1 800-2 000 kc/s is allocated may use any frequency therein on condition that no harmful interference is caused to the Loran system operating on 1 850 or 1 950 kc/s.

199 **SUP (Spa2)**

197.1 Mar [1] In Australia, Malaysia [including Sabah (North Borneo) and Sarawak], Brunei, Singapore, China, Indonesia, New Zealand and the Philippines, the stations of the maritime mobile service are authorized to use this band subject to agreements to be reached with administrations whose services, operating in accordance with the Table, may be affected.

199.1 **SUP (Spa2)**

kHz
2 000—2 194
(Spa2)

<table>
<tr><th colspan="3">Allocation to Services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td>2 000—2 045
FIXED
MOBILE except aeronautical mobile
193</td><td colspan="2" rowspan="2">2 000—2 065
FIXED
MOBILE</td></tr>
<tr><td>2 045—2 065
METEOROLOGICAL AIDS
FIXED
MOBILE except aeronautical mobile
193</td></tr>
<tr><td rowspan="2">2 065—2 170
FIXED
MOBILE except aeronautical mobile (R)
193</td><td colspan="2">2 065—2 107
MARITIME MOBILE
200</td></tr>
<tr><td colspan="2">2 107—2 170
FIXED
MOBILE</td></tr>
<tr><td colspan="3">2 170—2 194
MOBILE (distress and calling)
201 201A</td></tr>
</table>

200 Mar In Region 2, except in Greenland, coast stations and ship stations using radiotelephony shall be limited to class A3A or A3J emissions and to a peak envelope power not exceeding 1 kW. Preferably, the following carrier frequencies should be used: 2 065·0, 2 079·0, 2 082·5, 2 086·0, 2 093·0, 2 096·5, 2 100·0, 2 103·5 kc/s.

201 Mar The frequency 2 182 kc/s is the international distress and calling frequency for radiotelephony. The conditions for the use of the band 2 170- 2 194 kc/s are prescribed in Article 35.

201A Spa2 The frequencies 2 182 kHz, 3 023·5 kHz, 5 680 kHz, 8 364 kHz, 121·5 MHz, 156·8 MHz and 243 MHz may also be used, in accordance with the procedures in force for terrestrial radiocommunication services, for search and rescue operations concerning manned space vehicles.

The same applies to the frequencies 10 003 kHz, 14 993 kHz and 19 993 kHz, but in each of these cases emissions must be confined in a band of ± 3 kHz about the frequency.

kHz
2 194—2 625
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
2 194—2 300 FIXED MOBILE except aeronautical mobile (R) 193	**2 194—2 300** FIXED MOBILE	
2 300—2 498 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 202 193	**2 300—2 495** FIXED MOBILE BROADCASTING 202	
2 498—2 502 STANDARD FREQUENCY 203 203A	**2 495—2 505** STANDARD FREQUENCY 203 203A	
2 502—2 625 FIXED MOBILE except aeronautical mobile (R) 193	**2 505—2 625** FIXED MOBILE	

202 For the conditions of use of this band by the broadcasting service see Nos. **135, 136** and **423** to **428**.

203 The standard frequency is 2 500 kc/s.

203A **Spa2** The bands 2 501 – 2 502 kHz, 5 003 – 5 005 kHz, 10 003 – 10 005 kHz, 15 005 – 15 010 kHz, 19 990 – 19 995 kHz, 20 005 – 20 010 kHz and 25 005 – 25 010 kHz are also allocated, on a secondary basis, to the space research service.

204 SUP **(Spa2)**

kHz
2 625 — 2 850

Allocation to Services		
Region 1	Region 2	Region 3
2 625 — 2 650 MARITIME MOBILE MARITIME RADIONAVIGATION 175	**2 625 — 2 850** FIXED	
2 650 — 2 850 FIXED MOBILE except aeronautical mobile (R) 205	MOBILE	

205 Special agreements shall determine the conditions of operation of stations of the fixed and mobile services in order to protect these services from mutual harmful interference, having special regard to the difficulties of operation of stations of the maritime mobile service and also to the needs of the fixed service in certain areas.

kHz
2 850 — 3 500
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
2 850 — 3 025		
AERONAUTICAL MOBILE (R) 201A		
3 025 — 3 155		
AERONAUTICAL MOBILE (OR)		
3 155 — 3 200		
FIXED		
MOBILE except aeronautical mobile (R)		
3 200 — 3 230		
FIXED		
MOBILE except aeronautical mobile (R)		
BROADCASTING 202		
3 230 — 3 400		
FIXED		
MOBILE except aeronautical mobile		
BROADCASTING 202		
3 400 — 3 500		
AERONAUTICAL MOBILE (R)		

kHz
3 500—4 000

Allocation to Services		
Region 1	Region 2	Region 3
3 500—3 800 AMATEUR FIXED MOBILE except aeronautical mobile	**3 500—4 000** AMATEUR FIXED MOBILE exept aeronautical mobile (R)	**3 500—3 900** AMATEUR FIXED MOBILE 206 207
3 800—3 900 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE		
3 900—3 950 AERONAUTICAL MOBILE (OR)		**3 900—3 950** AERONAUTICAL MOBILE BROADCASTING
3 950—4 000 FIXED BROADCASTING		**3 950—4 000** FIXED BROADCASTING

206 In Australia, the band 3 500-3 700 kc/s is allocated to the amateur service; the band 3 700-3 900 kc/s is allocated to the fixed and mobile services.

207 In India, the band 3 500-3 890 kc/s is allocated to the fixed and mobile services; the band 3 890-3 900 kc/s is allocated to the amateur service.

kHz
4 000—4 850

Allocation to Services		
Region 1	Region 2	Region 3
4 000—4 063	FIXED	
4 063—4 438	MARITIME MOBILE 208 209	
4 438—4 650 FIXED MOBILE except aeronautical mobile (R)		**4 438—4 650** FIXED MOBILE except aeronautical mobile
4 650—4 700	AERONAUTICAL MOBILE (R)	
4 700—4 750	AERONAUTICAL MOBILE (OR)	
4 750—4 850 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE BROADCASTING 202	**4 750—4 850** FIXED BROADCASTING 202	

208 In the U.S.S.R., in the bands 4 063-4 133 kc/s and 4 408-4 438 kc/s, fixed stations of limited power may operate provided that, in order to minimize the possibility of causing harmful interference to the maritime mobile service, they are situated at least 600 km from the coast. A limited power station is one whose power and antenna characteristics are so adjusted that the field strength established at any point in any direction does not exceed that obtainable with a non-directive antenna and a peak envelope power of 1 kW.

209 On condition that harmful interference is not caused to the maritime mobile service, the frequencies between 4 063 and 4-438 kc/s may be used exceptionally by fixed stations communicating only within the boundary of the country in which they are located, with a mean power not exceeding 50 watts; however, in Regions 2 and 3, between 4 238 and 4 368 kc/s, a mean power not exceeding 500 watts may be used by such fixed stations.

kHz
4 850—5 480
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
4 850—4 995	FIXED LAND MOBILE BROADCASTING 202	
4 995—5 005	STANDARD FREQUENCY 203A 210	
5 005—5 060	FIXED BROADCASTING 202	
5 060—5 250	FIXED	
5 250—5 430 FIXED LAND MOBILE	**5 250—5 450** FIXED LAND MOBILE	**5 250—5 430** FIXED LAND MOBILE
5 430—5 480 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	**5 450—5 480** AERONAUTICAL MOBILE (R)	**5 430—5 480** FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE

210 The standard frequency is 5 000 kc/s.

kHz
5 480—7 100
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
5 480—5 680	AERONAUTICAL MOBILE (R) 201A	
5 680—5 730	AERONAUTICAL MOBILE (OR) 201A	
5 730—5 950	FIXED	
5 950—6 200	BROADCASTING	
6 200—6 525	MARITIME MOBILE 211	
6 525—6 685	AERONAUTICAL MOBILE (R)	
6 685—6 765	AERONAUTICAL MOBILE (OR)	
6 765—7 000	FIXED	
7 000—7 100	AMATEUR AMATEUR-SATELLITE	

211 On condition that harmful interference is not caused to the maritime mobile service, the frequencies between 6 200 and 6 525 kc/s may be used exceptionally by fixed stations, communicating only within the boundary of the country in which they are located, with a mean power not exceeding 50 watts. At the time of notification of these frequencies, the attention of the International Frequency Registration Board will be drawn to the above conditions.

kHz
7 100—9 995
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
7 100—7 300 BROADCASTING 212	7 100—7 300 AMATEUR	7 100—7 300 BROADCASTING
7 300—8 195	FIXED	
8 195—8 815	MARITIME MOBILE 201A 213	
8 815—8 965	AERONAUTICAL MOBILE (R)	
8 965—9 040	AERONAUTICAL MOBILE (OR)	
9 040—9 500	FIXED	
9 500—9 775	BROADCASTING	
9 775—9 995	FIXED	

212 In the Union of South Africa and the Territory of South West Africa, the band 7 100-7 150 kc/s is allocated to the amateur service.

213 Between 8 615 and 8 815 kc/s, 12 925 and 13 200 kc/s, and between 17 160 and 17 360 kc/s, the U.S.S.R. will meet their special requirements for the fixed service with due regard to technical provisions (power, location, antenna, etc.) with a view to minimizing the possibility of harmful interference to the maritime mobile service. Coast stations in the maritime mobile service will also have due regard to technical provisions (power, location, antenna, etc.) with a view to minimizing the possibility of harmful interference to the fixed service in the U.S.S.R. The International Frequency Registration Board will be consulted regarding this subject.

kHz
9 995—12 330
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
9 995—10 005	STANDARD FREQUENCY 201A 203A 214	
10 005—10 100	AERONAUTICAL MOBILE (R) 201A	
10 100—11 175	FIXED	
11 175—11 275	AERONAUTICAL MOBILE (OR)	
11 275—11 400	AERONAUTICAL MOBILE (R)	
11 400—11 700	FIXED 216	
11 700—11 975	BROADCASTING	
11 975—12 330	FIXED	

214 The standard frequency is 10 000 kc/s.

215 215A SUP (Spa2)

216 In the U.S.S.R., the band 11 400-11 450 kc/s is also allocated to the aeronautical mobile (OR) service.

kHz
12 330 — 14 990
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
12 330 — 13 200	MARITIME MOBILE 213	
13 200 — 13 260	AERONAUTICAL MOBILE (OR)	
13 260 — 13 360	AERONAUTICAL MOBILE (R)	
13 360 — 14 000	FIXED 217	
14 000 – 14 250	AMATEUR AMATEUR-SATELLITE	
14 250 – 14 350	AMATEUR 218	
14 350 — 14 990	FIXED	

217 The frequency 13 560 kc/s is designated for industrial, scientific and medical purposes. Emissions must be confined within the limits of ± 0·05 % of that frequency. Radiocommunication services operating within those limits must accept any harmful interference that may be experienced from the operation of industrial, scientific and medical equipment.

218 In the U.S.S.R., the band 14 250-14 350 kc/s is also allocated to the fixed service.

kHz
14 990—17 900
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
14 990 — 15 010	STANDARD FREQUENCY 201A 203A 219	
15 010 — 15 100	AERONAUTICAL MOBILE (OR)	
15 100 — 15 450	BROADCASTING	
15 450—15 762	FIXED	
15 762—15 768	FIXED	
15 768—16 460	FIXED	
16 460 — 17 360	MARITIME MOBILE 213	
17 360 — 17 700	FIXED	
17 700 — 17 900	BROADCASTING	

219 The standard frequency is 15 000 kc/s.

kHz
17 900—21 750
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
17 900—17 970	AERONAUTICAL MOBILE (R)	
17 970—18 030	AERONAUTICAL MOBILE (OR)	
18 030 - 18 052	FIXED	
18 052 - 18 068	FIXED *Space Research*	
18 068 - 19 990	FIXED	
19 990 - 20 010	STANDARD FREQUENCY 201A 203A 220	
20 010—21 000	FIXED	
21 000—21 450	AMATEUR AMATEUR-SATELLITE	
21 450—21 750	BROADCASTING	

220 The standard frequency is 20 000 kc/s.

221 **221A** SUP (Spa2)

kHz
21 750 — 25 010
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
21 750 — 21 850	FIXED	
21 850 - 21 870	RADIO ASTRONOMY 221B	
21 870 - 22 000	AERONAUTICAL FIXED AERONAUTICAL MOBILE (R)	
22 000 — 22 720	MARITIME MOBILE	
22 720 — 23 200	FIXED	
23 200 — 23 350	AERONAUTICAL FIXED AERONAUTICAL MOBILE (OR)	
23 350 — 24 990	FIXED LAND MOBILE 222 222A	
24 990 — 25 010	STANDARD FREQUENCY 203A 223	

221B Spa2 In Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 21 850 – 21 870 kHz is also allocated to the aeronautical fixed and the aeronautical mobile (R) services. The administrations concerned will take all practicable steps to protect radio astronomy observations in this band from harmful interference.

222 Inter-ship radiotelegraphy may be used in the maritime mobile service between the frequencies 23 350 and 24 000 kc/s.

222A Spa2 In Argentina and Uruguay, the band 24 528 – 24 538 kHz may be used by the space research service, subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

223 The standard frequency is 25 000 kc/s.

kHz
25 010—27 500

Allocation to Services		
Region 1	Region 2	Region 3
25 010—25 070	FIXED MOBILE except aeronautical mobile	
25 070—25 110	MARITIME MOBILE 224	
25 110—25 600	FIXED MOBILE except aeronautical mobile	
25 600—26 100	BROADCASTING	
26 100—27 500	FIXED MOBILE except aeronautical mobile 225 226	

224 Limited to ship stations employing A1 or F1 emissions.

225 The frequency 27 120 kc/s is designated for industrial, scientific and medical purposes. Emissions must be confined within the limits of ± 0·6% of that frequency. Radiocommunication services operating within those limits must accept any harmful interference that may be experienced from the operation of industrial, scientific and medical equipment.

226 In Region 2, Australia and New Zealand, the amateur service may operate between the frequencies 26 960 and 27 230 kc/s.

MHz
27·5–37·75
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
27·5—28 METEOROLOGICAL AIDS 227	27·5—28 METEOROLOGICAL AIDS FIXED MOBILE	
28 – 29·7	AMATEUR AMATEUR-SATELLITE	
29·7 – 30·005	FIXED 228 229 231 232 MOBILE	
30·005 – 30·01	SPACE OPERATION (Satellite identification) FIXED 228 229 231 MOBILE SPACE RESEARCH	
30·01 – 37·75	FIXED 228 229 230 231 MOBILE 233A	

227 In Albania, Bulgaria, Hungary, Poland, Roumania, Switzerland, Czechoslovakia, and the U.S.S.R., the band 27·5-28 Mc/s is also allocated to the fixed and mobile services.

228 Stations designed to use ionospheric scatter may operate only subject to agreements between administrations concerned and those whose services, operating in accordance with the Table, may be affected.

229 Systems designed to use ionospheric scatter or other fixed service systems designed to operate over distances exceeding 800 km shall confine their emissions to the following bands:

Region 1	Region 2	Region 3
32·6—33	32·6—33	32·6—33
36·2—36·6	34·6—35	34·6—35
39 —39·4	36·4—36·8	36·4—36·8

and shall have priority in Region 2 in the bands shown above for such use in that Region.

230 In the case of the bands referred to in No. **229**, which are limited to a particular Region the provisions of No. **117** shall apply and administrations shall avoid beaming such transmissions towards another Region unless specifically co-ordinated otherwise.

231 Ionospheric scatter stations, existing on 1 January 1960, and not causing harmful interference to the other services to which the band is allocated, may continue to operate on frequencies now assigned until re-accommodated.

232 Conventional (F2) long distance fixed service use of the band 29·7-30 Mc/s is not excluded in Region 2, provided that such use is coordinated between the administrations concerned.

233 SUP (Spa2)

233A Spa2 In Argentina and Uruguay, the bands 36·65 – 36·85 MHz, 41·15 – 41·35 MHz and 45·65 – 45·85 MHz, and in Argentina, Brazil and Uruguay, the band 170·55 – 170·95 MHz, are allocated to the radio astronomy service and no assignments shall be made to the fixed and mobile services in these bands.

MHz
37·75–50
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
37·75 – 38·25	FIXED 228 229 231 MOBILE *Radio Astronomy* 233B	
38·25 – 41	FIXED 228 229 230 231 MOBILE 235 236 236A	
41 – 47 BROADCASTING *Fixed* 228 237 *Mobile* 236A 238 239 240 241	**41 – 50** FIXED 228 231 237 MOBILE 233A 236A	**41 – 44** FIXED 228 237 MOBILE 236A
		44 – 50 FIXED 228 231 237 MOBILE BROADCASTING

233B In making assignments to stations of other services to which the bands
Spa2 37·75 – 38·25 MHz, 150·05 – 153 MHz, 406·1 – 410 MHz, 2 690 – 2 700 MHz and 4 700 – 5 000 MHz are allocated, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference.

234 SUP (Spa)

235 The band 39·986 – 40·02 MHz is also allocated, on a secondary basis, to the
Spa2 space research service.

236 The frequency 40·68 Mc/s is designated for industrial, scientific and medical purposes. Emissions must be confined within the limits of ± 0·05% of that frequency. Radiocommunication services operating within those limits must accept any harmful interference that may be experienced from the operation of industrial, scientific and medical equipment.

236A Spa2 The band 40·98 – 41·015 MHz is also allocated, on a secondary basis, to the space research service, in particular for measurements of the differential Faraday effect.

237 Systems designed to use ionospheric scatter which may cause harmful interference to the broadcasting service are prohibited.

238 In Rhodesia and Nyasaland, the band 41-44 Mc/s is allocated to the fixed, mobile and aeronautical radionavigation services; the bands 44-50 and 54-68 Mc/s are allocated to the fixed, mobile and broadcasting services; the band 50-54 Mc/s is allocated to the amateur service.

239 In the Belgian Congo and Ruanda Urundi, and the Union of South Africa and the Territory of South West Africa, the band 41-50 Mc/s is also allocated to the fixed, mobile and aeronautical radionavigation services; the band 50-54 Mc/s is allocated to the amateur service; and the band 54-68 Mc/s is allocated to the fixed, mobile and broadcasting services. The band 53-54 Mc/s may be used for model control.

240 In Spain, France, Monaco and the United Kingdom, the band 41-47 Mc/s is allocated to the broadcasting service.

241 In the Portuguese Oversea Provinces in Region 1 south of the equator, the band 41-68 Mc/s is also allocated on a permitted basis to the fixed and mobile services.

MHz
47–68

Allocation to Services		
Region 1	Region 2	Region 3
47—68		
	50—54 AMATEUR 244 245 246 247	
BROADCASTING	54—68 FIXED 228 237 MOBILE BROADCASTING	54—68 FIXED 228 231 237 MOBILE BROADCASTING
238 239 241 242 243		246

242 In Austria, the F. R. of Germany and Czechoslovakia, the band 47-68 Mc/s is also allocated, on a secondary basis, to the fixed service and mobile, except aeronautical mobile, service.

243 In Albania, Bulgaria, Hungary, Poland, Roumania and the U.S.S.R., the band 47-48·5 Mc/s is also allocated, on a secondary basis, to the fixed and mobile services; the band 56·5-58 Mc/s is also allocated, on a secondary basis, to the fixed service.

244 In Malaya, New Zealand and Singapore, the band 50-51 Mc/s is allocated to the fixed, mobile and broadcasting services.

245 In India, Indonesia, Iran and Pakistan, the band 50-54 Mc/s is allocated to the fixed and mobile services.

246 In Australia, the band 50-54 Mc/s is allocated to the fixed, mobile and broadcasting services; the band 56-58 Mc/s is allocated to the amateur service.

247 In New Zealand, the band 51-53 Mc/s is also allocated to the fixed and mobile services; the band 53-54 Mc/s is allocated to the fixed and mobile services.

MHz
68—75·4
(Spa)

<table>
<tr><th colspan="3">Allocation to Services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td rowspan="2">68—74·8
FIXED
MOBILE except aeronautical mobile

248 249 250 251 252</td><td rowspan="2">68—73
FIXED
MOBILE
BROADCASTING</td><td>68—70
FIXED
MOBILE
AERONAUTICAL RADIONAVIGATION
254 255 256</td></tr>
<tr><td>70—74·6
FIXED
MOBILE
256 257 258</td></tr>
<tr><td rowspan="2">74·8—75·2
AERONAUTICAL RADIONAVIGATION
259</td><td colspan="2">73—74·6
RADIO ASTRONOMY
253A 253B</td></tr>
<tr><td colspan="2">74·6—75·4
AERONAUTICAL RADIONAVIGATION
259</td></tr>
</table>

248 In the U.S.S.R., the bands 68-73 Mc/s and 76-87·5 Mc/s are allocated to the broadcasting service. The services to which these bands are allocated in other countries and the broadcasting service in the U.S.S.R. are subject to local agreement in order to avoid mutual harmful interference.

249 In Austria, Belgium, France, Greece, Morocco and the United Kingdom, the band 68-70 Mc/s is also allocated to the aeronautical radionavigation service for ground-based transmitters only.

250 In Albania, Bulgaria, Hungary, Poland, Roumania and Czechoslovakia, the bands 68-73 Mc/s (sound broadcasting) and 76-87·5 Mc/s (television) are also allocated to the broadcasting service. In these countries, broadcasting stations in these bands shall be established and operated only in accordance with agreements

and associated plans, to be drawn up by a special regional conference to be held not later than 1 May 1960. In the preparation of plans for the broadcasting service and the associated agreement concerning the fixed and mobile services, account should be taken of the existing assignments to broadcasting in the U.S.S.R. and to the fixed and mobile services in other countries which may be affected. The plans and agreement shall have the object of ensuring that no harmful interference is caused between the broadcasting service and the fixed and mobile services. The countries: Albania, Austria, Bulgaria, Denmark, Greece, Hungary, Italy, Poland, F. R. of Germany, Yugoslavia, Roumania, Sweden, Switzerland, Czechoslovakia, Turkey, the U.S.S.R. and other interested countries shall participate in the conference.

251 In Greece and the United Kingdom, the band 72·8-74·8 Mc/s is also allocated to the aeronautical radionavigation service for ground-based transmitters only.

252 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the bands 73-74·8 Mc/s and 75·2-76 Mc/s are also allocated to the aeronautical radionavigation service for ground-based transmitters only.

253 SUP (Spa)

253A Spa In Region 2, fixed, mobile and broadcasting service operations previously authorized in the band 73-74·6 Mc/s may continue to operate on a non-interference basis to the radio astronomy service.

253B Spa In Cuba, the band 73-74·6 Mc/s is also allocated to the fixed, mobile and broadcasting services.

254 In Australia, the band 68-70 Mc/s is allocated to the fixed, mobile and broadcasting services; the band 85-88 Mc/s is allocated to the broadcasting and radionavigation services.

255 In China, the bands 68-70 Mc/s and 75·4-87 Mc/s are allocated to the fixed, mobile and broadcasting services; the band 100-108 Mc/s is allocated to the fixed and broadcasting services.

256 In Korea, the band 68-72 Mc/s is also allocated to the broadcasting service; the bands 76-87 Mc/s and 100-108 Mc/s are allocated to the fixed, mobile and broadcasting services.

257 In India, the bands 70-72·8 Mc/s and 76-85 Mc/s are also allocated to the broadcasting service.

258 In North Borneo, Brunei, Sarawak, Singapore and Malaya, the band 72·8-74·6 Mc/s is also allocated to the aeronautical radionavigation service; the band 100-108 Mc/s is allocated to the fixed, mobile and broadcasting services.

259 The frequency 75 Mc/s is assigned to aeronautical marker beacons. Administrations shall refrain from assigning frequencies close to the limits of the guard-band to stations of other services which, because of their power or geographical position, might cause harmful interference to marker beacons.

MHz
75·2—100
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
75·2—87·5 FIXED MOBILE except aeronautical mobile 248 250 252 260 261 262 263	**75·4—88** FIXED MOBILE BROADCASTING	**75·4—78** FIXED MOBILE 255 256 257 265
		78—80 FIXED MOBILE AERONAUTICAL RADIONAVIGATION 255 256 257 261 266
		80—87 FIXED MOBILE 254 255 256 257 261 266
87·5—100 BROADCASTING 264 265	**88—100** BROADCASTING	**87—100** FIXED MOBILE BROADCASTING 254 267 268

260 In Belgium, Morocco and the United Kingdom, the band 78-80 Mc/s is also allocated to the aeronautical radionavigation service for ground-based transmitters only; in France this band is allocated to the radionavigation service.

261 The band 79·75-80·25 Mc/s is also allocated in Regions 1 and 3 (except Korea, India and Japan) to the radio astronomy service. In making assignments to stations of other services to which this band is allocated, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference. The radio astronomy service shall be protected from harmful interference from services operating in other bands in accordance with the provisions of these Regulations, only to the extent that these services are protected from each other.

262 In the United Kingdom, the band 82-87 Mc/s is also allocated to the radiolocation service.

263 In Nigeria, Sierra Leone and Gambia, the band 86-87·5 Mc/s is also allocated to the broadcasting service.

264 In the United Kingdom, the band 87·5-88 Mc/s is also allocated to the land mobile service.

265 In the United Kingdom, the band 95-100 Mc/s is also allocated, on a permitted basis, to the fixed and land mobile services.

266 In Japan, the band 76-87 Mc/s is also allocated to the broadcasting service.

267 Spa2 In New Zealand, the bands 87 – 88 MHz and 94 – 108 MHz are allocated to the fixed and mobile services.

268 In India, the band 87-100 Mc/s is allocated to the broadcasting service.

MHz
100 — 108

Allocation to Services		
Region 1	Region 2	Region 3
100 — 108	**100 — 108**	
MOBILE except aeronautical mobile (R)	BROADCASTING	
269 270 271	255 256 258 267 272	

269 In the Portuguese Oversea Provinces in Region 1 south of the equator, Rhodesia and Nyasaland, and the Union of South Africa and Territory of South West Africa, the band 100-108 Mc/s is allocated to the broadcasting service.

270 In Austria, Belgium, Spain, Israel, Italy, Yugoslavia, Switzerland and, if necessary, in Denmark, the Netherlands and the F. R. of Germany, the band 100-104 Mc/s is allocated on a permitted basis to the broadcasting service. The introduction of the broadcasting service in these countries is subject to special agreements between the interested and affected administrations, to ensure that harmful interference is not caused to the services of the other countries operating in accordance with the Radio Regulations.

271 In Denmark, Finland, Greece, Ireland, Iceland, Norway, the F. R. of Germany, Sweden and Turkey, the band 100-108 Mc/s is also allocated to the fixed service and the same allocation will also be made eventually in the Netherlands and the United Kingdom. In Italy and Yugoslavia, the band 104-108 Mc/s is also allocated to the fixed service. The effective radiated power of any station in the fixed service shall normally not exceed 25 watts. In case higher powers are used, the introduction of the fixed service is subject to special agreements between interested and affected administrations.

272 In the Philippines, the band 100-108 Mc/s is also allocated to the fixed and mobile services.

MHz
108–138
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
108 — 117·975	AERONAUTICAL RADIONAVIGATION	
117·975 – 132	AERONAUTICAL MOBILE (R) 201A 273 273A	
132 – 136	AERONAUTICAL MOBILE (R) 273A 274 274A 274B 275	
136 – 137	SPACE RESEARCH (Space-to-Earth) 281A 281AA	
137 – 138	SPACE OPERATION (Telemetering and tracking) METEOROLOGICAL-SATELLITE SPACE RESEARCH (Space-to-Earth) 275A 279A 281C 281E	

273 The frequency 121.5 Mc/s is the aeronautical emergency frequency in this band; mobile stations of the maritime mobile service may communicate on this frequency for safety purposes with stations of the aeronautical mobile service.

273A Spa In the band 117·975-132 Mc/s and in the band 132-136 Mc/s where the aeronautical mobile (R) service is authorized, the use and development, for this service, of systems using space communication techniques may be authorized but limited initially to satellite relay stations of the aeronautical mobile (R) service. Such use and development shall be subject to co-ordination between administrations concerned and those having services operating in accordance with the Table, which may be affected.

274 Spa2 In Bulgaria, Japan, Poland, Portugal, Portuguese Oversea Provinces in Region 1 south of the equator, Roumania, Sweden, Czechoslovakia and the U.S.S.R., existing stations in the aeronautical mobile (OR) service in the band 132 – 136 MHz, may continue to operate for an unspecified period on a primary basis.

274A Spa2 In Regions 2 and 3, stations of the fixed and mobile services may continue to use the band 132 – 136 MHz until 1 January 1976. Until that date, frequency assignments to stations of the aeronautical mobile (R) service shall be co-ordinated between the administrations concerned and shall be protected from harmful interference.

274B Spa2 In Cuba and Mexico, the band 132 – 136 MHz is also allocated to the fixed and mobile services.

275 Spa2 In Burundi, Ethiopia, Gambia, Malawi, Nigeria, Portuguese Oversea Provinces in Region 1 south of the equator, Rhodesia, Rwanda, Sierra Leone and in the Republic of South Africa, the band 138 – 144 MHz is allocated to the fixed and mobile services. In these countries, existing stations in the fixed and mobile services may continue to operate in the band 132 – 136 MHz until 1 January 1976.

275A Spa In Burundi, Nigeria, Sierra Leone, Gambia, Portuguese Oversea Provinces in Region 1 south of the equator, Rhodesia and Nyasaland, and Rwanda, the band 137-138 Mc/s is also allocated to the fixed and mobile services.

276 277 SUP **(Spa2)**

278 Spa2 In New Zealand, the band 138 – 144 MHz is allocated to the aeronautical mobile (OR) service.

279 SUP **(Spa2)**

279A Spa In Australia, the band 137-144 Mc/s is also allocated to the broadcasting service for television.

280 281 SUP **(Spa)**

281A Spa For the use of the band 136-137 Mc/s, see Recommendation No. Spa7.

281AA Spa2 In Bulgaria, China, Cyprus, Korea, Spain, Ethiopia, Ghana, Hungary, India, Indonesia, Iran, Iraq, Kenya, Kuwait, Malaysia, Uganda, Pakistan, Philippines, Poland, Portugal, the United Arab Republic, Roumania, Senegal, Syria, Tanzania, Czechoslovakia and the U.S.S.R., the band 136 – 137 MHz is also allocated to the fixed and mobile services.

281B SUP **(Spa2)**

281C Spa2 In Bulgaria, Hungary, Kuwait, Lebanon, Poland, the United Arab Republic, Roumania, Czechoslovakia, the U.S.S.R. and in Yugoslavia, the band 137 – 138 MHz is also allocated to the aeronautical mobile (OR) service.

281D SUP **(Spa2)**

281E Spa2 In Malaysia, Pakistan and the Philippines, the band 137 – 138 MHz is also allocated to the fixed and mobile services.

281F SUP **(Spa2)**

MHz
138–143·6
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
138 – 143·6 AERONAUTICAL MOBILE (OR) 275 281G 282A 283	**138 – 143·6** FIXED MOBILE Radiolocation *Space Research* (Space-to-Earth) 283A	**138 – 143·6** FIXED MOBILE *Space Research* (Space-to-Earth) 278 279A 284

281G Spa2 In the F.R. of Germany, the band 138 – 140 MHz is also allocated, on a secondary basis, to the space research service (space-to-Earth).

282 SUP **(Spa2)**

282A Spa2 In Belgium, France, Israel, Italy, Liechtenstein, Netherlands, the United Kingdom and Switzerland, the bands 138 – 143·6 MHz and 143·65 – 144 MHz are also allocated, on a secondary basis, to the space research service (space-to-Earth).

283 Spa2 In Austria, Denmark, Greece, Norway, Netherlands, Portugal, F.R. of Germany, United Kingdom, Sweden, Switzerland and Turkey, the band 138 – 144 MHz is also allocated to the fixed and mobile, except aeronautical mobile (R), services.

283A Spa2 In Argentina, the frequency 138·54 MHz ± 7·5 kHz and the band 143·6 – 143·65 MHz may be used by the space research service (telecommand), subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

284 Spa In China, the band 138-144 Mc/s is also allocated to the radiolocation service.

MHz
143·6—150·05
(Spa2)

<table>
<tr><th colspan="3">Allocation to Services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td>143·6 – 143·65
AERONAUTICAL MOBILE (OR)
SPACE RESEARCH (Space-to-Earth)

275 283</td><td>143·6 – 143·65
FIXED
MOBILE
SPACE RESEARCH (Space-to-Earth)
Radiolocation

283A</td><td>143·6 – 143·65
FIXED
MOBILE
SPACE RESEARCH (Space-to-Earth)

278 279A 284</td></tr>
<tr><td>143·65 – 144
AERONAUTICAL MOBILE (OR)

275 282A 283</td><td>143·65 – 144
FIXED
MOBILE
Radiolocation
Space Research (Space-to-Earth)</td><td>143·65 – 144
FIXED
MOBILE
Space Research (Space-to-Earth)
278 279A 284</td></tr>
<tr><td colspan="3">144 – 146
AMATEUR
AMATEUR-SATELLITE</td></tr>
<tr><td rowspan="2">146 – 149·9
FIXED
MOBILE except aeronautical mobile (R)

285 285A</td><td colspan="2">146 – 148
AMATEUR
289</td></tr>
<tr><td colspan="2">148 – 149·9
FIXED
MOBILE
285A 290</td></tr>
<tr><td colspan="3">149·9 – 150·05
RADIONAVIGATION-SATELLITE
285B 285C</td></tr>
</table>

MHz
150·05–174
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
150·05 – 151 FIXED MOBILE except aeronautical mobile (R) RADIO ASTRONOMY 233B 285 286A	**150·05 – 174** FIXED MOBILE	**150·05 – 170** FIXED MOBILE
151 – 153 FIXED MOBILE except aeronautical mobile (R) RADIO ASTRONOMY Meteorological Aids 233B 285 286A		
153 – 154 FIXED MOBILE except aeronautical mobile (R) Meteorological Aids 285		
154 – 156 FIXED MOBILE except aeronautical mobile (R) 285		201A 287 287A 290
156 – 174 FIXED MOBILE except aeronautical mobile 201A 285 287 287A 288	201A 233A 287 287A	**170 – 174** FIXED MOBILE BROADCASTING

284A SUP (Spa2)

285 Spa In Rhodesia and Nyasaland, and the Rep. of South Africa and Territory of South-West Africa, the bands 146-149·9 Mc/s and 150·05-174 Mc/s are also allocated to the aeronautical mobile service.

285A Spa2 The band 148 – 149·9 MHz may be authorized for space telecommand, subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected. The bandwidth of an individual transmission shall not exceed ± 15 kHz.

285B Spa2 In Austria, Bulgaria, Cuba, Hungary, Iran, Kuwait, Pakistan, Poland, the United Arab Republic, Roumania and Yugoslavia, the band 149·9 – 150·05 MHz is also allocated to fixed and mobile services (see Recommendation No. Spa 8).

285C Spa2 Emissions of the radionavigation-satellite service in the bands 149·9 – 150·05 MHz and 399·9 – 400·05 MHz may also be used by receiving earth stations of the space research service.

286 SUP (Spa2) (*see* ADD **233B**)

286A Spa In the United Kingdom, the band 150·05-151 Mc/s is allocated to the radio astronomy service, and the band 151-153 Mc/s is allocated to the radio astronomy service on a primary basis and to the meteorological aids service on a secondary basis; however, in this band the provisions of No. **274** apply.

287 Mar The frequency 156·8 Mc/s is the international safety and calling frequency for the maritime mobile VHF radiotelephone service. Administrations shall ensure that a guard-band on each side of the frequency 156·8 Mc/s is provided. The conditions for the use of this frequency are contained in Article 35.

In the bands 156·025-157·425 Mc/s, 160·625-160·975 Mc/s and 161·475-162·025 Mc/s, each administration shall give priority to the maritime mobile service on only such frequencies as are assigned to stations of the maritime mobile service by that administration (see Article 35).

Any use of frequencies in these bands by stations of other services to which they are allocated should be avoided in areas where such use might cause harmful interference to the maritime mobile VHF radiotelephone service.

However, the frequency bands in which priority is given to the maritime mobile service may be used for radiotelephone communications on inland waterways, subject to agreements between interested and affected administrations and taking into account current frequency usage and existing agreements.

287A Spa2 In the frequency bands designated for the maritime mobile service in accordance with Appendix 18 to the Radio Regulations, the use of satellite systems for safety and distress may be authorized on certain channels on an exclusive basis in the band 157·3125 – 157·4125 MHz for transmissions from ships to satellites and in the band 161·9125 – 162·0125 MHz for transmissions from satellites to ships. The satellite systems shall not be brought into use before 1 January 1976 (see Resolution No. **Spa2** – 5).

288 In France, Morocco and Monaco, the band 162-174 Mc/s is allocated to the broadcasting service.

289 In China, India and Japan, the band 146-148 Mc/s is also allocated to the fixed and mobile services.

290 Spa In New Zealand, the bands 148-149·9 Mc/s and 150·05-156 Mc/s are allocated to the aeronautical mobile (OR) service.

MHz
174—235
(Spa)

Allocation to Services		
Region 1	Region 2	Region 3
174—216 BROADCASTING 291 292 293 294	**174—216** FIXED MOBILE BROADCASTING 294 295 296	
216—223 AERONAUTICAL RADIONAVIGATION BROADCASTING 297 298 299 300 301	**216—220** FIXED MOBILE RADIOLOCATION	**216—225** AERONAUTICAL RADIONAVIGATION *Radiolocation* 306 307 308
223—235 AERONAUTICAL RADIONAVIGATION *Fixed* *Mobile* 299 300 301 302 303 304 305	**220—225** AMATEUR RADIOLOCATION	
	225—235 FIXED MOBILE	**225—235** FIXED MOBILE AERONAUTICAL RADIONAVIGATION

291 In the Union of South Africa and the Territory of South West Africa, the bands 174-181 Mc/s and 213-216 Mc/s are also allocated to the fixed and land mobile services.

292 In the United Kingdom, the band 174-184 Mc/s is also allocated to the fixed service; the band 211-216 Mc/s is allocated to the broadcasting and aeronautical radionavigation services.

293 In Ethiopia, Kenya, Tanganyika, Uganda, Nigeria, Sierra Leone, Gambia, Rhodesia and Nyasaland, and Zanzibar, the band 174-216 Mc/s is also allocated to the fixed and mobile services.

294 Spa The band 183·1-184·1 Mc/s is also allocated, on a secondary basis, to the space research service.

295 In India, the band 197-216 Mc/s, and in New Zealand, Pakistan and the Philippines, the band 200-216 Mc/s are also allocated to the aeronautical radionavigation service.

296 In Australia, the band 202-209 Mc/s is allocated to the aeronautical radionavigation service.

297 The aeronautical radionavigation service will be operated only in Denmark, Spain, France, Greece, Nigeria, the Netherlands, Portugal, the United Kingdom, Sweden, Turkey and the Union of South Africa and Territory of South West Africa.

The broadcasting service will be introduced in such a way so as not to reduce the areas of coverage of the aeronautical radionavigation service of the abovementioned countries existing on 21st December, 1959, or such lesser areas as may exist thereafter. The agreement of administrations concerned shall be obtained before new broadcasting stations are brought into operation which could cause harmful interference to the aeronautical radionavigation service.

The administrations employing the aeronautical radionavigation service shall not operate airborne equipment during flights over countries in which the band 216-223 Mc/s is used exclusively for the broadcasting service.

298 In Italy, the band 216-223 Mc/s is also allocated to the fixed service.

299 In France and in Italy, the provisions of No. **297** concerning the introduction of the broadcasting service apply to the band 216-225 Mc/s.

300 In the United Kingdom, the band 216-225 Mc/s is allocated to the aeronautical radionavigation and radiolocation services. The radiolocation service is a secondary service.

301 In Rhodesia and Nyasaland, the band 220-225 Mc/s is allocated to the amateur service.

302 In Austria and Switzerland, the band 223-230 Mc/s is allocated on a permitted basis to the broadcasting service; the band 230-235 Mc/s is allocated to the fixed and mobile services.

303 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 223-230 Mc/s is allocated to the broadcasting service. The broadcasting service in these countries shall be introduced so as not to cause harmful interference to the aeronautical radionavigation service and broadcasting stations operating in this band shall be established only in accordance with agreements and associated plans to be concluded at the next European VHF/UHF Broadcasting Conference.

304 In the Union of South Africa and the Territory of South West Africa, the band 223-235 Mc/s is also allocated to the broadcasting service and the provisions of No. **297** concerning the introduction of that service will apply to this band.

305 In Nigeria, Sierra Leone and Gambia, the band 223-251 Mc/s is also allocated to the broadcasting service.

305A In New Zealand, the band 235 – 239·5 MHz is also allocated to the aero-
Spa2 nautical radionavigation service.

306 In Indonesia, the band 216-222 Mc/s is allocated to the fixed, mobile and broadcasting services.

307 In Japan, the band 216-222 Mc/s is allocated to the broadcasting service.

308 In China, Korea and the Philippines, the band 216-225 Mc/s is also allocated to the fixed and broadcasting services.

MHz
235— 335·4
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
235 – 267	FIXED MOBILE 201A 305 305A 308A 309	
267 – 272	FIXED MOBILE *Space operation* (Telemetering) 309A 309B 308A	
272 – 273	SPACE OPERATION (Telemetering) 309A FIXED MOBILE 308A	
273 – 328·6	FIXED MOBILE 308A 310 310A	
328·6 – 335·4	AERONAUTICAL RADIONAVIGATION 311	

308A Spa2 The bands 240 – 328·6 MHz and 335·4 – 399·9 MHz may also be used by the mobile-satellite service. The use and development of this service shall be subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

309 The frequency 243 Mc/s is the frequency in this band for use by survival craft stations and equipment used for survival purposes.

309A Spa Space stations employing frequencies in the band 267-273 Mc/s for telemetering purposes may also transmit tracking signals in the band.

309B Spa In the band 267-272 Mc/s individual administrations may use space telemetering in their countries on a primary basis, subject to the agreement of the administrations concerned and those having services operating in accordance with the Table, which may be affected.

310 Spa2 Radio astronomy observations in the band 322 – 328·6 MHz are carried out in a number of countries under national arrangements. Administrations should bear in mind the needs of the radio astronomy service in using this band.

310A Spa2 In India, the band 322 – 328·6 MHz is also allocated to the radio astronomy service.

311 Limited to Instrument Landing Systems (glide path).

MHz
335·4–401
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
335·4 – 399·9	FIXED MOBILE 308A	
399·9 – 400·05	RADIONAVIGATION-SATELLITE 285C 311A	
400·05 – 400·15	STANDARD FREQUENCY-SATELLITE 312B 313 314	
400·15 – 401	METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (Maintenance telemetering) SPACE RESEARCH (Telemetering and tracking) 313 314	

311A Spa2 In Bulgaria, Cuba, Greece, Hungary, Indonesia, Iran, Kuwait, Lebanon, the United Arab Republic, Syria and Yugoslavia, the band 399·9 – 400·05 MHz is also allocated to the fixed and mobile services (see Recommendation No. Spa 8).

312 SUP (Spa)

312A SUP (Spa2)

312B Spa2 In this band the standard frequency is 400·1 MHz. Emissions shall be confined in a band of ± 25 kHz about this frequency.

313 Spa In Albania, Bulgaria, Greece, Hungary, Poland, the United Arab Republic, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the band 400·05-401 Mc/s, is also allocated to the fixed and mobile services.

314 Spa In the United Kingdom, the band 400·05-420 Mc/s is also allocated to the radiolocation service; however, between 400·05 and 410 Mc/s the allocation to the radiolocation service is on a secondary basis.

MHz
401–406
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
401 – 402	METEOROLOGICAL AIDS SPACE OPERATION (Telemetering) 315A *Fixed* *Meteorological-Satellite* (Earth-to-space) *Mobile* except aeronautical mobile 314 315 315B 315C 316	
402 – 403	METEOROLOGICAL AIDS *Fixed* *Meteorological-Satellite* (Earth-to-space) *Mobile* except aeronautical mobile 314 315 315C 316	
403 – 406	METEOROLOGICAL AIDS *Fixed* *Mobile* except aeronautical mobile 314 315 316	

315 In France, the band 401-406 Mc/s is allocated to the meteorological aids service.

315A Spa Space stations employing frequencies between 401-402 Mc/s for telemetering purposes may also transmit tracking signals in this band.

315B Spa In Australia, the space operation service (telemetering) in the band 401-402 Mc/s is a secondary service.

315C Spa2 In the band 401 – 403 MHz, earth exploration-satellite applications, other than the meteorological-satellite service, may also be used for Earth-to-space transmissions on condition that no harmful interference is caused to stations operating in accordance with the Table.

316 In Albania, Bulgaria, Greece, Hungary, Iran, Norway, Poland, Yugoslavia, Roumania, Sweden, Switzerland, Czechoslovakia, Turkey and the U.S.S.R., the band 401-406 Mc/s is also allocated, on a primary basis, to the fixed service and mobile, except aeronautical mobile, service.

317 **SUP** **(Spa2)** (*see* ADD 233B)

MHz
406–420
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
406 – 406·1	MOBILE-SATELLITE (Earth-to-space) 314 317A 317B	
406·1 – 410	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 233B 314	
410 – 420	FIXED MOBILE except aeronautical mobile 314	

317A Spa2 The band 406 – 406·1 MHz is reserved solely for the use and development of low-power (not to exceed 5 W) emergency position-indicating radiobeacon (EPIRB) systems using space techniques.

317B Spa2 In Austria, Bulgaria, Chile, Cuba, Ethiopia, Hungary, India, Iran, Kenya, Kuwait, Liechtenstein, Malaysia, Uganda, Poland, the United Arab Republic, Rwanda, Sweden, Switzerland, Syria, Tanzania, Czechoslovakia and in the U.S.S.R., the band 406 – 406·1 MHz is also allocated to the fixed service and the mobile, except aeronautical mobile, service.

MHz
420–470
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
420 – 430 FIXED MOBILE except aeronautical mobile *Radiolocation* 318 319	**420 – 450**	
430 – 440 AMATEUR RADIOLOCATION 318 319 319B 320 320A 321 322	RADIOLOCATION *Amateur*	
440 – 450 FIXED MOBILE except aeronautical mobile *Radiolocation* 318 319 319A	318 319A 319B 320A 323 324	
450 – 460	FIXED MOBILE 318 319A	
460 – 470	FIXED MOBILE *Meteorological-Satellite* (Space-to-Earth) 318A 324B	

318 Spa2 Radio altimeters may also be used until 31 December 1974 in the band 420 – 460 MHz. However, after this date, they may be authorized to continue to operate on a secondary basis except in the U.S.S.R. where they will continue to operate on a primary basis.

318A Spa In Bulgaria, Cuba, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 460-470 Mc/s may be used, on a primary basis, by the meteorological-satellite service subject to agreement among administrations concerned and those having services, or intending to introduce services, operating in accordance with the Table, which may be affected.

319 In the United Kingdom, the band 420-450 Mc/s is allocated, on a primary basis to the radiolocation service and on a secondary basis to the amateur service.

319A Spa2 The band 449·75 – 450·25 MHz may be used for space telecommand and space research (Earth-to-space), subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

319B Spa2 In France and the French Department of Guyana (Region 2) the frequency 434 MHz ± 0·25 MHz may be used for space operation (Earth-to-space) subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

320 In Greece, Italy and Switzerland, the band 430-440 Mc/s is also allocated to the fixed service and mobile, except aeronautical mobile, service.

320A Spa2 In the band 435 – 438 MHz, the amateur-satellite service may be authorized, on condition that no harmful interference shall be caused to other services operating in accordance with the Table. Administrations authorizing such use shall ensure that any harmful interference caused by emissions from an amateur satellite is immediately eliminated in accordance with the provisions of No. 1567A.

321 In Austria, Portugal, the F. R. of Germany, Yugoslavia and Switzerland, the frequency 433.92 Mc/s is designated for industrial, scientific and medical purposes. Emissions must be confined within the limits of ± 0.2% of that frequency.

322 Spa2 In Denmark, Norway and Sweden, the bands 430 – 432 MHz and 438 – 440 MHz are also allocated to the fixed and mobile services.

323 In Indonesia, the band 420-450 Mc/s is also allocated, on a secondary basis, to the fixed service and mobile, except aeronautical mobile, service.

324 In Australia, the band 420-450 Mc/s is also allocated to the fixed service until the frequency assignments in this band for the fixed service stations are transferred to another band

324A Spa2 It is intended that meteorological-satellite space stations operating in the band 1 670 – 1 690 MHz shall transmit to selected earth stations. The location of such earth stations is subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

324B Spa2 Earth exploration-satellite service applications, other than the meteorological-satellite service, may also be used in the bands 460 – 470 MHz and 1 690 – 1 700 MHz for space-to-Earth transmissions on condition that no harmful interference is caused to stations operating in accordance with the Table.

MHz
470–942
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
470—582 BROADCASTING	**470—890** BROADCASTING	**470—585** BROADCASTING 335
582—606 BROADCASTING RADIONAVIGATION 325 327 328 329		**585—610** RADIONAVIGATION 330B 336 337
606—790 BROADCASTING 329 330 330A 331 332 332A		**610—890** FIXED MOBILE BROADCASTING 330B 332 332A 338 339
790—890 FIXED BROADCASTING 329 331 333 334	329A 332 332A	
890—942 FIXED BROADCASTING *Radiolocation* 329 331 333 339A	**890—942** FIXED RADIOLOCATION 339A 340	**890—942** FIXED MOBILE BROADCASTING *Radiolocation* 339 339A

325 In the United Kingdom, the band 582-606 Mc/s is allocated on a primary basis to the aeronautical radionavigation service and on a secondary basis to the radiolocation service.

326 **SUP (Spa2)**

327 In France and the F. R. of Germany, the band 582-606 Mc/s is allocated on a primary basis to the broadcasting service and on a secondary basis to the radionavigation service.

328 In Belgium, the band 582-606 Mc/s is allocated on a primary basis to the radionavigation service and on a secondary basis to the broadcasting service.

329 In Israel, the band 582-960 Mc/s is also allocated to the fixed service and mobile, except aeronautical mobile, service.

329A Spa2 In Argentina and Uruguay, the band 602 – 608 MHz is allocated to the radio astronomy service.

330 Spa In Region 1, except the African Broadcasting Area*, the radionavigation service may continue to operate in the band 606-610 Mc/s until the band is required for the broadcasting service.

330A Spa In the African Broadcasting Area*, the band 606-614 Mc/s is allocated to the radio astronomy service.

330B Spa2 In India, the band 608 – 614 MHz is also allocated to the radio astronomy service.

331 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 645-960 Mc/s is also allocated to the aeronautical radionavigation service.

332 Spa In Region 1, except the African Broadcasting Area*, the band 606-614 Mc/s, and in Region 3, the band 610-614 Mc/s may be used by the radio astronomy service. Administrations shall avoid using the band concerned for the broadcasting service as long as possible, and thereafter, as far as practicable, shall avoid the use of such effective radiated powers as will cause harmful interference to radio astronomy observations.

In Region 2, the band 608-614 Mc/s is reserved exclusively for the radio astronomy service until the first Administrative Radio Conference after 1 January, 1974 which is competent to review this provision; however, this provision does not apply to Cuba.

330.1 * Spa For the purposes of this Regulation the term " African Broadcasting Area " means:

a) African countries, parts of countries, territories and groups of territories situated between the parallels 40° South and 30° North.

b) Islands in the Indian Ocean west of meridian 60° East, situated between the parallel 40° South and the great circle arc joining the points 45° East, 11° 30′ North and 60° East, 15° North.

c) Islands in the Atlantic Ocean east of Line B defined in No. **131** of these Regulations, situated between the parallels 40° South and 30° North.

332A Spa2 Within the frequency band 620 – 790 MHz, assignments may be made to television stations using frequency modulation in the broadcasting-satellite service subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected (see Resolutions Nos. **Spa2** – 2 and **Spa2** – 3). Such stations shall not produce a power flux density in excess of the value —129 dBW/m² for angles of arrival less than 20° (see Recommendation No. **Spa2** – 10) within the territories of other countries without the consent of the administrations of those countries.

333 In Region 1, stations of the fixed service using tropospheric scatter may operate in the band 790-960 Mc/s subject to agreements between the administrations concerned and affected. Such operations in the band 790-860 Mc/s shall be on a secondary basis to those of the broadcasting service.

334 In Belgium, France and Monaco, the band 790-860 Mc/s is allocated to the broadcasting service.

335 In Australia, the band 470-500 Mc/s is allocated to the fixed and mobile services.

336 In China, Korea, Japan and the Philippines, the band 585-610 Mc/s is also allocated to the broadcasting service.

337 In Australia, the band 585-610 Mc/s is allocated on a primary basis to the broadcasting service and on a secondary basis to the radionavigation service.

338 In Australia, the band 610-820 Mc/s is allocated to the broadcasting service; the bands 820-890 Mc/s and 942-960 Mc/s are allocated to the fixed service.

339 In India and Pakistan, the band 610-960 Mc/s is allocated to the broadcasting service.

339A Spa Specific portions of the frequency band 900-960 Mc/s may also be used, on a secondary basis, for experimental purposes in connection with space research.

340 Spa2 In Region 2, the frequency 915 MHz is designated for industrial, scientific and medical purposes. Emissions must be confined within the limits of ±13 MHz of that frequency. Radiocommunication services operating within these limits must accept any harmful interference that may be experienced from the operation of industrial, scientific and medical equipment.

MHz
942—960
(Spa)

Allocation to Services		
Region 1	Region 2	Region 3
942—960 FIXED BROADCASTING 329 331 333 339A	**942—960** FIXED 339A	**942—960** FIXED MOBILE BROADCASTING 338 339 339A

MHz
960—1 350
(Spa)

Allocation to Services		
Region 1	Region 2	Region 3
960—1 215	AERONAUTICAL RADIONAVIGATION 341	
1 215—1 300	RADIOLOCATION *Amateur* 342 343 344 345	
1 300—1 350	AERONAUTICAL RADIONAVIGATION 346 *Radiolocation* 347 348	

341 **Spa** The band 960-1 215 Mc/s is reserved on a world-wide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground-based facilities.

342 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 1 215-1 300 Mc/s is also allocated to the fixed service.

343 In Belgium, France, Norway, the Netherlands, Portugal and Sweden, the band 1 215-1 300 Mc/s is also allocated to the radionavigation service.

344 In China, India, Indonesia, Japan, Pakistan, Portuguese Oversea Provinces in Region 1 south of the equator, and in Switzerland, the band 1 215-1 300 Mc/s is also allocated to the fixed and mobile services.

345 In the F. R. of Germany, the band 1 250-1 300 Mc/s is allocated to the amateur service.

346 The use of the bands 1 300-1 350 Mc/s, 2 700-2 900 Mc/s and 9 000-9 200 Mc/s by the aeronautical radionavigation service is restricted to ground-based radars and, in the future, to associated airborne transponders which transmit only on frequencies in these bands and only when actuated by radars operating in the same band.

347 In the United Kingdom, the band 1 300-1 350 Mc/s is allocated to the radiolocation service.

348 In Albania, Austria, Bulgaria, Hungary, Indonesia, Poland, Roumania, Sweden, Switzerland, Czechoslovakia and the U.S.S.R., the band 1 300-1 350 Mc/s is also allocated to the fixed and mobile services.

MHz
1 350–1 525
(Spa2)

<table>
<tr><th colspan="3">Allocation to Services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td>1 350 — 1 400
FIXED
MOBILE
RADIOLOCATION
349 349A</td><td colspan="2">1 350 — 1 400
RADIOLOCATION
349 349A</td></tr>
<tr><td colspan="3">1 400 — 1 427
RADIO ASTRONOMY</td></tr>
<tr><td>1 427—1 429</td><td colspan="2">SPACE OPERATION (Telecommand)
FIXED
MOBILE except aeronautical mobile</td></tr>
<tr><td rowspan="2">1 429 — 1 525
FIXED
MOBILE except aeronautical mobile</td><td>1 429 — 1 435
FIXED
MOBILE</td><td rowspan="2">1 429 — 1 525
FIXED
MOBILE</td></tr>
<tr><td>1 435 — 1 525
MOBILE
Fixed</td></tr>
</table>

349 In Region 2 and Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the existing installations of the radionavigation service may continue to operate, temporarily, in the band 1 350-1 400 Mc/s.

349A Spa2 Radio astronomy observations on the Hydrogen line displaced towards lower frequencies are carried out in a number of countries under national arrangements. Administrations should bear in mind the needs of the radio astronomy service in their future planning of the band 1 350 - 1 400 MHz.

350 SUP (Spa)

MHz
1 525–1 535
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
1 525 – 1 535 SPACE OPERATION (Telemetering) 350A FIXED 350B *Earth Exploration-Satellite* *Mobile* except aeronautical mobile 350C	**1 525 – 1 535** SPACE OPERATION (Telemetering) 350A *Earth Exploration-Satellite* *Fixed* *Mobile* 350D	**1 525 – 1 535** SPACE OPERATION (Telemetering) 350A FIXED 350B *Earth Exploration-Satellite* *Mobile*

350A Spa2 Space stations employing frequencies in the band 1 525 – 1 535 MHz for telemetering purposes may also transmit tracking signals in this band.

350B Spa As regards the category of the fixed service, see Resolution NoSpa3.

350C Spa In Albania, Bulgaria, France, Hungary, Kuwait, Lebanon, Morocco, Poland, the United Arab Republic, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the band 1 525-1 535 Mc/s is also allocated, on a primary basis, to the mobile, except aeronautical mobile, service. As regards the category of this service, see Resolution NoSpa3.

350D Spa In Cuba, the band 1 525-1 535 Mc/s is also allocated, on a primary basis, to the mobile service.

350E SUP (Spa2)

MHz
1 535–1 660
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
1 535 – 1 542·5	MARITIME MOBILE-SATELLITE 352 352D 352E	
1 542·5 – 1 543·5	AERONAUTICAL MOBILE-SATELLITE (R) MARITIME MOBILE-SATELLITE 352 352D 352F	
1 543·5 – 1 558·5	AERONAUTICAL MOBILE-SATELLITE (R) 352 352D 352G	
1 558·5 – 1 636·5	AERONAUTICAL RADIONAVIGATION 352 352A 352B 352D 352K	
1 636·5 – 1 644	MARITIME MOBILE-SATELLITE 352 352D 352H	
1 644 – 1 645	AERONAUTICAL MOBILE-SATELLITE (R) MARITIME MOBILE-SATELLITE 352 352D 352I	
1 645 – 1 660	AERONAUTICAL MOBILE-SATELLITE (R) 352 352D 352J	

351 **SUP** (Spa2)

352 Spa In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 1 535-1 660 Mc/s is also allocated to the fixed service. As regards the category of the fixed service in the band 1 535-1 540 Mc/s, see Resolution NoSpa3.

352A Spa2 The bands 1 558·5 – 1 636·5 MHz, 4 200 – 4 400 MHz, 5 000 – 5 250 MHz and 15·4 – 15·7 GHz are reserved on a world-wide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities.

352B Spa2 The bands 1 558·5 – 1 636·5 MHz, 5 000 – 5 250 MHz and 15·4 – 15·7 GHz are also allocated to the aeronautical mobile (R) service for the use and development of systems using space radiocommunication techniques. Such use and development is subject to agreement and co-ordination between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

352C **SUP** (Spa2)

352D Spa In Austria, Indonesia and the F. R. of Germany, the band 1 540-1 660 Mc/s is also allocated to the fixed service.

352E Spa2 The use of the band 1 535 – 1 542·5 MHz is limited to transmissions from space to earth stations in the maritime mobile-satellite service for communication and/or radiodetermination purposes. Transmissions from coast stations directly to ship stations, or between ship stations, are also authorized when such transmissions are used to extend or supplement the satellite-to-ship links.

352F Spa2 The use of the band 1 542·5 – 1 543·5 MHz is limited to transmissions from space to earth stations in the aeronautical mobile-satellite (R) and maritime mobile-satellite services for communication and/or radiodetermination purposes. Transmissions from land stations directly to mobile stations, or between mobile stations, of the aeronautical mobile (R) and maritime mobile services, are also authorized. The utilization of this band is subject to prior operational co-ordination between the two services.

352G Spa2 The use of the band 1 543·5 – 1 558·5 MHz is limited to transmissions from space to earth stations in the aeronautical mobile-satellite (R) service for communication and/or radiodetermination purposes. Transmissions from terrestrial aeronautical stations directly to aircraft stations, or between aircraft stations, in the aeronautical mobile (R) service are also authorized when such transmissions are used to extend or supplement the satellite-to-aircraft links.

352H Spa2 The use of the band 1 636·5 – 1 644 MHz is limited to transmissions from earth to space stations in the maritime mobile-satellite service for communication and/or radiodetermination purposes. Transmissions from ship stations directly to coast stations, or between ship stations, are also authorized when such transmissions are used to extend or supplement the ship-to-satellite links.

352I Spa2 The use of the band 1 644 – 1 645 MHz is limited to transmissions from earth to space stations in the aeronautical mobile-satellite (R) and maritime mobile-satellite services for communication and/or radiodetermination purposes. Transmissions from mobile stations directly to land stations, or between mobile stations, of the aeronautical mobile (R) and maritime mobile services, are also authorized. The utilization of this band is subject to prior operational coordination between the two services.

352J Spa2 The use of the band 1 645 – 1 660 MHz is limited to transmissions from earth to space stations in the aeronautical mobile-satellite (R) service for communication and/or radiodetermination purposes. Transmissions from aircraft stations in the aeronautical mobile (R) service directly to terrestrial aeronautical stations, or between aircraft stations, are also authorized when such transmissions are used to extend or supplement the aircraft-to-satellite links.

352K Spa2 Radio astronomy observations on important spectral lines due to the hydroxyl radicle OH at frequencies 1 612·231 MHz and 1 720·530 MHz are carried out in a number of countries under national arrangements; the bands observed being 1 611·5 – 1 612·5 MHz and 1 720 – 1 721 MHz respectively. Administrations should bear in mind the needs of radio astronomy service in their future planning of the bands 1 558·5 – 1 636·5 MHz and 1 710 – 1 770 MHz.

MHz
1 660–1 710
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
1 660 – 1 670	METEOROLOGICAL AIDS RADIO ASTRONOMY 353A 354 354A 354B	
1 670 – 1 690	METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (Space-to-Earth) 324A MOBILE except aeronautical mobile 354	
1 690 – 1 700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (Space-to-Earth) *Fixed* *Mobile* except aeronautical mobile 324B 354A	**1 690 – 1 700** METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (Space-to-Earth) 324B 354A 354C	
1 700 – 1 710 FIXED SPACE RESEARCH (Space-to-Earth) *Mobile* 354D	**1 700 – 1 710** FIXED MOBILE SPACE RESEARCH (Space-to-Earth) 354D	

353 SUP (Spa2)

353A Spa2 In view of the successful detection by astronomers of two hydroxyl spectral lines in the regions of 1 665 MHz and 1 667 MHz, administrations are urged to give all practicable protection in the band 1 660 – 1 670 MHz for future research in radio astronomy particularly by eliminating air-to-ground transmissions in the meteorological aids service in the band 1 664·4 – 1 668·4 MHz as soon as practicable.

354 **In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the bands 1 660-1 690 Mc/s, 3 165-3 195 Mc/s, 4 800-4 810 Mc/s, 5 800-5 815 Mc/s and 8 680-8 700 Mc/s are also used for radio astronomy observations.**

354A Spa2 In Bulgaria, Cuba, Ethiopia, Hungary, Israel, Jordan, Kenya, Kuwait, Lebanon, Uganda, Pakistan, Poland, the United Arab Republic, Roumania, Syria, Tanzania, Czechoslovakia, the U.S.S.R. and Yugoslavia, the bands 1 660 – 1 670 MHz and 1 690 – 1 700 MHz are also allocated to the fixed service and the mobile, except aeronautical mobile, service.

354B Spa In Australia, Cyprus, Spain, Ethiopia, Indonesia, Israel, New Zealand, Portugal, the Spanish Provinces in Africa, the United Kingdom, Sweden and Switzerland, the band 1 660-1 670 Mc/s is also allocated, on a secondary basis, to the fixed service, and the mobile, except aeronautical mobile, service.

354C Spa In Australia, Indonesia and New Zealand, the band 1 690-1 700 Mc/s is also allocated, on a secondary basis, to the fixed service and the mobile, except aeronautical mobile, service.

354D Spa2 The band 1 700 – 1 700·2 MHz may be used, on a secondary basis, for the transmission from space stations on board satellites of frequencies harmonically related to those emitted in the bands 149·9 – 150·05 MHz and 399·9 – 400·05 MHz for the requirements of ionospheric investigation and geodesy.

355 SUP (Spa)

355A SUP (Spa2)

MHz
1 710–2 300
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
1 710 – 1 770 FIXED *Mobile* 352K 356	**1 710 – 1 770** FIXED MOBILE 352K 356A	
1 770 – 1 790 FIXED *Meteorological-Satellite* 356AA *Mobile* 356	**1 770 – 1 790** FIXED MOBILE *Meteorological-Satellite* 356AA 356A	
1 790 – 2 290 FIXED *Mobile* 356 356AB 356ABA 356AC	**1 790 – 2 290** FIXED MOBILE 356A 356AB 356ABA	
2 290 – 2 300 FIXED SPACE RESEARCH (Space-to-Earth) *Mobile* 356C	**2 290 – 2 300** FIXED MOBILE SPACE RESEARCH (Space-to-Earth)	

356 Spa2 In Switzerland, the band 1 710 – 2 290 MHz is allocated to the fixed service and the mobile, except the aeronautical mobile, service and the band 1 770 – 1 790 MHz is also allocated, on a secondary basis, to the meteorological-satellite service.

356A Spa2 In Region 2, in Australia and Japan, the band 1 750 – 1 850 MHz may also be used for Earth-to-space transmissions, and in Regions 2 and 3, the band 2 200 – 2 290 MHz may also be used for space-to-Earth transmissions in the space research service, subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

356AA Spa In Bulgaria, Cuba, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the meteorological-satellite service, in the band 1 770-1 790 Mc/s, shall be on a primary basis, subject to co-ordination with the administrations concerned and those having services operating in accordance with the Table, which may be affected by the siting of earth stations.

356AB Spa2 In Regions 2 and 3 and in Spain, in the band 2 025 – 2 120 MHz Earth-to-space transmissions in the earth exploration-satellite service may be authorized with equality of right to operate with stations of other space radiocommunication services in this band and subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

356ABA Spa2 In Region 2, in Australia and Spain, in the band 2 025 – 2 120 MHz and in Regions 1 and 3, in the band 2 110 – 2 120 MHz Earth-to-space transmissions in the space research service may be authorized with equality of right to operate with other space radiocommunication services in these bands and subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

356AC Spa2 In Region 1, in the band 2 096 – 2 120 MHz, Earth-to-space transmissions in the earth exploration-satellite service may be authorized with equality of right to operate with stations of other space radiocommunication services in this band and subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected (see No. **356AB**).

356B SUP **(Spa2)**

356C Spa In Austria, the space research service in the band 2 290-2 300 Mc/s is a secondary service.

MHz
2 300—2 450

Allocation to Services		
Region 1	Region 2	Region 3
2 300—2 450	**2 300—2 450**	
FIXED	RADIOLOCATION	
Amateur	*Amateur*	
Mobile	*Fixed*	
Radiolocation	*Mobile*	
357 358 359	357 360	

357 The frequency 2 450 Mc/s is designated for industrial, scientific and medical purposes except in Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., where the frequency 2 375 Mc/s is used. Emissions must be confined within ± 50 Mc/s of the frequencies designated. Radiocommunication services operating within these limits must accept any harmful interference that may be experienced from the operation of industrial, scientific and medical equipment.

358 In the United Kingdom, the band 2 300-2 450 Mc/s is allocated on a primary basis to the radiolocation service and on a secondary basis to the amateur, fixed and mobile services.

359 In the F. R. of Germany, the band 2 300-2 350 Mc/s is allocated to the amateur service and this service is excluded from the band 2 350-2 450 Mc/s.

360 In India, Japan and Pakistan, the band 2 300-2 450 Mc/s is allocated on a primary basis to the fixed, mobile and radiolocation services, and on a secondary basis to the amateur service.

MHz
2 450–2 655
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
2 450 – 2 500 FIXED MOBILE *Radiolocation* 357 361	**2 450 – 2 500** FIXED MOBILE RADIOLOCATION 357	
2 500 – 2 550 FIXED 364C MOBILE except aeronautical mobile BROADCASTING-SATELLITE 361B 361A 362 364F	**2 500 – 2 535** FIXED 364C FIXED-SATELLITE (Space-to-Earth) MOBILE except aeronautical mobile BROADCASTING-SATELLITE 361B 361A 364E 364F **2 535 – 2 550** FIXED 364C MOBILE except aeronautical mobile BROADCASTING-SATELLITE 361B 361A 364F	
2 550 – 2 655 FIXED 364C MOBILE except aeronautical mobile BROADCASTING-SATELLITE 361B 362 363 364 364F		

MHz
2 655–2 700
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
2 655 – 2 690 FIXED 364C 364D MOBILE except aeronautical mobile BROADCASTING-SATELLITE 361B 364H 363 364 364F 364G	**2 655 – 2 690** FIXED 364C 364D FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile BROADCASTING-SATELLITE 361B 364H 364E 364F 364G	
2 690 – 2 700 RADIO ASTRONOMY 233B 363 364A 364B		

361 Spa2 In France and the United Kingdom, the band 2 450 – 2 500 MHz is allocated on a primary basis to the radiolocation service and, on a secondary basis, to the fixed and mobile services.

361A Spa2 In France, the band 2 500 – 2 550 MHz is also allocated, on a primary basis, to the radiolocation service and, on a secondary basis, to the fixed and mobile services. In Canada, the band 2 500 – 2 550 MHz is also allocated on a primary basis to the radiolocation service.

361B Spa2 The use of the band 2 500 – 2 690 MHz by the broadcasting-satellite service is limited to domestic and regional systems for community reception and such use is subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected (see Resolutions Nos. **Spa2** – 2 and **Spa2** – 3). The power flux density at the Earth's surface shall not exceed the values given in Nos. **470NH–470NK.**

362 Spa2 In the United Kingdom, the band 2 500 – 2 600 MHz is also allocated, on a secondary basis, to the radiolocation service.

363 Spa In the F. R. of Germany, the band 2 550-2 690 Mc/s is allocated to the fixed service; and the band 2 690-2 700 Mc/s is also allocated to the fixed service.

364 Spa2 In Region 1, tropospheric scatter systems may operate in the band 2 550 – 2 690 MHz, subject to agreement between the administrations concerned and those having terrestrial radiocommunication services, operating in accordance with the Table, which may be affected.

364A Spa2 In Bulgaria, Cuba, Hungary, India, Israel, Kuwait, Lebanon, Morocco, Pakistan, the Philippines, Poland, the United Arab Republic, Roumania, Czechoslovakia, the U.S.S.R. and Yugoslavia, the band 2 690 – 2 700 MHz is also allocated to the fixed and mobile services.

364B Spa In Algeria, Bulgaria, Hungary, Poland, the United Arab Republic, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., tropospheric scatter systems may operate in the band 2 690-2 700 Mc/s under agreements concluded between administrations concerned and those having services operating in accordance with the Table, which may be affected.

364C Spa2 When planning new tropospheric scatter radio-relay links in the band 2 500 – 2 690 MHz, all possible measures shall be taken to avoid directing the antennae of these links towards the geostationary satellite orbit.

364D Spa2 Administrations shall make all practicable effort to avoid developing new tropospheric scatter systems in the band 2 655 – 2 690 MHz.

364E Spa2 The use of the bands 2 500 – 2 535 MHz and 2 655 – 2 690 MHz by the fixed-satellite service is limited to domestic and regional systems and such use is subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected (see Article 9A). In the direction space-to-Earth, the power flux density at the Earth's surface shall not exceed the values given in No. **470NE**.

364F Spa2 In Bulgaria, Iran, Portugal and the U.S.S.R., the band 2 500 – 2 690 MHz is allocated to the fixed service and the mobile, except aeronautical mobile, service.

364G Spa2 Radio astronomy observations in the band 2 670 – 2 690 MHz are carried out in a number of countries under national arrangements. Administrations should bear in mind the needs of the radio astronomy service in their future planning of this band.

364H Spa2 In the design of systems in the broadcasting-satellite service, administrations are urged to take all necessary steps to protect the radio astronomy service in the band 2 690 – 2 700 MHz.

365 SUP **(Spa2)** (*see* ADD **233B**)

MHz
2 700—3 400
(Spa)

Allocation to Services		
Region 1	Region 2	Region 3
2 700 — 2 900	AERONAUTICAL RADIONAVIGATION 346 *Radiolocation* 366	
2 900 — 3 100	RADIONAVIGATION 367 *Radiolocation*	
3 100 — 3 300	RADIOLOCATION 354 368 369	
3 300—3 400 RADIOLOCATION 370 371	3 300—3 400 RADIOLOCATION *Amateur* 376	

366 In the band 2 700-2 900 Mc/s ground-based radars used for meteorological purposes are authorized to operate on the basis of equality with stations of the aeronautical radionavigation service.

367 The use of the band 2 900-3 100 Mc/s by the aeronautical radionavigation service is limited to ground-based radars.

368 In Albania, Austria, Belgium, Bulgaria, Hungary, Poland, Roumania, Sweden, Switzerland, Czechoslovakia and the U.S.S.R., the band 3 100-3 300 Mc/s is also allocated to the radionavigation service.

369 In the band 3 100-3 300 Mc/s, existing racons and shipborne radars in merchant ships may operate within the band 3 100-3 266 Mc/s.

370 In Albania, Austria, Bulgaria, Hungary, Poland, Portugal, Roumania, Switzerland, Czechoslovakia and the U.S.S.R., the band 3 300-3 400 Mc/s is also allocated to the radionavigation service.

371 In Austria, Greece, Norway, the Netherlands, Portugal and Sweden, the band 3 300-3 400 Mc/s is also allocated to the fixed and mobile services.

372 In Austria, the band 3 400-3 600 Mc/s is also allocated to the radionavigation service.

373 Spa2 In Denmark, Norway, Sweden and Switzerland, the fixed, mobile, radiolocation and fixed-satellite services operate on a basis of equality of rights in the band 3 400 – 3 600 MHz.

374 In the United Kingdom, the band 3 400-3 770 Mc/s is allocated to the radiolocation service.

374A SUP (Spa2)

375 In Austria, Israel, Netherlands, F. R. of Germany and the United Kingdom, the band 3 400-3 475 Mc/s is also allocated, on a secondary basis, to the amateur service.

376 In China, India, Indonesia, Japan and Pakistan the band 3 300-3 500 Mc/s is also allocated to the fixed and mobile services.

MHz
3 400–4 700
(Spa2)

<table>
<tr><th colspan="3">Allocation to Services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td>3 400 – 3 600
FIXED
FIXED-SATELLITE (Space-to-Earth)
MOBILE
Radiolocation
372 373 374 375</td><td colspan="2">3 400 – 3 500
FIXED-SATELLITE (Space-to-Earth)
RADIOLOCATION
Amateur
376</td></tr>
<tr><td rowspan="2">3 600 – 4 200
FIXED
FIXED-SATELLITE (Space-to-Earth)
Mobile
374</td><td>3 500 – 3 700
FIXED
FIXED-SATELLITE (Space-to-Earth)
MOBILE
RADIOLOCATION</td><td>3 500 – 3 700
FIXED-SATELLITE (Space-to-Earth)
RADIOLOCATION
Fixed
Mobile
377 378</td></tr>
<tr><td colspan="2">3 700 – 4 200
FIXED
FIXED-SATELLITE (Space-to-Earth)
MOBILE
379</td></tr>
<tr><td colspan="3">4 200 – 4 400
AERONAUTICAL RADIONAVIGATION
352A 379A 381 382 383</td></tr>
<tr><td colspan="3">4 400 - 4 700
FIXED
FIXED-SATELLITE (Earth-to-space)
MOBILE</td></tr>
</table>

MHz
4 700–5 250
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
4 700 – 4 990	FIXED MOBILE 233B 354 382A 382B	
4 990 – 5 000 FIXED MOBILE RADIO ASTRONOMY 233B	**4 990 – 5 000** RADIO ASTRONOMY 383A	**4 990 – 5 000** FIXED MOBILE RADIO ASTRONOMY 233B
5 000 – 5 250	AERONAUTICAL RADIONAVIGATION 352A 352B 383B	

377 Spa2 In China and Japan, the band 3 500 – 3 700 MHz is also allocated to the fixed and mobile services.

378 **In Japan, in the band 3 620-3 700 Mc/s, the radiolocation service is excluded.**

379 Spa2 In Australia, the band 3 700 – 3 770 MHz is allocated to the radiolocation and fixed-satellite services.

379A Spa2 The standard frequency-satellite service and the time signal-satellite service may be authorized to use the frequency 4 202 MHz for space-to-Earth transmissions and the frequency 6 427 MHz for Earth-to-space transmissions. Such transmissions shall be confined within the limits of ±2 MHz of these frequencies and shall be subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

380 SUP (Spa)

381 In China and the Philippines, the band 4 200-4 400 Mc/s is also allocated, on a secondary basis, to the fixed service.

382 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 4 200-4 400 Mc/s is also allocated to the fixed and mobile services subject to causing no harmful interference to the aeronautical radio-navigation service used by aircraft on international air routes in these countries.

382A Spa2 Radio astronomy observations on the formaldehyde line (rest frequency 4 829·649 MHz) are being carried out in a number of countries under national arrangements. Administrations should bear in mind the needs of the radio astronomy service in their future planning of the band 4 825 – 4 835 MHz.

382B Spa2 Radio astronomy observations in the band 4 950 – 4 990 MHz are being carried out in a number of countries under national arrangements. Administrations should bear in mind the needs of the radio astronomy service in their future planning of this band.

383 In Austria, Denmark, Norway, the F. R. of Germany, Sweden and Switzerland, the band 4 200-4 210 Mc/s is also allocated, on a secondary basis, to the fixed service.

383A Spa2 In Cuba, the band 4 990 – 5 000 MHz is also allocated to the fixed and mobile services, and the provisions of No. **233B** apply.

383B Spa2 The band 5 000 – 5 250 MHz is also allocated to the fixed-satellite service for connection between one or more earth stations at specified fixed points on the Earth and satellites used by the aeronautical mobile (R) service and/or the radio-determination service. Such use and development shall be subject to agreement and co-ordination between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

MHz
5 250 — 5 725
(Spa)

Allocation to Services		
Region 1	Region 2	Region 3
5 250—5 255	RADIOLOCATION *Space Research* 384	
5 255—5 350	RADIOLOCATION 384 384A	
5 350—5 460	AERONAUTICAL RADIONAVIGATION 385 *Radiolocation*	
5 460—5 470	RADIONAVIGATION 385 *Radiolocation*	
5 470—5 650	MARITIME RADIONAVIGATION *Radiolocation* 386 387	
5 650—5 670	RADIOLOCATION *Amateur* 388 389	
5 670—5 725	RADIOLOCATION *Amateur* *Space Research* (Deep Space) 388 389 389A	

384 Spa In Albania, Austria, Bulgaria, Hungary, Poland, Roumania, Switzerland, Czechoslovakia and the U.S.S.R., the band 5 250-5 350 Mc/s is also allocated to the radionavigation service.

384A Spa In Sweden, the band 5 255-5 350 Mc/s is also allocated to the radionavigation service.

385 The use of the band 5 350-5 470 Mc/s by the aeronautical radionavigation service is limited to airborne radars and associated airborne beacons.

386 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 5 470-5 650 Mc/s is also allocated to the aeronautical radionavigation service.

387 Between 5 600 and 5 650 Mc/s, ground-based radars used for meteorological purposes are authorized to operate on the basis of equality with stations of the maritime radionavigation service.

388 In the F. R. of Germany, the band 5 650-5 775 Mc/s is allocated to the amateur service and the band 5 775-5 850 Mc/s is allocated to the fixed service.

389 In China, India, Indonesia, Japan and Pakistan the band 5 650-5 850 Mc/s is also allocated to the fixed and mobile services.

389A Spa In Bulgaria, Cuba, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the space research service is a primary service in the band 5 670-5 725 Mc/s.

MHz
5 725–5 850
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
5 725 – 5 850 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION *Amateur* 354 388 390 391 391A	**5 725 – 5 850** RADIOLOCATION *Amateur* 389 391 391A	

390 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the
Spa2 U.S.S.R., the band 5 800 – 5 850 MHz is allocated to the fixed, mobile and fixed-satellite services.

391 The frequency 5 800 Mc/s is designated for industrial, scientific and medical purposes. Emissions must be confined within the limits of ± 75 Mc/s of that frequency. Radiocommunication services operating within those limits must accept any harmful interference that may be experienced from the operation of industrial, scientific and medical equipment.

391A Radio astronomy observations are being carried out in the bands 5 750 –
Spa2 5 770 MHz and 36·458 – 36·488 GHz in a number of countries under national arrangements. Administrations are urged to take all practicable steps to protect radio astronomy observations in these bands from harmful interference.

392 SUP (**Spa**)

MHz
5 850–7 300
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
5 850 – 5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 391	**5 850 – 5 925** RADIOLOCATION *Amateur* 391	**5 850 – 5 925** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE *Radiolocation* 391
5 925 – 6 425 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE		
6 425 – 7 250 FIXED MOBILE 379A 392AA 392B 393		
7 250 – 7 300 FIXED-SATELLITE (Space-to-Earth) 392D 392G		

MHz
7 300—7 750
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
7 300 – 7 450	FIXED FIXED-SATELLITE (Space-to-Earth) MOBILE 392D	
7 450 – 7 550	FIXED FIXED-SATELLITE (Space-to-Earth) METEOROLOGICAL-SATELLITE (Space-to-Earth) MOBILE 392D	
7 550 – 7 750	FIXED FIXED-SATELLITE (Space-to-Earth) MOBILE 392D	

392A SUP (Spa2)

392AA Spa2 In Brazil, Canada and the United States of America, the band 6 625 – 7 125 MHz is also allocated, on a secondary basis, to the fixed-satellite service for space-to-Earth transmissions. In Region 2, the power flux density produced by space stations in this band shall be in accordance with the provisions of No. 470NM. In Regions 1 and 3, it shall be at least 6 dB lower. Receiving earth stations in this band may not impose restrictions on the locations or technical parameters of existing or future terrestrial stations of other countries.

392B Spa2 The band 7 145 – 7 235 MHz may be used for Earth-to-space transmissions in the space research service, subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

392C SUP (Spa2)

392D Spa2 As an exception, passive fixed-satellite systems also may be accommodated in the band 7 250 – 7 750 MHz subject to:

a) agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected;

b) the co-ordination procedures laid down in Articles 9 and 9A.

Such systems shall not cause any more interference at active earth station receivers than would be caused by the fixed or mobile service. Power flux density limitations at the Earth's surface after reflection from the passive fixed-satellites shall not exceed those prescribed in the present Regulations for active fixed-satellite systems.

392E *(Not used)*

392F SUP (Spa2)

392G Spa In Algeria, Austria, Bulgaria, Cyprus, Cuba, Ethiopia, Finland, Hungary, Japan, Kuwait, Lebanon, Liberia, Malaysia, Morocco, the Philippines, Poland, the United Arab Republic, Yugoslavia, Roumania, Sweden, Switzerland, Czechoslovakia and the U.S.S.R., the band 7 250-7 300 Mc/s is also allocated to the fixed and mobile services.

392H Spa In Algeria, Bulgaria, Cuba, Ethiopia, Finland, Hungary, Japan, Kuwait, Lebanon, Morocco, Poland, the United Arab Republic, Yugoslavia, Roumania, Sweden, Switzerland, Czechoslovakia and the U.S.S.R., the band 7 975-8 025 Mc/s is also allocated to the fixed and mobile services.

393 Spa In Italy, the band 6 450-6 575 Mc/s is also allocated to the radiolocation service.

MHz
7 750–8 025
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
7 750—7 900	FIXED MOBILE	
7 900 – 7 975	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	
7 975 – 8 025	FIXED-SATELLITE (Earth-to-space) 392H	

MHz
8 025–8 400
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
8 025 – 8 175 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE *Earth Exploration-Satellite* (Space-to-Earth) 394B	**8 025 – 8 175** EARTH EXPLORATION-SATELLITE (Space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	**8 025 – 8 175** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE *Earth Exploration-Satellite* (Space-to-Earth)
8 175 – 8 215 FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE *Earth Exploration-Satellite* (Space-to-Earth) 394B	**8 175 – 8 215** EARTH EXPLORATION-SATELLITE (Space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE	**8 175 – 8 215** FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE *Earth Exploration-Satellite* (Space-to-Earth)
8 215 – 8 400 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE *Earth Exploration-Satellite* (Space-to-Earth) 394 394B	**8 215 – 8 400** EARTH EXPLORATION-SATELLITE (Space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	**8 215 – 8 400** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE *Earth Exploration-Satellite* (Space-to-Earth) 394

MHz
8 400–8 500
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
8 400 – 8 500		
	FIXED	
	MOBILE	
	SPACE RESEARCH (Space-to-Earth)	
	394A 394D	

394 Spa2 In Australia and the United Kingdom, the band 8 250 – 8 400 MHz is allocated to the radiolocation and fixed-satellite services.

394A Spa2 In the United Kingdom, the band 8 400 – 8 500 MHz is allocated to the radiolocation and space research services.

394B Spa2 In Israel, the band 8 025 – 8 400 MHz is allocated, on a primary basis, to the fixed and mobile services and, on a secondary basis, to the fixed-satellite service.

394C SUP **(Spa2)**

394D Spa In Austria, Belgium, France, Israel, Luxembourg and Malaysia, the allocation to the space research service in the band 8 400-8 500 Mc/s is on a secondary basis.

MHz
8 500–9 500

Allocation to Services		
Region 1	Region 2	Region 3
8 500 — 8 750	RADIOLOCATION 354 395	
8 750 — 8 850	RADIOLOCATION AERONAUTICAL RADIONAVIGATION 396 397	
8 850 — 9 000	RADIOLOCATION 397 398	
9 000 — 9 200	AERONAUTICAL RADIONAVIGATION 346 *Radiolocation* 397	
9 200 — 9 300	RADIOLOCATION 397 398	
9 300 — 9 500	RADIONAVIGATION *Radiolocation* 399	

MHz
9 500—10 500
(Spa)

Allocation to Services		
Region 1	Region 2	Region 3
9 500—9 800		
RADIOLOCATION		
398		
9 800—10 000		
RADIOLOCATION		
Fixed		
400 401 401A		
10 000—10 500		
RADIOLOCATION		
Amateur		
401A 402 403		

395 In Albania, Austria, Bulgaria, Hungary, Poland, Roumania, Sweden, Czechoslovakia and the U.S.S.R., the band 8 500-8 750 Mc/s is also allocated to the radionavigation service.

396 The use of the band 8 750-8 850 Mc/s by the aeronautical radionavigation service is limited to airborne Doppler navigation aids on a centre frequency of 8 800 Mc/s.

397 In Belgium, France, the Netherlands and the F. R. of Germany, the band 8 825-9 225 Mc/s is also allocated to the maritime radionavigation service for use by shore-based radars.

398 In Albania, Austria, Bulgaria, Hungary, Poland, Roumania, Sweden, Switzerland, Czechoslovakia and the U.S.S.R., the bands 8 850-9 000 Mc/s, 9 200-9 300 Mc/s and 9 500-9 800 Mc/s are also allocated to the radionavigation service.

399 The use of the band 9 300-9 500 Mc/s by the aeronautical radionavigation service is limited to airborne weather radars, and ground-based radars. In this band ground-based radars used for meteorological purposes have priority over other radiolocation devices.

400 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the band 9 800-10 000 Mc/s is also allocated to the fixed and radionavigation services.

401 In India, Indonesia, Japan and Sweden, the fixed and radiolocation services operate on a basis of equality in the band 9 800-10 000 Mc/s.

401A Spa The band 9 975-10 025 Mc/s may be used by weather radar on meteorological-satellites.

402 In Japan and Sweden, the band 10 000-10 500 Mc/s is also allocated to the fixed and mobile services.

403 In the F. R. of Germany and Switzerland, the band 10 000-10 250 Mc/s is also allocated to the fixed and mobile services; the band 10 250-10 500 Mc/s is allocated to the amateur service.

GHz
10·5—10·55

Allocation to Services		
Region 1	Region 2	Region 3
10·5 — 10·55 FIXED MOBILE *Radiolocation*	10·5—10·55 RADIOLOCATION 404	

404 Limited to continuous wave systems.

GHz
10·55–10·7
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
10·55 – 10·6	FIXED MOBILE *Radiolocation*	
10·6 – 10·68	FIXED MOBILE RADIO ASTRONOMY *Radiolocation* 404A	
10·68 – 10·7	RADIO ASTRONOMY 405B	

404A Spa2 In the F.R. of Germany, in the band 10·6 – 10·68 GHz, the radio astronomy service is a secondary service.

405 SUP (Spa)

405A SUP (Spa2)

405B Spa In Algeria, Bulgaria, Cuba, Hungary, Japan, Kuwait, Lebanon, Pakistan, Poland, the United Arab Republic, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the band 10·68-10·7 Gc/s is also allocated to the fixed and mobile services.

GHz
10·7–12·5
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
10·7 – 10·95 FIXED MOBILE		
10·95 – 11·2 FIXED FIXED-SATELLITE (Space-to-Earth) (Earth-to-space) MOBILE	**10·95 – 11·2** FIXED FIXED-SATELLITE (Space-to-Earth) MOBILE	
11·2 – 11·45 FIXED MOBILE		
11·45 – 11·7 FIXED FIXED-SATELLITE (Space-to-Earth) MOBILE		
11·7 – 12·5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 405BA	**11·7 – 12·2** FIXED FIXED-SATELLITE (Space-to-Earth) MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 405BB 405BC	**11·7 – 12·2** FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 405BA
	12·2 – 12·5 FIXED MOBILE except aeronautical mobile BROADCASTING	

GHz
12·5–15·35
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
12·5 – 12·75 FIXED-SATELLITE (Space-to-Earth) (Earth-to-space) 405BD 405BE	**12·5 – 12·75** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile	**12·5 – 12·75** FIXED FIXED-SATELLITE (Space-to-Earth) MOBILE except aeronautical mobile
12·75 – 13·25 FIXED MOBILE		
13·25 – 13·4 AERONAUTICAL RADIONAVIGATION 406 407 407A		
13·4 – 14 RADIOLOCATION 407 407A 408 409		
14 – 14·3 FIXED-SATELLITE (Earth-to-space) RADIONAVIGATION 408A 407 407A		
14·3 – 14·4 FIXED-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE 408A		
14·4 – 14·5 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 408B 408C		
14·5 – 15·35 FIXED MOBILE 408B 408C		

405BA Spa2 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 the appropriate broadcasting frequency assignment planning conference (see Resolution No. **Spa2** – 2) and this requirement shall be taken into account in the decisions of that conference.

405BB Spa2 Terrestrial radiocommunication services in the band 11·7 – 12·2 GHz in Region 2 shall be introduced only after the elaboration and approval of plans for the space radiocommunication services, so as to ensure compatibility between the uses that each country decides for this band.

405BC Spa2 The use of the band 11·7 – 12·2 GHz in Region 2 by the broadcasting-satellite and fixed-satellite services is limited to domestic systems and is subject to previous agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected (see Article 9A and Resolution No. **Spa2** – 3).

405BD Spa2 In Bulgaria, Cameroon, Congo (Brazzaville), the Ivory Coast, Gabon, Ghana, Hungary, Iraq, Israel, Jordan, Kuwait, Libya, Mali, Niger, Poland, Syria, United Arab Republic, Roumania, Senegal, Czechoslovakia, Togo and the U.S.S.R., the band 12·5 – 12·75 GHz is also allocated to the fixed service and the mobile, except aeronautical mobile, service.

405BE Spa2 In Algeria, Belgium, Denmark, Spain, Ethiopia, Finland, France, Greece, Kenya, Liechtenstein, Luxembourg, Monaco, Norway, Uganda, Netherlands, Portugal, the F. R. of Germany, Sweden, Switzerland, Tanzania and Tunisia, the band 12·5 – 12·75 GHz is also allocated, on a secondary basis, to the fixed service and the mobile, except aeronautical mobile, service.

405C Spa In Cuba, the band 31·5-31·8 Gc/s is also allocated, on a secondary basis, to the fixed and mobile services.

406 Limited to Doppler navigation aids.

407 Spa2 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the bands 13·25 – 13·5 GHz, 14·175 – 14·3 GHz, 15·4 – 17·7 GHz, 23·6 – 24 GHz, 24·05 – 24·25 GHz and 33·4 – 36 GHz are also allocated to the fixed and mobile services.

407A Spa2 The band 13·25 – 14·2 GHz may also be used, on a secondary basis, for Earth-to-space transmissions in the space research service, subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

408 Spa2 In Sweden, the bands 13·4 – 14 GHz, 15·7 – 17·7 GHz and 33·4 – 36 GHz are also allocated to the fixed and mobile services.

408A Spa2 The use of the bands 14 – 14·3 GHz and 14·3 - 14·4 GHz by the radionavigation service and radionavigation-satellite service respectively, shall be such as to provide sufficient protection to space stations of the fixed-satellite service (see Recommendation No. **Spa2** – 15, paragraph 2.14).

408B Spa2 The band 14·4 – 15·35 GHz may also be used, on a secondary basis, for space-to-Earth transmissions in the space research service, subject to agreement between the administrations concerned and those having services, operating in accordance with the Table, which may be affected.

408C Spa2 Radio astronomy observations on the formaldehyde line (rest frequency 14·489 GHz) are being carried out in a number of countries under national arrangements. In making assignments to stations in the fixed and mobile services, administrations are urged to take all practicable steps to protect radio astronomy observations from harmful interference in the band 14·485 – 14·515 GHz.

409 In Albania, Bulgaria, Hungary, Poland, Roumania, Czechoslovakia, and the U.S.S.R., the band 13·5-14 Gc/s is also allocated to the radionavigation service.

409A 409B SUP (Spa2)

GHz
15·35—17·7
(Spa)

Allocation to Services		
Region 1	Region 2	Region 3
15·35—15·4	RADIO ASTRONOMY 409C	
15·4—15·7	AERONAUTICAL RADIONAVIGATION 352A 352B 407	
15·7—17·7	RADIOLOCATION 407 408	

409C Spa In Algeria, Bulgaria, Cuba, Hungary, Kuwait, Lebanon, Morocco, Pakistan, Poland, the United Arab Republic, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the band 15·35-15·4 Gc/s is also allocated to the fixed and mobile services.

GHz
17·7–23·6
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
17·7 – 19·7	FIXED FIXED-SATELLITE (Space-to-Earth) MOBILE	
19·7 – 21·2	FIXED-SATELLITE (Space-to-Earth) 409E	
21·2 – 22	EARTH EXPLORATION-SATELLITE (Space-to-Earth) FIXED MOBILE	
22 – 22·5	FIXED MOBILE 410A	
22·5 – 23	FIXED MOBILE	22·5 – 23 FIXED MOBILE BROADCASTING-SATELLITE 410B
23 – 23·6	FIXED MOBILE	

GHz
23·6–24·25
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
23·6 – 24	RADIO ASTRONOMY 407	
24 – 24·05	AMATEUR AMATEUR-SATELLITE 410C	
24·05 – 24·25	RADIOLOCATION *Amateur* 407 410C	

409D SUP **(Spa2)**

409E Spa2 In Japan, the bands 19·7 – 21·2 GHz and 29·5 – 31 GHz are also allocated to the fixed and mobile services. This additional use shall not impose any limitation on the power flux density of space stations in the fixed-satellite service.

410 SUP **(Spa2)**

410A Spa2 The band 22·21 – 22·26 GHz is also allocated to the radio astronomy service for observations of a spectral line due to water vapour (rest frequency 22·235 GHz). Administrations are urged to give all practicable protection in this band for future research in radio astronomy.

410B Spa2 In Region 3, the broadcasting-satellite service is authorized in the band 22·5 – 23·0 GHz, subject to power flux density limits for the protection of the terrestrial services in this band.

410C Spa2 The frequency 24·125 GHz is designated for industrial, scientific and medical purposes. Emissions must be confined within the limits of ±125 MHz of that frequency. Radiocommunication services operating within those limits must accept any harmful interference that may be experienced from the operation of industrial, scientific and medical equipment.

GHz
24·25—33
(Spa2)

Allocation to Services		
Region 1	**Region 2**	**Region 3**
24·25—25·25	RADIONAVIGATION 411 412	
25·25 – 27·5	FIXED MOBILE	
27·5 – 29·5	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	
29·5 – 31	FIXED-SATELLITE (Earth-to-space) 409E	
31 – 31·3	FIXED MOBILE *Space Research* 412H 412I	
31·3—31·5	RADIO ASTRONOMY 412A	
31·5—31·8 SPACE RESEARCH *Fixed* *Mobile*	**31·5—31·8** SPACE RESEARCH 405C	**31·5—31·8** SPACE RESEARCH *Fixed* *Mobile*
31·8—32·3	RADIONAVIGATION *Space Research* 412B	
32·3—33	RADIONAVIGATION	

GHz
33—40
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
33—33·4 RADIO ASTRONOMY RADIONAVIGATION	33—33·4 RADIONAVIGATION 412F	
33·4—34·2 RADIOLOCATION 407 408 412 412G		
34·2—35·2 RADIOLOCATION *Space Research* 407 408 412 412C 412D		
35·2—36 RADIOLOCATION 407 408 412		
36 – 40 FIXED MOBILE 391A 412E		

411 In the band 24·25-25·25 Gc/s, ground-based radionavigation aids are not permitted except where they operate in cooperation with airborne or shipborne radionavigation devices.

412 In Japan, the bands 24·25-25·25 Gc/s and 33·4-36 Gc/s are also allocated to the meteorological aids service.

412A Spa In Bulgaria, Cuba, Hungary, Poland, the United Arab Republic, Roumania, Czechoslovakia and the U.S.S.R., the band 31·3-31·5 Gc/s is also allocated to the fixed and mobile services.

412B Spa In Bulgaria, Cuba, Hungary, Poland, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the space research service is a primary service in the band 31·8-32·3 Gc/s.

412C Spa In Bulgaria, Cuba, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the space research service is a primary service in the band 34·2-35·2 Gc/s.

412D Spa The band 34·4-34·5 Gc/s may be used by weather radar devices on meteorological-satellites for the detection of cloud.

412E Spa In Bulgaria, Cuba, Hungary, Poland, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the band 36·5-37·5 Gc/s is also allocated to the radio astronomy service.

412F Spa In Cuba and India, the band 33-33·4 Gc/s is also allocated to the radio astronomy service.

412G Spa In Bulgaria, Cuba, Hungary, Poland, Yugoslavia, Roumania, Czechoslovakia and the U.S.S.R., the band 33·4-34 Gc/s is also allocated to the radio astronomy service.

412H Spa In Bulgaria, Cuba, Hungary, Poland, Roumania, Czechoslovakia and the U.S.S.R., the space research service is a primary service in the band 31-31·3 Gc/s.

412I Spa2 Radio astronomy observations in the band 31·2 – 31·3 GHz are carried out in a number of countries under national arrangements. Administrations are urged to take all practicable steps to protect radio astronomy observations in this band from harmful interference.

GHz
40–58·2
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
40 – 41		
	FIXED-SATELLITE (Space-to-Earth)	
41 – 43		
	BROADCASTING-SATELLITE	
43 – 48		
	AERONAUTICAL MOBILE-SATELLITE MARITIME MOBILE-SATELLITE AERONAUTICAL RADIONAVIGATION-SATELLITE MARITIME RADIONAVIGATION-SATELLITE	
48 – 50		
	(Not allocated)	
50 – 51		
	FIXED-SATELLITE (Earth-to-space)	
51 – 52		
	EARTH EXPLORATION-SATELLITE SPACE RESEARCH	
52 – 54·25		
	SPACE RESEARCH (Passive) 412J	
54·25 – 58·2		
	INTER-SATELLITE	

412J All emissions in the bands 52 – 54·25 GHz, 58·2 – 59 GHz, 64 – 65 GHz.
Spa2 86 – 92 GHz, 101 – 102 GHz, 130 – 140 GHz, 182 – 185 GHz and 230 – 240 GHz are prohibited. The use of passive sensors by other services is also authorized.

GHz
58·2–92
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
58·2 – 59	SPACE RESEARCH (Passive) 412J	
59 – 64	INTER-SATELLITE	
64 – 65	SPACE RESEARCH (Passive) 412J	
65 – 66	EARTH EXPLORATION-SATELLITE SPACE RESEARCH	
66 – 71	AERONAUTICAL MOBILE-SATELLITE MARITIME MOBILE-SATELLITE AERONAUTICAL RADIONAVIGATION-SATELLITE MARITIME RADIONAVIGATION-SATELLITE	
71 – 84	(Not allocated)	
84 – 86	BROADCASTING-SATELLITE	
86 – 92	RADIO ASTRONOMY SPACE RESEARCH (Passive) 412J	

GHz
92–142
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
92 – 95	FIXED-SATELLITE (Earth-to-space)	
95 – 101	AERONAUTICAL MOBILE-SATELLITE MARITIME MOBILE-SATELLITE AERONAUTICAL RADIONAVIGATION-SATELLITE MARITIME RADIONAVIGATION-SATELLITE	
101 – 102	SPACE RESEARCH (Passive) 412J	
102 – 105	FIXED-SATELLITE (Space-to-Earth)	
105 – 130	INTER-SATELLITE 412K	
130 – 140	RADIO ASTRONOMY SPACE RESEARCH (Passive) 412J	
140 – 142	FIXED-SATELLITE (Earth-to-space)	

412K Spa2 Radio astronomy observations on the carbon monoxide line at 115·271 GHz are carried out in a number of countries under national arrangements. In making assignments to other services in the Table, administrations should bear in mind the need to protect radio astronomy observations from harmful interference in the band 115·16 – 115·38 GHz.

GHz
142–230
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
142 – 150	AERONAUTICAL MOBILE-SATELLITE MARITIME MOBILE-SATELLITE AERONAUTICAL RADIONAVIGATION-SATELLITE MARITIME RADIONAVIGATION-SATELLITE	
150 – 152	FIXED-SATELLITE (Space-to-Earth)	
152 – 170	(Not allocated)	
170 – 182	INTER-SATELLITE	
182 – 185	SPACE RESEARCH (Passive) 412J	
185 – 190	INTER-SATELLITE	
190 – 200	AERONAUTICAL MOBILE-SATELLITE MARITIME MOBILE-SATELLITE AERONAUTICAL RADIONAVIGATION-SATELLITE MARITIME RADIONAVIGATION-SATELLITE	
200 – 220	(Not allocated)	
220 – 230	FIXED-SATELLITE	

GHz
230–275
(Spa2)

Allocation to Services		
Region 1	Region 2	Region 3
230 – 240	RADIO ASTRONOMY SPACE RESEARCH (Passive) 412J	
240 – 250	(Not allocated)	
250 – 265	AERONAUTICAL MOBILE-SATELLITE MARITIME MOBILE-SATELLITE AERONAUTICAL RADIONAVIGATION-SATELLITE MARITIME RADIONAVIGATION-SATELLITE	
265 – 275	FIXED-SATELLITE	
Above 275	(Not allocated)	

ARTICLE 6

Special Rules for the Assignment and Use of Frequencies

413 § 1. (1) Members and Associate Members of the Union recognize that among frequencies which have long-distance propagation characteristics, those in the bands between 5 000 and 30 000 kc/s are particularly useful for long-distance communications; they agree to make every possible effort to reserve these bands for such communications. Whenever frequencies in these bands are used for short or medium-distance communications, the minimum power necessary shall be employed.

414 (2) To reduce requirements for frequencies in the bands between 5 000 and 30 000 kc/s and thus to prevent harmful interference to long-distance radiocommunications, administrations are encouraged to use, whenever practicable, any other possible means of communication.

415 § 2. (1) When special circumstances make it indispensable to do so,
Spa2 an administration may, as an exception to the normal methods of working authorized by these Regulations, have recourse to the special methods of working enumerated below, on the sole condition that the characteristics of the stations still conform to those inserted in the Master International Frequency Register:

a) a fixed station in the terrestrial radiocommunication service or an earth station in the fixed-satellite service may, on a secondary basis, transmit to mobile stations on its normal frequencies;

b) a land station may communicate, on a secondary basis, with fixed stations in the terrestrial radiocommunication service or earth stations in the fixed-satellite service or other land stations of the same category.

416 (2) However, in circumstances involving the safety of life, or the safety of a ship or aircraft, a land station may communicate with fixed stations or land stations of another category.

417 Spa2 § 3. Any administration may assign a frequency in a band allocated to the fixed service or allocated to the fixed-satellite service to a station authorized to transmit, unilaterally, from one specified fixed point to one or more specified fixed points provided that such transmissions are not intended to be received directly by the general public.

418 § 4. Any mobile station using an emission which satisfies the frequency tolerance applicable to the coast station with which it is communicating may transmit on the same frequency as the coast station on condition that the latter requests such transmission and that no harmful interference is caused to other stations.

419 § 5. In certain cases provided for in Articles 32 and 35, aircraft stations are authorized to use frequencies in the bands allocated to the maritime mobile service for the purpose of communicating with stations of that service (see No. **952**).

419A Spa2 § 5A. Earth stations on board aircraft are authorized to use frequencies in the bands allocated to the maritime mobile-satellite service for the purpose of communicating, via the stations of that service, with the public telegraph and telephone networks.

420 § 6. In Region 1, stations which use frequencies in the band 1 625-1 670 kc/s allocated for low-power telephony services shall, in principle, employ a power which is as low as possible. Such power shall not exceed 20 watts.

421 § 7. Any emission capable of causing harmful interference to distress, alarm, urgency or safety signals on the international distress frequencies of 500 kc/s or 2 182 kc/s is prohibited (see Nos. **187**, **201**, **1112** and **1325**).

ARTICLE 7

Special Rules Relating to Particular Services

Section I. Broadcasting Service

General

422 § 1. (1) The establishment and use of broadcasting stations (sound broadcasting and television broadcasting stations) on board ships, aircraft or any other floating or airborne objects outside national territories is prohibited.

423 (2) In principle, except in the frequency band 3 900-4 000 kc/s, broadcasting stations using frequencies below 5 060 kc/s or above 41 Mc/s shall not employ power exceeding that necessary to maintain economically an effective national service of good quality within the frontiers of the country concerned.

Broadcasting in the Tropical Zone

424 § 2. (1) In these Regulations, the expression " broadcasting in the Tropical Zone " indicates a type of broadcasting for internal national use in countries in the zone defined in Nos. **135** and **136**, where it may be shown that because of the difficulty of high atmospheric noise level and propagation it is not possible to provide economically a more satisfactory service by using low, medium, or very high frequencies.

425 (2) The use by the broadcasting service of the bands listed below is restricted to the Tropical Zone :

2 300 - 2 498 kc/s (Region 1)
2 300 - 2 495 kc/s (Regions 2 and 3)
3 200 - 3 400 kc/s (All Regions)
4 750 - 4 995 kc/s (All Regions)
5 005 - 5 060 kc/s (All Regions)

426 (3) Within the Tropical Zone, the broadcasting service has priority over the other services with which it shares the bands listed in No. **425**.

427 (4) However, in that part of Libya north of parallel 30° North the broadcasting service in the bands listed in No. **425** has equal rights to operate with other services in the Tropical Zone with which it shares these bands.

428 (5) The broadcasting service operating inside the Tropical Zone, and other services operating outside the Zone, are subject to the provisions of No. **117**.

Spa2 **Section IA. Broadcasting-Satellite Service**

428A Spa2 § 2A. In devising the characteristics of a space station in the broadcasting-satellite service, all technical means available shall be used to reduce, to the maximum extent practicable, the radiation over the territory of other countries unless an agreement has been previously reached with such countries.

Section II. Aeronautical Mobile Service

429 § 3. Frequencies in any band allocated to the aeronautical mobile (R) service are reserved for communications between any aircraft and those aeronautical stations primarily concerned with the safety and regularity of flight along national or international civil air routes.

430 § 4. Frequencies in any band allocated to the aeronautical mobile (OR) service are reserved for communications between any aircraft and aeronautical stations other than those primarily concerned with flight along national or international civil air routes.

431 Aer § 5. Frequencies in the bands allocated to the aeronautical mobile service between 2 850 and 18 030 kc/s (see Article 5) shall be assigned in conformity with the provisions of Appendices 26 and 27 and the other relevant provisions of these Regulations.

432 § 6. Administrations shall not permit public correspondence in the frequency bands allocated exclusively to the aeronautical mobile service, unless permitted by special aeronautical regulations adopted by a Conference of the Union to which all interested Members and Associate Members of the Union are invited. Such regulations shall recognize the absolute priority of safety and control messages.

Section III. Aeronautical Radiobeacons

433 § 7. (1) The assignment of frequencies to aeronautical radiobeacons operating in the bands between 160 and 415 kc/s shall be based on a protection ratio against interference of at least 10db for each beacon throughout its service area.

434 (2) It is agreed that, to provide the protection ratio required, the radiated power should be kept to the value necessary to give the desired field strength at the service range.

435 (3) The daylight service range of radiobeacons referred to in No. 433 shall be based on the following field strengths;

436 (4) *Regions 1 and 2*

— 70 microvolts per metre for radiobeacons north of 30°N.

— 120 microvolts per metre for radiobeacons between 30°N and 30°S.

— 70 microvolts per metre for radiobeacons south of 30°S.

437 (5) *Region 3*

— 70 microvolts per metre for radiobeacons north of 40°N.

— 120 microvolts per metre for radiobeacons between 40°N and 50°S.

— 70 microvolts per metre for radiobeacons south of 50°S.

Section IV. Maritime Mobile Service

437A Mar § 7A. Stations of the maritime mobile service employing single sideband radiotelegraph transmissions shall use upper sideband emissions. The frequencies specified in the Radio Regulations for class A2H emissions in the maritime mobile service such as 410, 425, 454, 468, 480, 500, 512 and 8 364 kc/s, shall be used as carrier frequencies.

438 § 8. (1) Except as provided in No. **418**, ship stations authorized to work in the bands between 415 and 535 kc/s shall transmit on the frequencies indicated in Article 32 (see No. **1123**).

438A **Mar** § 8A. As a general rule, the minimum separation between adjacent frequencies used respectively by coast stations and by ship stations is 4 kc/s.

439 § 9. In the band 405 - 415 kc/s in Region 1, no frequency is assigned to coast stations, in order to protect the frequency 410 kc/s which is designated for the maritime radionavigation service (radio direction-finding).

440 § 10. (1) In the African Area of Region 1, in the bands 415 - 490 kc/s and 510 - 525 kc/s, the separation between adjacent frequencies assigned to coast stations is, as a general rule, 3 kc/s. However, in order that the frequencies may coincide with those used in the European Area in these bands, this spacing is reduced in certain cases.

441 SUP (**Mar**)

442 **Mar** § 11. (1) In Region 1, frequencies assigned to stations of the maritime mobile service operating in the bands between 1 605 and 3 800 kc/s (see Article 5) should, whenever possible, be in accordance with the following subdivision:

— 1 605	- 1 625	kc/s:	Radiotelegraphy exclusively.
— 1 625	- 1 670	kc/s:	Low power radiotelephony.
— 1 670	- 1 950	kc/s:	Coast stations.
— 1 950	- 2 053	kc/s:	Ship stations working to coast stations.
— 2 053	- 2 065	kc/s:	Intership working.
— 2 065	- 2 170	kc/s:	Ship stations working to coast stations.
— 2 170	- 2 173·5	kc/s:	Coast stations calling ship stations (including selective calling) and, exceptionally, coast stations transmitting safety messages.

— *2 173·5 - 2 190·5 kc/s: Guard-band for the distress and calling frequency 2 182 kc/s.*

— 2 190·5 - 2 194 kc/s: Ship stations calling coast stations.

— 2 194 - 2 440 kc/s: Intership working.

— 2 440 - 2 578 kc/s: Ship stations working to coast stations.

— 2 578 - 2 850 kc/s: Coast stations.

— 3 155 - 3 340 kc/s: Ship stations working to coast stations.

— 3 340 - 3 400 kc/s: Intership working.

— 3 500 - 3 600 kc/s: Intership working.

— 3 600 - 3 800 kc/s: Coast stations.

443 Mar (2) In these bands, in Region 1, the frequencies assigned to the maritime mobile service are spaced, as far as possible, by:

— 7 kc/s when two adjacent frequencies are used for double sideband radiotelephony;

— 3 kc/s when two adjacent frequencies are used for radiotelegraphy;

— 5 kc/s when one frequency is used for double sideband radiotelephony and the adjacent frequency is used for radiotelegraphy.

444 Mar (3) However, in the case of the intership bands, in Region 1, the spacing is reduced to 5 kc/s for adjacent frequencies used for double sideband radiotelephony.

444A Mar (4) When these bands are used for single sideband radiotelephony, a station operating in the lower half of a double sideband channel shall use upper sideband emission with the carrier frequency located 3 kc/s below the centre frequency of that channel.

444B Mar (5) However, in the case of the intership bands, the carrier frequency of a station operating in the lower half of the double sideband channel is located only 2·5 kc/s below the centre frequency of that channel.

445 Mar § 11A. In Regions 2 and 3, the carrier frequencies 2 635 kc/s (assigned frequency 2 636·4 kc/s) and 2 638 kc/s (assigned frequency 2 639·4 kc/s) are used as single sideband intership radiotelephony working frequencies in addition to the frequencies prescribed for common use in certain services. The carrier frequency 2 635 kc/s should be used with class A3A and A3J emissions only. The carrier frequency 2 638 kc/s may be used with class A3, A3H, A3A and A3J emissions. However, after 1 January 1982, class A3 and A3H emissions are no longer authorized. In Region 3 these frequencies are protected by a guard-band between 2 634 and 2 642 kc/s.

445A Mar § 11B. The assigned frequency of a single sideband channel of a station in the radiotelephone maritime mobile service shall be 1 400 c/s higher than the carrier frequency.

446 § 12. (1) The bands exclusively allocated to the maritime mobile service between 4 000 and 27 500 kc/s (see Articles 5, 32 and 35) are subdivided into the following categories :

447 Mar *a) Ship stations*, telephony, duplex operation (two-frequency channels)

4 063 - 4 139·5 kc/s
6 200 - 6 210·4 kc/s
8 195 - 8 281·2 kc/s
12 330 - 12 421 kc/s
16 460 - 16 565 kc/s
22 000 - 22 094·5 kc/s

448 Mar *b) Coast stations*, telephony, duplex operation (two-frequency channels)

4 361 - 4 438 kc/s
6 514 - 6 525 kc/s
8 728·5 - 8 815 kc/s
13 107·5 - 13 200 kc/s
17 255 - 17 360 kc/s
22 624·5 - 22 720 kc/s

449 Mar *c) Ship stations and coast stations*, telephony, simplex operation (single-frequency channels)

4 139·5 - 4 142·5 kc/s
6 210·4 - 6 216·5 kc/s
8 281·2 - 8 288 kc/s
12 421 - 12 431·5 kc/s
16 565 - 16 576 kc/s
22 094·5 - 22 112 kc/s

450 SUP (Mar)

451 Mar *(e) Ship stations*, wide-band telegraphy, facsimile, and special transmission systems

4 142·5 - 4 162·5 kc/s
6 216·5 - 6 244·5 kc/s
8 288 - 8 328 kc/s
12 431·5 - 12 479·5 kc/s
16 576 - 16 636·5 kc/s
22 112 - 22 160·5 kc/s

451A Mar *(f) Ship stations*, oceanographic data transmission (see note *a)* in Appendix 15)

4 162·5 - 4 166 kc/s
6 244·5 - 6 248 kc/s
8 328 - 8 331·5 kc/s
12 479·5 - 12 483 kc/s
16 636·5 - 16 640 kc/s
22 160·5 - 22 164 kc/s

451B *(g) Ship stations,* narrow-band direct-printing telegraph and
Mar data transmission systems

4 166 - 4 172·25 kc/s
6 248 - 6 258·25 kc/s
8 331·5 - 8 341·75 kc/s
12 483 - 12 503·25 kc/s
16 640 - 16 660·5 kc/s
22 164 - 22 184·5 kc/s

452 *(h) Ship stations,* telegraphy
Mar

4 172·25 - 4 231 kc/s
6 258·25 - 6 345·5 kc/s
8 341·75 - 8 459·5 kc/s
12 503·25 - 12 689 kc/s
16 660·5 - 16 917·5 kc/s
22 184·5 - 22 374 kc/s
25 070 - 25 110 kc/s

452.1 SUP **(Mar)**

453 *(i) Coast stations,* wide-band and manual telegraphy, facsimile,
Mar special and data transmission systems and direct-printing telegraph systems

4 231 - 4 361 kc/s
6 345·5 - 6 514 kc/s
8 459·5 - 8 728·5 kc/s
12 689 - 13 107·5 kc/s
16 917·5 - 17 255 kc/s
22 374 - 22 624·5 kc/s

453A (1A) Frequencies in the bands 25 010-25 070 kc/s, 25 110-25 600
Mar kc/s and 26 100-27 500 kc/s may be assigned to coast stations.

453.1 SUP **(Mar)**

454 – 455 SUP **(Mar)**

456 Mar § 13. (1) Appendix 17 shows the radiotelephone channels of the maritime mobile service in the frequency bands listed in Nos. **447**, **448** and **449**.

457 Mar (2) Appendix 25 contains the frequency allotment plan for coast radiotelephone stations in the high frequency bands (see, however, Resolution No. Mar 11).

Section V. Maritime Radiobeacons

458 § 14. (1) The protection ratio required for maritime radiobeacons operating in the bands between 285 and 325 kc/s is based on the radiated power being kept to the value necessary to give the desired field strength at the service range.

459 (2) The daylight service range of the radiobeacons referred to in No. **458** shall be based on the following field strengths:

460 (3) *Region 1*

— 50 microvolts per metre for radiobeacons north of 43°N.

— 75 microvolts per metre for radicbeacons between 43°N and 30°N.

— 100 microvolts per metre for radiobeacons between 30°N and 30°S.

— 75 microvolts per metre for radiobeacons between 30°S and 43°S.

— 50 microvolts per metre for radiobeacons south of 43°S.

461 (4) *Region 2*

— 50 microvolts per metre for radiobeacons north of 40°N.

— 75 microvolts per metre for radiobeacons between 40°N and 31°N.

— 100 microvolts per metre for radiobeacons between 31°N and 30°S.

— 75 microvolts per metre for radiobeacons between 30°S and 43°S.

— 50 microvolts per metre for radiobeacons south of 43°S.

462 (5) *Region 3*

— 75 microvolts per metre for radiobeacons north of 40°N.

— 100 microvolts per metre for radiobeacons between 40°N and 50°S.

— 75 microvolts per metre for radiobeacons south of 50°S.

463 (6) In Region 1, for maritime radiobeacons in these bands, the assignment of frequencies is based on a separation of 2·3 kc/s between adjacent frequencies used for class A2 emissions.

464 (7) In Region 1, for maritime radiobeacons, the depth of modulation should be at least 70 %.

Section VI. Fixed Service

General

465 § 15. (1) Administrations are urged to discontinue, in the fixed service, the use of double sideband radiotelephone transmissions in the bands below 30 Mc/s, if possible as from January 1, 1970.

466 (2) Class F3 emissions are prohibited in the fixed service in the bands below 30 Mc/s.

Selection of Frequencies for the International Exchange of Police Information.

467 § 16. (1) The frequencies necessary for the international exchange of information to assist in the apprehension of criminals shall be selected from the bands allocated to the fixed service, if necessary by special agreement among interested administrations, in accordance with Article 44 of the Convention.

468 (2) To obtain economy in the use of frequencies, the International Frequency Registration Board should be consulted by the administrations concerned whenever such agreements are under discussion on a regional or world-wide basis.

Selection of Frequencies for the International Exchange of Synoptic Meteorological Information.

469 § 17. (1) The frequencies necessary for the international exchange of synoptic meteorological information shall be selected from the bands allocated to the fixed service if necessary by special agreement among interested administrations, in accordance with Article 44 of the Convention.

470 (2) To obtain economy in the use of frequencies, the International Frequency Registration Board should be consulted by the administrations concerned whenever such agreements are under discussion on a regional or world-wide basis.

Spa2 **Section VII. Terrestrial Radiocommunication Services sharing Frequency Bands with Space Radiocommunication Services above 1 GHz**

Choice of Sites and Frequencies

470A Spa2 § 18. Sites and frequencies for terrestrial stations, operating in frequency bands shared with equal rights between terrestrial radiocommunication and space radiocommunication services shall be selected having regard to the relevant Recommendations of the C.C.I.R. with respect to geographical separation from earth stations.

470AA § 18A. (1) As far as practicable, sites for transmitting[1] stations,
Spa2 in the fixed or mobile service, employing maximum values of equivalent isotropically radiated power exceeding +35 dBW in the frequency bands between 1 and 10 GHz, should be selected so that the direction of maximum radiation of any antenna will be at least 2° away from the geostationary satellite orbit, taking into account the effect of atmospheric refraction[2].

470AB (2) As far as practicable, sites for transmitting[3] stations, in
Spa2 the fixed or mobile service, employing maximum values of equivalent isotropically radiated power exceeding +45 dBW in the frequency bands between 10 and 15 GHz, should be selected so that the direction of maximum radiation of any antenna will be at least 1·5° away from the geostationary satellite orbit, taking into account the effect of atmospheric refraction[4].

470AC (3) In the frequency bands above 15 GHz there shall be no
Spa2 restriction as to the direction of maximum radiation for stations in the fixed or mobile service.

470AA.1 [1] For their own protection receiving stations in the fixed or mobile services
Spa2 operating in bands shared with space radiocommunication services (space-to Earth) should also avoid directing their antennae towards the geostationary satellite orbit if their sensitivity is sufficiently high that interference from space station transmissions may be significant.

470AA.2 [2] Information on this subject is given in the most recent version of C.C.I.R.
Spa2 Report No. 393.

470AB.1 [3] See No. 470AA.1.
Spa2

470AB.2 [4] See No. 470AA.2.
Spa2

Power Limits

470B § 19. (1) The maximum equivalent isotropically radiated power of
Spa2 a station in the fixed or mobile service shall not exceed +55 dBW.

470BA (1A) Where compliance with No. **470AA** is impracticable the
Spa2 maximum equivalent isotropically radiated power of a station in the fixed or mobile service shall not exceed:

+47 dBW in any direction within 0·5° of the geostationary satellite orbit; or

+47 dBW to +55 dBW, on a linear decibel scale (8 dB per degree), in any direction between 0·5° and 1·5° of the geostationary satellite orbit, taking into account the effect of atmospheric refraction[1].

470C (2) The power delivered by a transmitter to the antenna of
Spa2 a station in the fixed or mobile service in frequency bands between 1 and 10 GHz, shall not exceed +13 dBW.

470CA (2A) The power delivered by a transmitter to the antenna of a
Spa2 station in the fixed or mobile service in frequency bands above 10 GHz shall not exceed +10 dBW.

470D (3) The limits given in Nos. **470AA**, **470B**, **470BA** and **470C**
Spa2 apply in the following frequency bands allocated to the fixed-satellite

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470BA.1 [1] See No. **470AA.2**.
Spa2

service and the meteorological-satellite service for reception by space stations, where these bands are shared with equal rights with the fixed or mobile service:

2 655 - 2 690 MHz (for Regions 2 and 3)
5 800 - 5 850 MHz (for the countries mentioned in No. **390**)
5 850 - 5 925 MHz (for Regions 1 and 3)
5 925 - 6 425 MHz
7 900 - 7 975 MHz
7 975 - 8 025 MHz (for the countries mentioned in No. **392H**)
8 025 - 8 400 MHz

470DA (4) The limits given in Nos. **470AB**, **470B** and **470CA** apply
Spa2 in the following frequency bands allocated to the fixed-satellite service for reception by space stations, where these bands are shared with equal rights with the fixed or mobile service:

10·95 - 11·20 GHz (Region 1)
12·50 - 12·75 GHz (Regions 1 and 2)
14·175 - 14·300 GHz (for the countries mentioned in No. **407**)
14·4 - 14·5 GHz

470DB (5) The limits given in Nos. **470B** and **470CA** apply in the
Spa2 following frequency bands allocated to the fixed-satellite service for reception by space stations, where these bands are shared with equal rights with the fixed or mobile service:

27·5 - 29·5 GHz
29·5 - 31·0 GHz (for the country mentioned in No. **409E**)

Spa2 **Section VIII. Space Radiocommunication Services sharing Frequency Bands with Terrestrial Radiocommunication Services above 1 GHz**

Choice of Sites and Frequencies

470E § 20. Sites and frequencies for earth stations, operating in frequen-
Spa2 cy bands shared with equal rights between terrestrial radiocommunication and space radiocommunication services, shall be selected having regard to the relevant Recommendations of the C.C.I.R. with respect to geographical separation from terrestrial stations.

Power Limits

470F § 21. (1) Earth stations.
Spa2

470G (2) The equivalent isotropically radiated power transmitted
Spa2 in any direction towards the horizon by an earth station operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided in Nos. **470H** or **470GC**:

$$+40 \text{ dBW in any 4 kHz band for } \theta \leqslant 0°$$

$$+40 + 3\,\theta \text{ dBW in any 4 kHz band for } 0° < \theta \leqslant 5°$$

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

470GA (2A) The equivalent isotropically radiated power transmitted in
Spa2 any direction towards the horizon by an earth station operating in frequency bands above 15 GHz shall not exceed the following limits except as provided in Nos. **470H** or **470GD**:

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

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

where θ is as defined in No. **470G**.

470GB (2B) For angles of elevation of the horizon greater than 5° there
Spa2 shall be no restriction as to the equivalent isotropically radiated power transmitted by an earth station towards the horizon.

470GC (2C) As an exception to the limits given in No. **470G**, the
Spa2 equivalent isotropically radiated power towards the horizon for an earth station in the space research service (deep-space) shall not exceed $+55$ dBW in any 4 kHz band.

470GD (2D) As an exception to the limits given in No. **470GA**, the equi-
Spa2 valent isotropically radiated power towards the horizon for an earth station in the space research service (deep-space) shall not exceed $+79$ dBW in any 1 MHz band.

470H (3) The limits given in No. **470G**, No. **470GA**, No. **470GC** and
Spa2 No. **470GD**, as applicable, may be exceeded by not more than 10 dB. However, when the resulting co-ordination area extends into the territory of another country, such increase shall be subject to agreement by the administration of that country.

470I **SUP** **(Spa2)**

470J (3A) The limits given in No. **470G** apply in the following fre-
Spa2 quency bands allocated to transmission by earth stations in the fixed-satellite service and earth exploration-satellite service, and in particular the meteorological-satellite service, where these bands are shared with equal rights with the fixed or mobile service:

2 655 - 2 690 MHz	(Regions 2 and 3)
4 400 - 4 700 MHz	
5 800 - 5 850 MHz	(for the countries mentioned in No. **390**)
5 850 - 5 925 MHz	(Regions 1 and 3)
5 925 - 6 425 MHz	
7 900 - 7 975 MHz	
7 975 - 8 025 MHz	(for the countries mentioned in No. **392H**)
8 025 - 8 400 MHz	
10·95 - 11·20 GHz	(Region 1)
12·50 - 12·75 GHz	(Regions 2 and 3 and for the countries mentioned in No. **405BD**)
14·175 - 14·300 GHz	(for the countries mentioned in No. **407**)
14·4 - 14·5 GHz	

470JA (3B) The limits given in No. **470GA** apply in the following fre-
Spa2 quency band allocated to transmission by earth stations in the fixed-satellite service, where this is shared with equal rights with the fixed or mobile service:

27·5 - 29·5 GHz

Minimum Angle of Elevation

470K § 22. (1) Earth stations.
Spa2

470L (2) Earth station antennae shall not be employed for trans-
Spa2 mission at elevation angles of less than 3 degrees measured from the horizontal plane to the direction of maximum radiation, except when agreed to by administrations concerned or those whose services may be affected. In case of reception by an earth station, the above value shall be used for co-ordination purposes if the operating angle of elevation is less than that value.

470LA (2A) As an exception to No. **470L**, earth station antennae in the
Spa2 space research service (near-earth) shall not be employed for transmission at elevation angles of less than 5 degrees, and earth station antennae in the space research service (deep-space) shall not be employed for transmission at elevation angles of less than 10 degrees, both angles being those measured from the horizontal plane to the direction of maximum radiation. In case of reception by an earth station, the above values shall be used for co-ordination purposes if the operating angle of elevation is less than those values.

470M **SUP** **(Spa2)**

Spa2 *Limits of Power Flux Density from Space Stations*

470N § 23. (1) Power flux density limits between 1 690 MHz and 1 700
Spa2 MHz.

470NA *a)* The power flux density at the Earth's surface produced
Spa2 by emissions from a space station or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed -133 dBW/m^2 in any 1·5 MHz band. This limit relates to the power flux density which would be obtained under assumed free-space propagation conditions.

470NB *b)* The limit given in No. **470NA** applies in the frequency
Spa2 band listed in No. **470NC** which is allocated to transmission by space stations in the earth exploration-satellite service and in particular the meteorological-satellite service where this band is shared with equal rights with the meteorological aids service.

470NC 1 690 - 1 700 MHz
Spa2

470ND **Spa2** (2) Power flux density limits between 1 670 MHz and 2 535 MHz.

470NE **Spa2** *a)* The power flux density at the Earth's surface produced by emissions from a space station or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed the following values:

-154 dBW/m² in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-154 + \frac{\delta - 5}{2}$ dBW/m² in any 4 kHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane;

-144 dBW/m² in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

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

470NF **Spa2** *b)* The limits given in No. **470NE** apply in the frequency bands listed in No. **470NG** which are allocated to transmission by space stations in the following space radiocommunication services:

— Earth exploration-satellite service and in particular meteorological-satellite service (space-to-Earth)

— space research service (space-to-Earth)

— fixed-satellite service (space-to-Earth)

where these bands are shared with equal rights with the fixed or mobile service:

470NG 1 670 - 1 690 MHz
Spa2 1 690 - 1 700 MHz (for the countries mentioned in No. **354A**)

1 700 - 1 710 MHz
1 770 - 1 790 MHz (for the countries mentioned in No. **356AA**)

2 200 - 2 290 MHz
2 290 - 2 300 MHz
2 500 - 2 535 MHz

470NGA *c)* The power flux density values given in No. **470NE** are
Spa2 derived on the basis of protecting the fixed service using line-of-sight techniques. Where a fixed service using tropospheric scatter operates in the bands listed in No. **470NG** and where there is insufficient frequency separation, there must be sufficient angular separation between the direction to the space station and the direction of maximum radiation of the antenna of the receiving station of the fixed service using tropospheric scatter to ensure that the interference power at the receiver input of the station of the fixed service does not exceed −168 dBW in any 4 kHz band.

470NH (3) Power flux density limits between 2 500 MHz and
Spa2 2 690 MHz.

470NI *a)* The power flux density at the Earth's surface produced
Spa2 by emissions from a space station in the broadcasting-satellite service for all conditions and for all methods of modulation shall not exceed the following values:

−152 dBW/m² in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$$-152 + \frac{3(\delta - 5)}{4} \text{ dBW/m}^2$$ in any 4 kHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane;

— 137 dBW/m² in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

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

470NJ Spa2 *b)* The limits given in No. **470NI** apply in the frequency band:

2 500 - 2 690 MHz

which is shared by the broadcasting-satellite service with the fixed or mobile service.

470NK Spa2 *c)* The power flux density values given in No. **470NI** are derived on the basis of protecting the fixed service using line-of-sight techniques. Where a fixed service using tropospheric scatter operates in the band mentioned in No. **470NJ** and where there is insufficient frequency separation, there must be sufficient angular separation between the direction to the space station and the direction of maximum radiation of the antenna of the receiving station of the fixed service using tropospheric scatter to ensure that the interference power at the receiver input of the station of the fixed service does not exceed —168 dBW in any 4 kHz band.

470NL (4) Power flux density limits between 3 400 MHz and 7 750
Spa2 MHz.

470NM *a)* The power flux density at the Earth's surface produced
Spa2 by emissions from a space station or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed the following values:

-152 dBW/m² in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-152 + \frac{\delta - 5}{2}$ dBW/m² in any 4 kHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane;

-142 dBW/m² in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

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

470NN *b)* The limits given in No. **470NM** apply in the frequency
Spa2 bands listed in No. **470NO** which are allocated to transmission by space stations in the following space radiocommunication services:

— fixed-satellite service (space-to-Earth)

— meteorological-satellite service (space-to-Earth)

where these bands are shared with equal rights with the fixed or mobile service:

470NO Spa2

3 400 - 4 200 MHz
7 250 - 7 300 MHz (for the countries mentioned in No. **392G**)
7 300 - 7 750 MHz

470NP Spa2

(5) Power flux density limits between 8 025 MHz and 11·7 GHz.

470NQ Spa2

a) The power flux density at the Earth's surface, produced by emissions from a space station, or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed the following values:

-150 dBW/m² in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-150 + \frac{\delta - 5}{2}$ dBW/m² in any 4 kHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane;

-140 dBW/m² in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

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

470NR Spa2

b) The limits given in No. **470NQ** apply in the frequency bands listed in No. **470NS** which are allocated to transmission by space stations in the following space radiocommunication services:

— earth exploration-satellite service (space-to-Earth)

— space research service (space-to-Earth)

— fixed-satellite service (space-to-Earth)

where these bands are shared with equal rights with the fixed or mobile service:

470NS
Spa2

8 025 - 8 400 MHz
8 400 - 8 500 MHz
10·95 - 11·20 GHz
11·45 - 11·70 GHz

470NT
Spa2

(6) Power flux density limits between 12·50 GHz and 12·75 GHz.

470NU
Spa2

a) The power flux density at the Earth's surface, produced by emissions from a space station or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed the following values:

-148 dBW/m² in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-148 + \frac{\delta - 5}{2}$ dBW/m² in any 4 kHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane;

-138 dBW/m² in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

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

470NV Spa2 *b)* The limits given in No. **470NU** apply in the frequency band indicated in No. **470NW** which is allocated to the fixed-satellite service for transmission by space stations where this band is shared with equal rights with the fixed or mobile service:

470NW Spa2 12·50 - 12·75 GHz (Region 3 and for the countries mentioned in No. **405BD**)

470NX Spa2 (7) Power flux density limits between 17·7 GHz and 22·0 GHz.

470NY Spa2 *a)* The power flux density at the Earth's surface produced by emissions from a space station or reflected from a passive satellite for all conditions and for all methods of modulation shall not exceed the following values:

-115 dBW/m² in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

$-115 + \frac{\delta - 5}{2}$ dBW/m² in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane;

-105 dBW/m² in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

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

470NZ *b)* The limits given in No. **470NY** apply in the frequency
Spa2 bands listed in No. **470NZA** which are allocated to transmission by space stations in the following space radiocommunication services:

— fixed-satellite service (space-to-Earth)

— earth exploration-satellite service (space-to-Earth)

where these bands are shared with equal rights with the fixed or mobile service:

470NZA 17·7 - 19·7 GHz
Spa2 21·2 - 22·0 GHz

470NZB (8) The limits given in Nos. **470NA, 470NE, 470NI,**
Spa2 **470NM, 470NQ, 470NU** and **470NY** may be exceeded on the territory of any country the administration of which has so agreed.

470O–470U SUP (Spa2)

Spa2 **Section IX. Space Radiocommunication Services**

Cessation of Emissions

470V § 24. Space stations shall be fitted with devices to ensure imme-
Spa2 diate cessation of their radio emissions by telecommand, whenever such cessation is required under the provisions of these Regulations.

Spa2 *Control of Interference between Geostationary-Satellite Systems and non-synchronous inclined Orbit-Satellite Systems*

470VA § 25. Non-geostationary space stations in the fixed-satellite
Spa2 service shall cease or reduce to a negligible level radio emissions, and their associated earth stations shall not transmit to them whenever there is insufficient angular separation between the non-geostationary satellite and geostationary satellites and unacceptable interference [1] to geostationary satellite space systems operating in accordance with these Regulations.

Spa2 *Station Keeping of Space Stations* [2]

470VB § 26. Space stations on geostationary satellites:
Spa2

470VC — shall have the capability of maintaining their positions
Spa2 within ±1 degree of the longitude of their nominal positions, but efforts should be made to achieve a capability of maintaining their positions at least within ± 0·5 degree of the longitude of their nominal positions;

470VD — shall maintain their positions within ±1 degree of lon-
Spa2 gitude of their nominal positions irrespective of the cause of variation; but

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470VA.1 [1] The level of unacceptable interference shall be fixed by agreement between
Spa2 the administrations concerned, using the relevant C.C.I.R. Recommendations as a guide.

Spa2 [2] In the case of space stations on geosynchronous satellites with orbits having an angle of inclination greater than 5 degrees the positional tolerance shall relate to the nodal point.

470VE — need not comply with No. **470VD** as long as the satellite
Spa2 network to which the space station belongs does not produce an unacceptable level of interference [1] into any other satellite network whose space station complies with the limits given in No. **470VD.**

Spa2 *Pointing Accuracy of Antennae on Geostationary Satellites*

470VF § 27. The pointing direction of maximum radiation of any earth-
Spa2 ward beam of antennae on geostationary satellites shall be capable of being maintained within:

10% of the half power beamwidth relative to the nominal pointing direction, or

0·5 degree relative to the nominal pointing direction,

whichever is greater. This provision applies only when such a beam is intended for less than global coverage.

In the event that the beam is not rotationally symmetrical about the axis of maximum radiation, the tolerance in any plane containing this axis shall be related to the half power beamwidth in that plane.

This accuracy shall be maintained only if it is required to avoid unacceptable interference[2] to other systems.

470VE.1 [1] The level of unacceptable interference shall be fixed by agreement between
Spa2 the administrations concerned, using the relevant C.C.I.R. Recommendations as a guide.

470VF.1 [2] The level of unacceptable interference shall be fixed by agreement between
Spa2 the administrations concerned, using the relevant C.C.I.R. Recommendations as a guide.

Spa2 *Power Flux Density at the Geostationary Satellite Orbit*

470VG§ 28. In the frequency band 8 025 to 8 400 MHz, which the Earth
Spa2 exploration-satellite service using non-geostationary satellites shares with the fixed-satellite service (Earth-to-space) or the meteorological-satellite service (Earth-to-space), the maximum power flux density produced at the geostationary satellite orbit by any earth exploration-satellite service space station shall not exceed -174 dBW/m^2 in any 4 kHz band.

CHAPTER III

Notification and Registration of Frequencies. International Frequency Registration Board

ARTICLE 8

General Provisions

471 § 1. The constitution and the essential duties of the International Frequency Registration Board are defined in the Convention.

472 § 2. The functions of the Board shall include:

473 *a)* the processing of frequency assignment notices received from administrations for recording in the Master International Frequency Register;

474 *b)* the processing and co-ordination of seasonal schedules of high frequency broadcasting with a view to accommodating requirements of all administrations for that service;

475 *c)* the compilation, for publication in suitable form and at appropriate intervals by the Secretary General, of frequency lists reflecting the data recorded in the Master International Frequency Register, as well as other material relating to the assignment and use of frequencies;

476 *d)* the review of entries in the Master International Frequency Register with a view to amending or eliminating, as appropriate, those which do not reflect actual frequency usage, in agreement with the administrations which notified the assignments concerned;

477 Spa2 *e)* the study, on a long-term basis, of the usage of the radio spectrum, with a view to making recommendations for its more effective use;

478 *f)* the investigation, at the request of one or more of the interested administrations, of harmful interference and the formulation of recommendations with respect thereto;

479 *g)* the provision of assistance to administrations in the field of radio spectrum utilization, in particular to those administrations in need of special assistance, and the recommendation to administrations, where appropriate, of adjustments in their frequency assignments in order to obtain a better use of the radio spectrum;

480 *h)* the collection of such results of monitoring observations as administrations and organizations may be able to supply and the making of arrangements, through the Secretary General, for their publication in suitable form;

481 *i)* the formulation and reference to the C.C.I.R. of all general technical questions arising from the Board's examination of frequency assignments;

482 *j)* the technical planning for radio conferences with a view to reducing their duration; and

483 *k)* the participation in an advisory capacity, upon invitation by the organizations or countries concerned, in conferences and meetings where questions relating to the assignment and utilization of frequencies are discussed.

484 § 3. The working arrangements of the Board are set forth in the remaining articles of this Chapter.

485 § 4. The Board shall have the assistance of an adequate specialized secretariat of the requisite qualifications and experience, which shall work under the immediate direction of the Board to enable it to discharge its prescribed duties and functions.

ARTICLE 9

Spa2 **Notification and Recording in the Master International Frequency Register of Frequency Assignments [1] to Terrestrial Radiocommunication Stations [2]**

Section I. Notification of Frequency Assignments and Co-ordination Procedure to be Applied in appropriate Cases

486 § 1. (1) Any frequency assignment[3] to a fixed, land, broadcasting[4],
Spa2 radionavigation land, radiolocation land or standard frequency station, or to a ground-based station in the meteorological aids service, shall be notified to the International Frequency Registration Board:

a) if the use of the frequency concerned is capable of causing harmful interference to any service of another administration[5]; or

b) if the frequency is to be used for international radiocommunication; or

c) if it is desired to obtain international recognition of the use of the frequency[5].

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[1] The expression *frequency assignment*, wherever it appears in this Article, 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 *Master Register*).

[2] For the notification and recording in the Master International Frequency Register of frequency assignments to radio astronomy and space radiocommunication stations, see Article 9A.

486.1 Spa2 [3] In the case where a frequency is used by numerous stations under the jurisdiction of the same administration, see Appendix 1 (Section E, II, Column 5a, paragraphs 2c and 2d).

486.2 Spa2 [4] With respect to assignments to broadcasting stations in the bands allocated exclusively to the broadcasting service between 5 950 kHz and 26 100 kHz, see Article 10.

486.3 Spa2 [5] The attention of administrations is specifically drawn to the application of the provisions of Nos. **486** *a)* and **486** *c)* in those cases where they make a frequency assignment to a terrestrial station, located within co-ordination area of an earth station (see No. **492A**), in a band which terrestrial radiocommunication services share with equal rights with space radiocommunication services in the frequency spectrum above 1 GHz.

487 Spa (2) Similar notice shall be given for any frequency to be used for the reception of mobile stations by a particular land station in each case where one or more of the conditions specified in No. **486** are applicable.

488 (3) Specific frequencies prescribed by these Regulations for common use by stations of a given service (for example, international distress frequencies 500 kc/s and 2 182 kc/s, frequencies of ship radiotelegraph stations operating in their exclusive high frequency bands, etc.), shall not be notified to the Board.

489 § 2. (1) For any notification under Nos. **486** or **487** an individual notice for each frequency assignment shall be drawn up as prescribed in Sections A or B of Appendix 1, which specify the basic characteristics to be furnished, according to the case. 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.

490 Spa2 (2) When stations of the same service, such as the land mobile service, use a band of frequencies above 28 000 kHz in a specific area or areas, an individual notice should be drawn up, as prescribed in Section C of Appendix 1, which specifies the basic characteristics to be furnished, for each frequency on which there are assignments within the band; however, the particulars should relate only to a typical station. This does not apply to broadcasting stations or to other terrestrial stations to which the provisions of Sub-Section IIB of this article apply or to other stations of the fixed or mobile service which operate in frequency bands listed in Table II of Appendix 28 with equivalent isotropically radiated power exceeding the corresponding values listed in the table.

491 Spa2 § 3. (1) Whenever practicable, each notice should reach the Board before the date on which the assignment is brought into use. It must reach the Board not earlier than ninety days before the date on which it is to be brought into use, but in any case not later than thirty days

after the date it is actually brought into use. However, for a frequency assignment to one of the terrestrial stations mentioned in Sub-Section IIB of this article or in No. **639AQ**, the notice 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.

492 **Spa2** (2) Any frequency assignment, the notice of which reaches the Board more than thirty days after the notified date of bringing into use, or in the case of a terrestrial station mentioned in Sub-Section IIB of this article, 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 No. **491**.

492A **Spa2** § 3A. (1) Before an administration notifies to the Board, or brings into use any frequency assignment to a terrestrial station [1] for transmitting in a band allocated with equal rights to terrestrial radiocommunication services and space radiocommunication services (space-to-Earth) in the frequency spectrum above 1 GHz, it shall initiate co-ordination of the proposed assignment with the administration responsible for the receiving earth station concerned if the assignment is for use within the co-ordination area of an existing receiving earth station or of one for which the co-ordination procedure referred to in No. **639AN** has been initiated. For the purpose of effecting co-ordination, it shall send to any other such administration, 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 pertinent details of the proposed frequency assignment, and the approximate date on which it is planned to bring the station into use.

492A.1 **Spa2** [1] Appendix 28 contains criteria relating only to co-ordination between earth stations and stations in the fixed or the mobile service. Until the C.C.I.R., in accordance with Recommendation No. **Spa2–9** provides criteria for other terrestrial radiocommunication services, the criteria to be used in effecting co-ordination between earth stations and terrestrial stations other than those of the fixed or the mobile service, shall be agreed between the administrations concerned.

492B Spa2 (2) An administration with which co-ordination is sought under No. **492A** shall acknowledge receipt of the co-ordination data immediately by telegram. If no acknowledgement is received within fifteen days of dispatch, the administration seeking co-ordination may dispatch a telegram requesting acknowledgement of receipt of the co-ordination data, to which the receiving administration shall reply. Upon receipt of the co-ordination data an administration shall promptly examine the matter with regard to interference [1] which would be caused to the services rendered by its earth stations operating in accordance with the Convention and these Regulations, or to be so operated within the next three years, with the proviso that in this latter case co-ordination specified in No. **639AN** has been effected or that the co-ordination procedure has already been initiated; and shall, within an overall period of sixty days from dispatch of the co-ordination data, either notify the administration requesting co-ordination 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.

492C Spa2 (3) No co-ordination under No. **492A** is required when an administration proposes:

a) to bring into use a terrestrial station which is located, in relation to an earth station, outside the co-ordination area; or

b) to change the characteristics of an existing assignment in such a way as not to increase the level of interference to the earth stations of other administrations.

492B.1 Spa2 [1] The criteria to be employed in evaluating interference levels shall be based upon relevant C.C.I.R. Recommendations or, in the absence of such Recommendations, shall be agreed between the administrations concerned.

492D (4) An administration seeking co-ordination may request the
Spa2 Board to endeavour to effect co-ordination, in those cases where:

a) an administration with which co-ordination is sought under No. **492A** fails to acknowledge receipt under No. **492B** within thirty days of dispatch of the co-ordination data;

b) an administration which has acknowledged receipt under No. **492B** but fails to give a decision within ninety days of dispatch of the co-ordination data;

c) there is disagreement between the administration seeking co-ordination and an administration with which co-ordination is sought as to the acceptable level of interference; or

d) co-ordination 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 co-ordination.

492E (5) Either the administration seeking co-ordination or an
Spa2 administration with which co-ordination is sought, or the Board, may request additional information which they may require to assess the level of interference to the services concerned.

492F (6) Where the Board receives a request under No. **492D** *a)*,
Spa2 it shall forthwith send a telegram to the administration concerned requesting immediate acknowledgement.

492FA (7) Where the Board receives an acknowledgement following
Spa2 its action under No. **492F**, or where the Board receives a request under No. **492D** *b)*, it shall forthwith send a telegram to the administration concerned requesting an early decision in the matter.

492FB (8) Where the Board receives a request under No. **492D** *d)*,
Spa2 it shall endeavour to effect co-ordination in accordance with the provisions of No. **492A**. Where the Board receives no acknowledgement of its request for co-ordination within the period specified in No. **492B**, it shall act in accordance with No. **492F**.

492FC (9) Where an administration fails to reply within thirty days
Spa2 of dispatch of the Board's telegram sent under No. **492F** requesting an acknowledgement, or fails to give a decision in the matter within sixty days of dispatch of the Board's telegram of request sent under No. **492FA**, it shall be deemed that the administration with which co-ordination was sought has undertaken that no complaint will be made in respect of any harmful interference which may be caused by the terrestrial station being co-ordinated to the service rendered by its earth station.

492G (10) Where necessary, as part of the procedure under No. **492D**,
Spa2 the Board shall assess the level of interference. In any case, the Board shall inform the administrations concerned of the results obtained.

492GA (11) In the event of continuing disagreement between one
Spa2 administration seeking to effect co-ordination and one with which co-ordination has been sought, provided that the assistance of the Board has been requested, the administration seeking co-ordination may, after sixty days from the date of the request for the assistance of the Board, taking into consideration the provisions of No. **491**, send its notice concerning the proposed assignment to the Board.

492GB Spa2 § 3B. Where the Board receives information from an administration in accordance with the provisions of No. **639AQ** in reply to a request for co-ordination for an earth station, it shall consider as notifications under this Section, only that information relating to assignments to existing terrestrial stations or to those to be brought into use within the time limits defined in No. **491**. Such notifications shall be examined by the Board with respect to the provisions of Nos. **570AB** and **570AD**, as appropriate, and shall be treated accordingly.

493 Spa2 § 3C. (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 those appropriate basic characteristics specified in Appendix 1.

494 Spa (2) Complete notices shall be considered by the Board in the order of their receipt.

495 § 4. When a service or regional agreement has been concluded, the Board shall be informed of the details of this agreement.

Section II. Procedure for the Examination of Notices and the Recording of Frequency Assignments in the Master Register

496 § 5. Any notice which is incomplete shall be returned by the Board immediately, by airmail, to the notifying administration with the reasons therefor.

497 § 6. Upon receipt of a complete notice, the Board shall include the particulars thereof, with the date of receipt, in a weekly circular sent by airmail to Administrations, Members and Associate Members of the Union; this circular shall contain the particulars of all such notices received since the publication of the previous circular.

498 § 7. The circular shall constitute the acknowledgment to the notifying administration of the receipt of a complete notice.

499 § 8. Complete notices shall be considered by the Board in the order specified in No. **494**. The Board cannot 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.

Spa2 **Sub-Section IIA. Procedure to be followed in cases not covered by Sub-Section IIB of this Article**

500 § 9. (1) Except for notices referred to in Nos. **541**, **547**, **552**, **561** and **568**, the Board shall examine each notice with respect to

501 *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 probability of harmful interference);

502 *b)* the probability of harmful interference to the service rendered by a station for which a frequency assignment already recorded in the Master Register:

1) bears a date in Column 2a (see No. **607**); or

2) is in conformity with the provisions of No. **501** and bears a date in Column 2b (see No. **608**), but has not, in fact, caused harmful interference to any frequency assignment with a date in Column 2a or to any assignment in conformity with No. **501** with an earlier date in Column 2b; or

503 *c)* the probability of harmful interference to the service rendered by a station for which a frequency assignment already recorded in the Master Register:

1) is in conformity with the provisions of No. **501** and either bears a symbol [1] in Column 2d (see No. **610**), or was recorded in the Master Register with a date in this column as a result of a favourable finding with respect to No. **503**; or

2) is in conformity with the provisions of No. **501** and was recorded in the Master Register with a date in Column 2d after an unfavourable finding with respect to No. **503**, but has not, in fact, caused harmful interference to any frequency assignment previously recorded in the Master Register and which is in conformity with No. **501**.

504 (2) The Board shall not make the examination specified in No. **502** where the notice refers to a broadcasting station in Region 2 in the band 535-1 605 kc/s. When the notice relates to a frequency above 28 000 kc/s, the Board shall only make the examination specified in No. **503** at the request of an administration directly concerned or affected when co-ordination has not been possible between the administrations involved.

505 (3) Where appropriate, the Board shall also examine the notice with respect to its conformity with a regional or service agreement. The procedure to be followed in connection with frequency assignments made pursuant to such an agreement shall be as specified in Nos. **501** and **502** or **503** except that the Board shall not consider the question of the probability of harmful interference among the parties to such agreement. Similarly, the Board shall not consider the probability of harmful interference to the assignments of any administration with which co-ordination has been effected.

503·1 [1] This symbol indicates an assignment notified pursuant to No. 272 of the Agreement of the Extraordinary Administrative Radio Conference, Geneva, 1951, or, in the frequency bands above 27 500 kc/s, an assignment for which the notice was received by the Board before 1 April 1952.

506 § 10. Depending upon the findings of the Board subsequent to the examination prescribed in Nos. **501** and **502** or **503**, further action shall be as follows:

507 § 11. (1) *Finding Favourable with Respect to No.* **501** *in cases where the Provisions of Nos.* **502** *or* **503** *are not applicable (see No.* **504***).*

508 (2) The assignment shall be recorded in the Master Register. The date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article, shall be the date of receipt of the notice by the Board.

509 § 12. (1) *Finding Favourable with Respect to Nos.* **501** *and* **502** *or* **503**.

510 (2) The assignment shall be recorded in the Master Register. The date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt of the notice by the Board.

511 (3) However, should the examination show that the probability of harmful interference for certain hours, seasons, or periods of solar activity is slightly greater than is considered desirable, a remark shall be included in the Master Register to show that there exists a slight probability of harmful interference and hence precautions must be taken in the use of the assignment to avoid harmful interference to assignments already recorded in the Master Register.

512 § 13. (1) *Finding Favourable with Respect to No.* **501** *but Unfavourable with Respect to Nos.* **502** *or* **503**.

513 (2) 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.

514 (3) Should the notifying administration resubmit the notice with modifications which result, after re-examination, in a favourable finding by the Board with respect to Nos. **502** or **503**, the assignment shall be recorded in the Master Register. The date to be

entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt by the Board of the original notice. The date of receipt by the Board of the resubmitted notice shall be indicated in the Remarks Column.

515 (4) 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 No. **514** to be applied, and should that administration insist upon reconsideration of the notice, but should the Board's finding 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 sixty days without any complaint of harmful interference having been received. The date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt by the Board of the original notice. The date of receipt by the Board of the advice that no complaint of harmful interference has been received shall be indicated in the Remarks Column.

516 (5) In the case of a frequency assignment recorded in accordance with the provisions of No. **515**, the Board shall investigate the assignments that contributed to the unfavourable finding, using such means at its disposal as are appropriate in the circumstances, and, with the agreement of the notifying administration concerned, shall effect any cancellations or amendments found to be necessary, in order that the recordings in the Master Register shall reflect the actual frequency usage. If, as a result, the Board is able to reach a favourable finding with respect to Nos. **502** or **503** with regard to any assignment recorded under the provisions of No. **515**, the appropriate changes shall be made in respect of the entry of that assignment in the Master Register. If the finding remains unfavourable, the Board shall enter suitable remarks in the Master Register for the entry or entries concerned which describe the situation as it has been found by the Board to exist.

517 (6) Moreover, if, as a result of investigations under No. **516** it is confirmed that an assignment recorded is being used in accordance with the notified basic characteristics, a symbol shall be entered in Column 13a of the Master Register to indicate this fact.

518 (7) Should the notifying administration resubmit the notice with modifications which increase the probability of harmful interference, and should the Board's finding remain unchanged, the resubmitted notice shall be treated under No. **513**. If the notice is resubmitted again and subsequently recorded, the date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt by the Board of the notice submitted for the second time.

519 § 14. (1) *Finding Unfavourable with Respect to No.* **501** *in cases where the Provisions of Nos.* **502** *or* **503** *are not applicable (see No.* **504***).*

520 (2) Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. **115** of these Regulations, the assignment shall be recorded in the Master Register. The date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt by the Board of the notice.

521 (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. **115** of these 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.

522 (4) If the notifying administration resubmits the notice, the assignment shall be recorded in the Master Register. The date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt by the Board of the resubmitted notice.

523 § 15. (1) *Finding Unfavourable with Respect to No.* **501** *in cases where the Provisions of Nos.* **502** *or* **503** *are applicable.*

524 (2) Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. **115** of these Regulations, it shall be examined immediately with respect to Nos. **502** or **503**, and the provisions of Nos. **525** or **526** applied, as appropriate.

525 (3) If the finding is favourable with respect to Nos. **502** or **503** the assignment shall be recorded in the Master Register. The date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt by the Board of the notice.

526 (4) If the finding is unfavourable with respect to Nos. **502** or **503**, the notice shall be returned immediately by airmail to the notifying administration. Should the administration insist upon reconsideration of the notice, 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 sixty days without any complaint of harmful interference having been received. The date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt by the Board of the original notice. The date of receipt by the Board of the advice that no complaint of harmful interference has been received shall be indicated in the Remarks Column.

527 (5) 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. **115** of these 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.

528 (6) If the notifying administration resubmits the notice with modifications which result after re-examination in a favourable finding by the Board with respect to No. **501**, the notice shall be examined with respect to Nos. **502** or **503** and treated subsequently according to the provisions of Nos. **510** or **511**, or No. **513** as appropriate. The date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt by the Board of the modified notice.

529 (7) If, however, the notifying administration insists upon re-consideration of the notice, and should the Board's finding remain unchanged, the notice shall be examined with respect to Nos. **502** or **503** and the provisions of Nos. **530** or **531** applied, as appropriate.

530 (8) If the finding is favourable with respect to Nos. **502** or **503**, the assignment shall be recorded in the Master Register. The date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt by the Board of the resubmitted notice.

531 (9) If the finding is unfavourable with respect to Nos. **502** or **503**, the notice shall be returned immediately by airmail to the notifying administration. Should the administration insist upon re-consideration of the notice, 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 sixty days without any complaint of harmful interference having been received. The date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt by the Board of the first resubmitted notice. The date of receipt by the Board of the advice that no complaint of harmful interference has been received shall be indicated in the Remarks Column.

532 § 16. (1) *Change in the basic Characteristics of Assignments already recorded in the Master Register.*

533 (2) A notice of a change in the basic characteristics of an assignment already recorded, as specified in Appendix 1 (except those entered in Columns 3, 4a and 11 of the Master Register), shall be examined by the Board according to Nos. **501** and **502**, **503** or **504**, as appropriate, and the provisions of Nos. **507** to **531** inclusive applied. Where the change should be recorded, the assignment shall be amended according to the notice.

534 (3) However, in the case of a change in the basic characteristics of an assignment (except a change of the assigned frequency which exceeds half of the frequency band originally assigned, as defined in No. **89**) which is in conformity with No. **501**, should the Board reach a favourable finding with respect to Nos. **502** or **503**, 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 the appropriate part of Column 2. In addition, the date of receipt by the Board of the notice relating to the change shall be entered in the Remarks Column.

535 § 17. *In applying the provisions of the whole of this Sub-Section,*
Spa any resubmitted notice which is received by the Board more than one hundred and eighty days after the date of its return by the Board shall be considered as a new notice.

536 § 18. (1) *Recording of Frequency Assignments notified before being brought into use.*

537 (2) If a frequency assignment notified in advance of bringing into use has received favourable findings by the Board with respect to Nos. **501** and **502** or **503**, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

538 (3) If, within the period of thirty days (see No. **491**) 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 ninety days.

539 (4) If the Board does not receive this confirmation within the period referred to in No. **538**, the entry concerned shall be cancelled.

540 Aer (5) The provisions of Nos. **537** to **539** do not apply to frequency assignments which are in conformity with the Allotment Plans appearing in Appendices 25, 26 and 27 to these Regulations; such frequency assignments shall be entered in the Master Register on receipt of the notice by the Board.

541 § 19. (1) *Examination of Notices concerning Frequency Assignments to Radiotelephone Coast Stations in the Bands allocated exclusively to the Maritime Mobile Service between 4 000 and 23 000 kc/s for Radiotelephone Coast Stations (see No.* **500***).*

542 (2) The Board shall examine each notice covered by No. **541** to determine whether the notified assignment is in conformity with an allotment in Section I or Section II of the Allotment Plan contained in Appendix 25 to these Regulations, i.e. whether the frequency, the area of allotment, the power and any limitations are those specified in that Appendix.

543 (3) Any frequency assignment for which the finding is favourable with respect to No. **542** shall be recorded in the Master Register (see also No. **540**). The date to be entered in Column 2a or 2b shall be that determined according to the relevant provisions of Section III of this Article.

544 (4) If a notice relates to an amendment to an assignment in conformity with an allotment in Section I or Section II of the Allotment Plan, which is only a change in the characteristics (including the frequency) of the emission of a radiotelephone coast station, without extending the necessary bandwidth beyond the upper or lower limits of the band provided for double sideband emissions in accordance with the Table in Appendix 17, the original assignment shall be amended according to the notice. The date to be entered in Column 2a or 2b shall be that determined according to the relevant provisions of Section III of this Article.

545 (5) In the case of a notice which is not in conformity with the provisions of Nos. **542** or **544**, the Board shall examine this notice with respect to the probability of harmful interference to the service rendered by a radiotelephone coast station for which a frequency assignment:

a) is in conformity with one of the allotments in Section I or II of the Plan and is already recorded in the Master Register or may be so recorded in the future; or

b) was recorded in the Master Register on a frequency specified in Appendix 17 as a result of a favourable finding with respect to Nos. **544** or **545**; or

c) was recorded in the Master Register on a frequency specified in Appendix 17 after an unfavourable finding with respect to Nos. **544** or **545**, but has not, in fact, caused harmful interference to any frequency assignment to a radiotelephone coast station previously recorded in the Master Register.

546 (6) According to the finding of the Board with respect to No. **545**, further action shall be in accordance with the provisions of Nos. **509** to **518** inclusive, or Nos. **532** to **534** inclusive, as appropriate, it being understood that in those provisions No. **545** shall be read for Nos. **501** and **502**.

547 § 20. (1) *Examination of Notices concerning Frequencies used for Reception by Radiotelephone Coast Stations in the Bands allocated exclusively to the Maritime Mobile Service between 4 000 and 23 000 kc/s for Radiotelephone Ship Stations (see Nos.* **487** *and* **500***).*

548 (2) The Board shall examine each notice covered by No. **547** to determine whether the notified assignment corresponds to a frequency associated, according to Appendix 17, with a frequency allotted to the notifying administration under Section I or Section II of the Allotment Plan contained in Appendix 25 to these Regulations.

549 (3) Any frequency assignment for which the finding is favourable with respect to No. **548** shall be recorded in the Master Register. The date to be entered in Column 2a or 2b shall be that determined according to the relevant provisions of Section III of this Article.

550 (4) Where a notice relates to an amendment to an assignment of a frequency which is associated, according to Appendix 17, with a frequency allotted to the notifying administration under Section I or Section II of the Plan, and this amendment is only a change in the characteristics (including the frequency) of the emission of radiotelephone ship stations, without extending the necessary bandwidth beyond the upper or lower limits of the band provided for double sideband emissions in accordance with the Table in Appendix 17, the original assignment shall be amended according to the notice. The date to be entered in Column 2a or 2b shall be that determined according to the relevant provisions of Section III of this Article.

551 (5) Any assignment of a frequency for reception by a radiotelephone coast station which is not in conformity with No. **548** shall be recorded in the Master Register. The date to be entered in Column 2b shall be that determined according to the relevant provisions of Section III of this Article.

552 § 21. (1) *Examination of Notices concerning Frequency Assignments to Aeronautical Stations in the Aeronautical Mobile (R) Service in the Bands allocated exclusively to that Service between 2 850 and 17 970 kc/s (see No.* **500***).*

553 (2) The Board shall examine each notice covered by No. **552** to determine whether :

554 Aer *a)* the frequency corresponds to one of the frequencies specified in Column 1 of the Allotment Plan for the aeronautical mobile (R) service contained in Part II, Section II, Article 2 of Appendix 27, or the assignment is the result of a permissive change from one class of emission to another and the necessary bandwidth is within the channelling arrangement provided for in Appendix 27;

555 *b)* the limitations of use set forth in Column 3 of the Plan have been appropriately observed ;

556 Aer *c)* the notice is in conformity with the technical principles of the Plan set forth in Appendix 27;

557 Aer *d)* the area of use is within the boundaries of the Areas as set forth in Column 2 of the Plan.

558 Aer (3) In the case of a notice in conformity with the provisions of Nos. **554** to **556**, but not with those of No. **557**, the Board, shall examine whether the protection specified in Appendix 27 Part I, Section II A, paragraph 5, is afforded to the allotments in the Plan. In doing so, the Board shall assume that the frequency will be used in accordance with the " Sharing conditions between areas " specified in Appendix 27, Part I, Section II B, paragraph 4 .

559 SUP (Aer)

560 Aer (4) All frequency assignments referred to in No. **552** shall be recorded in the Master Register according to the findings reached by the Board. The date to be entered in Column 2a or 2b shall be that determined according to the relevant provisions of Section III of this Article.

561 § 22. (1) *Examination of Notices concerning Frequency Assignments to Aeronautical Stations in the Aeronautical Mobile (OR) Service in the Bands allocated exclusively to that Service between 3 025 and 18 030 kc/s (see No.* **500***).*

562 (2) The Board shall examine each notice covered by No. **561** to determine whether :

563 *a)* the assignment is in conformity with the primary allotments in the Allotment Plan for the aeronautical mobile (OR) service and the conditions specified in Appendix 26 (Parts III and IV) ;

564 *b)* the assignment is in conformity with or satisfies the requirements for secondary allotments in the Allotment Plan for the aeronautical mobile (OR) service and the conditions specified in Appendix 26 (Part III, Section II, paragraph 4, sub-paragraph *d)*, and Part IV). In applying these provisions, the Board shall assume that the frequency will be used on a day-time basis ;

565 *c)* the assignment is the result of a permissive change from one class of emission to another, its occupied bandwidth is within the channelling arrangement provided for in Appendix 26 (Part III, Section II, paragraphs 1 and 2), and it meets all the conditions for a primary or secondary allotment in the Plan, except that the assigned frequency does not correspond numerically with one of the frequencies specified therein.

566 (3) The technical criteria to be employed by the Board in its examination of these notices shall be those in Appendix 26 (Part III).

567 (4) All frequency assignments referred to in No. **561** shall be recorded in the Master Register according to the findings reached by the Board. The date to be entered in Column 2a or 2b shall be that determined according to the relevant provisions of Section III of this Article.

568 § 23. (1) *Frequency Assignments to Broadcasting Stations in the Bands allocated exclusively to the Broadcasting Service between 5 950 and 26 100 kc/s (see No.* **500***).*

569 (2) When the Board has prepared according to the provisions of Article 10 the High Frequency Broadcasting Schedule for a particular season, this Schedule shall be compared with the listings in the Master Register, to determine whether all the frequency assignments included in that Schedule correspond to frequency assignments recorded in the Master Register on behalf of the administrations concerned.

570 (3) In the case where a frequency assignment included in a Schedule for a particular season is not covered by any listing in the Master Register, that frequency assignment shall be considered as being notified, and the Board, without further examination, shall make an appropriate entry in the Master Register. The date to be entered in the appropriate part of Column 2 according to the relevant provisions of Section III of this Article shall be the date of receipt by the Board of the projected seasonal schedule.

Spa2 Sub-Section IIB. Procedure to be followed in cases where terrestrial stations are in the same frequency band as, and within the co-ordination area of, an existing earth station or one for which co-ordination has been effected or initiated

570AA § 23A. The Board shall examine each notice:
Spa

570AB *a)* with respect to 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 co-ordination procedure and the probability of harmful interference);
Spa

570AC *b)* with respect to its conformity with the provisions of No. **492A** relating to co-ordination of the use of the frequency assignment with the other administrations concerned;
Spa

570AD Spa2 *c)* where appropriate, with respect to the probability of harmful interference to the service rendered by an earth receiving station for which a frequency assignment already recorded in the Master Register is in conformity with the provisions of No. **639BM**, and if the corresponding frequency assignment to the space transmitting station has not, in fact, caused harmful interference to any frequency assignment in conformity with No. **501** or **570AB**, as appropriate, previously recorded in the Master Register.

570AE§23B. Spa Depending upon the findings of the Board subsequent to the examination prescribed in Nos. **570AB, 570AC** and **570AD**, further action shall be as follows:

570AF§23C.(1) *Finding unfavourable with respect to No.* **570AB.**
Spa

570AG Spa2 (2) Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. **115**, it shall be examined immediately with respect to Nos. **570AC** and **570AD**.

570AGA Spa2 (3) If the finding is favourable with respect to No. **570AC** or **570AD**, 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.

570AGB Spa2 (4) If the finding is unfavourable with respect to No. **570AC** or **570AD**, as appropriate, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding. Should the administration insist upon reconsideration of the notice, 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 one hundred and twenty days 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. The

date of receipt by the Board of the advice that no complaint of harmful interference has been received shall be indicated in the Remarks Column.

570AGC (5) The period of one hundred and twenty days mentioned in
Spa2 Nos. **570AGB** and **570AX** shall count:

— from the date when the assignment to the terrestrial station which received an unfavourable finding is brought into use, if the assignment to the earth station is then in use;

— otherwise, from the date when the assignment to the earth station is brought into use.

But if the assignment to the earth station has not been brought into use by the notified date, the period of one hundred and twenty days shall be counted from that date. Allowance, if necessary, may be made for the additional period mentioned in No. **570BF**.

570AH (6) Where the notice does not include a specific reference to
Spa2 the fact that the station will be operated in accordance with the provisions of No. **115**, 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.

570AI (7) If the notifying administration resubmits the notice un-
Spa2 changed, it shall be treated in accordance with the provisions of No. **570AH**.

570AJ (8) If the notifying administration resubmits the notice with a
Spa2 specific reference to the fact that the station will be operated in accordance with the provisions of No. **115**, it shall be treated in accordance with the provisions of Nos. **570AG** and **570AGA** or No. **570AGB**, as appropriate.

570AK (9) If the notifying administration resubmits the notice with
Spa2 modifications which, after re-examination, result in a favourable finding by the Board with respect to No. **570AB**, the notice shall be treated under the provisions of Nos. **570AL** to **570AX**. 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.

570AL § 23D. (1) *Finding favourable with respect to No.* **570AB.**
Spa

570AM (2) Where the Board finds that the co-ordination procedure
Spa mentioned in No. **570AC** has been successfully completed with all administrations whose earth stations 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.

570AN (3) Where the Board finds that the co-ordination procedure
Spa mentioned in No. **570AC** has not been applied, and the notifying administration requests the Board to effect the required co-ordination, 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 No. **570AM.** If the Board's efforts are unsuccessful, the notice shall be examined by the Board with respect to the provisions of No. **570AD.**

570AO (4) Where the Board finds that the co-ordination procedure
Spa mentioned in No. **570AC** has not been applied, and the notifying administration does not request the Board to effect the required co-ordination, 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.

570AP (5) Where the notifying administration resubmits the notice
Spa and the Board finds that the co-ordination procedure mentioned in No. **570AC** has been successfully completed with all administrations whose earth stations 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.

570AQ Spa (6) Where the notifying administration resubmits the notice with a request that the Board effect the required co-ordination, it shall be treated in accordance with the provisions of No. **570AN.** 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.

570AR Spa (7) Where the notifying administration resubmits the notice and states it has been unsuccessful in effecting the co-ordination, it shall be examined by the Board with respect to the provisions of No. **570AD.** 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.

570AS Spa §23E.(1) *Finding favourable with respect to Nos.* **570AB** *and* **570AD.**

570AT Spa (2) 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.

570AU Spa §23F.(1) *Finding favourable with respect to No.* **570AB** *but unfavourable with respect to No.* **570AD.**

570AV Spa (2) 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.

570AW Spa (3) Should the notifying administration resubmit the notice with modifications which result, after re-examination, in a favourable finding by the Board with respect to No. **570AD,** 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.

570AX (4) Should the notifying administration resubmit the notice,
Spa2 either unchanged, or with modifications which decrease the probability of harmful interference, but not sufficiently to permit the provisions of No. **570AW** to be applied, and should that administration insist upon reconsideration of the notice, but should the Board's finding 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 one hundred and twenty days 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. The date of receipt by the Board of the advice that no complaint of harmful interference has been received shall be indicated in the Remarks Column. The period of one hundred and twenty days shall count from the date indicated in No. **570AGC**.

570AY **SUP** **(Spa2)**

570AZ§23G.(1) *Change in the Basic Characteristics of Assignments already*
Spa *recorded in the Master Register.*

570BA (2) A notice of a change in the basic characteristics of an assign-
Spa2 ment already recorded, as specified in Appendix 1 (except those entered in Columns 3 and 4a of the Master Register), shall be examined by the Board according to Nos. **570AB** and **570AC** and, where appropriate, No. **570AD**, and the provisions of Nos. **570AF** to **570AX** inclusive applied. Where the change should be recorded, the original assignment shall be amended according to the notice.

570BB (3) However, in the case of a change in the basic characteristics
Spa of an assignment which is in conformity with No. **570AB**, should the Board reach a favourable finding with respect to No. **570AC**, and, where its provisions are applicable, with respect to No. **570AD**, 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.

570BC § 23H. In applying the provisions of this Sub-Section, any resub-
Spa2 mitted 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.

570BD § 23I. (1) *Recording of Frequency Assignments notified before being*
Spa *brought into use.*

570BE (2) If a frequency assignment notified in advance of bringing
Spa into use has received a favourable finding by the Board with respect to Nos. **570AB** and **570AC** and, where appropriate, with respect to No. **570AD,** it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

570BF (3) If, within the period of thirty days after the projected date
Spa2 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. 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.

570BG (4) In the circumstances described in No. **570AX**, and as long as
Spa2 an assignment which received an unfavourable finding cannot be resubmitted as a consequence of the provisions of No. **570AGC**, the notifying administration may ask the Board to enter the assignment provisionally in the Master Register, in which event a special symbol to denote the provisional nature of the entry shall be entered in the Remarks Column. The Board shall delete this symbol when it receives from the notifying administration, at the end of the period specified in No. **570AX,** the information relating to the absence of complaint of harmful interference.

570BH (5) If the Board does not receive this confirmation within the
Spa2 period referred to in No. **570BF** or at the end of the period referred to in No. **570BG**, as appropriate, the entry concerned shall be cancelled. The Board shall advise the notifying administration before taking such action.

Section III. Recording of Dates and Findings in the Master Register

571 § 24. 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.

572 § 25. The procedure for recording dates in the appropriate part
Spa of Column 2 of the Master Register which shall be applied according to the frequency bands and services concerned is described in the following Nos. **573** to **604** for frequency assignments referred to in Sub-Section IIA.

573 § 26. (1) *Frequency Bands:*
Mar

10 - 2 850 kc/s
3 155 - 3 400 kc/s
3 500 - 3 900 kc/s in Region 1
3 500 - 4 000 kc/s in Region 2
3 500 - 3 950 kc/s in Region 3
4 231 - 4 361 kc/s
6 345·5 - 6 514 kc/s
8 459·5 - 8 728·5 kc/s
12 689 - 13 107·5 kc/s
16 917·5 - 17 255 kc/s
22 374 - 22 624·5 kc/s

574 (2) For any assignment to which the provisions of Nos. **510**, **511** or **514** apply, the relevant date shall be entered in Column 2a of the Master Register.

575 (3) For any assignment to which the provisions of Nos. **515**, **518**, **520**, **522**, **525**, **526**, **530** or **531** apply, the relevant date shall be entered in Column 2b of the Master Register.

576 (4) However, no date shall be entered in Column 2a or Column 2b in respect of frequency assignments to broadcasting stations in Region 2 in the band 535-1 605 kc/s. The date entered in Column 2c is given for information only.

577 § 27. (1) *Frequency Bands allocated exclusively to the Maritime Mobile Service between 4 000 and 23 000 kc/s for Radiotelephone Coast Stations.*

578 (2) If the finding is favourable with respect to No. **542**, the date of 3 December, 1951 shall be entered in Column 2a in the case of an allotment in Section I of the Plan ; in the case of an allotment in Section II, the date of 4 December, 1951 shall be entered in Column 2b.

579 (3) If the provisions of No. **544** are found to be applicable, the date originally entered in Column 2a or 2b, as the case may be, shall be retained.

580 (4) For all other cases referred to in No. **541**, the relevant date shall be entered in Column 2b (see Nos. **510**, **514**, **515**, **518**, **533** and **534**).

581 (5) For assignments to stations other than radiotelephone coast stations, the relevant date shall be entered in Column 2b (see Nos. **525**, **526**, **530** and **531**).

582 § 28. (1) *Frequency Bands allocated exclusively to the Maritime Mobile Service between 4 000 and 23 000 kc/s for Radiotelephone Ship Stations.*

583 (2) If the finding is favourable with respect to No. **548**, the date of 3 December, 1951 shall be entered in Column 2a if the associated allotment appears in Section I of the Plan ; if it appears in Section II, the date of 4 December, 1951 shall be entered in Column 2b.

584 (3) If the provisions of **550** are found to be applicable, the date originally entered in Column 2a or 2b, as the case may be, shall be retained.

585 (4) In all other cases covered by No. **547**, the date of receipt of the notice by the Board shall be entered in Column 2b.

586 (5) For assignments other than assignments of frequencies for reception by radiotelephone coast stations, the relevant date shall be entered in Column 2b (see Nos. **525**, **526**, **530** and **531**).

587 § 29. (1) *Frequency Bands allocated exclusively to the Maritime Mobile Service between 4 000 and 25 110 kc/s for Radiotelegraph Ship Stations (see No.* **488***).*

588 (2) For assignments to stations other than radiotelegraph ship stations, the relevant date shall be entered in Column 2b (see Nos. **525**, **526**, **530** and **531**).

589 § 30. (1) *Frequency Bands allocated exclusively to the Aeronautical Mobile (R) Service between 2 850 and 17 970 kc/s.*

590 Aer (2) If the finding is favourable with respect to Nos. **554** to **557** the date of 29 April 1966 shall be entered in Column 2a.

591 Aer (3) If the finding is favourable with respect to No. **558**, the date of 29 April 1966 shall be entered in Column 2b.

592 (4) In all other cases covered by No. **552**, the date of receipt of the notice by the Board shall be entered in Column 2b.

593 (5) For assignments to stations other than aeronautical stations in the aeronautical mobile (R) service, the relevant date shall be entered in Column 2b (see Nos. **525**, **526**, **530** and **531**).

594 § 31. (1) *Frequency Bands allocated exclusively to the Aeronautical Mobile (OR) Service between 3 025 and 18 030 kc/s.*

595 (2) If the finding is favourable with respect to No. **563**, the date of 3 December, 1951 shall be entered in Column 2a.

596 (3) If the finding is favourable with respect to No. **564** the date of 3 December, 1951 shall be entered in Column 2b.

597 (4) If the provisions of No. **565** are found to be applicable, the date of 3 December, 1951 shall be entered in Column 2a for a primary allotment, or in Column 2b for a secondary allotment.

598 (5) In all other cases covered by No. **561**, the date of receipt of the notice by the Board shall be entered in Column 2b.

599 (6) For assignments to stations other than aeronautical stations in the aeronautical mobile (OR) service, the relevant date shall be entered in Column 2b (see Nos. **525**, **526**, **530** and **531**).

600 § 32. (1) *Frequency Bands allocated exclusively to the Broadcasting Service between 5 950 and 26 100 kc/s.*

601 (2) For any frequency assignment which is to be recorded under the provisions of No. **570**, the relevant date shall be entered in Column 2d.

602 (3) For assignments to stations other than broadcasting stations, the relevant date shall be entered in Column 2d.

603 § 33. (1) *Frequency Bands between 3 950 kc/s (4 000 kc/s in Region 2) and 28 000 kc/s other than those allocated exclusively to the Aeronautical Mobile Service, Maritime Mobile Service, Broadcasting Service or Amateur Service, and Frequency Bands above 28 000 kc/s.*

604 (2) For any frequency assignment which is to be recorded under the provisions of Section II of this Article, the relevant date shall be entered in Column 2d of the Master Register.

605 § 34. *Date to be entered in Column 2c.*

606 The date to be entered in Column 2c shall be the date of putting into use notified by the administration concerned (see Nos. **491** and **492**). However, in cases covered by No. **568**, the date to be entered in this column shall be either the date of implementation of the schedule from which the assignment was extracted, or the notified date of putting into use, whichever is the later.

Section IV. Categories of Frequency Assignments

607 § 35. (1) Any frequency assignment which bears a date in Column 2a of the Master Register shall have the right to international protection from harmful interference.

608 (2) Any frequency assignment which bears a date in Column 2b is recorded in the Master Register in order that administrations may take into account the fact that the frequency assignment concerned is in use. This recording shall not give the right to international protection to the frequency assignment concerned, except as provided for in No. **502**, sub-paragraph 2).

609 (3) For frequency assignments having dates in two parts of Column 2, the date in Column 2c is given for information only.

610 (4) The existence of a symbol in Column 2d for a particular frequency assignment and of a date in that column for another assignment is not in itself to be considered as having any significance.

611 (5) If harmful interference to the reception of any station whose assignment is in accordance with No. **501** is actually caused by the use of a frequency assignment which is not in conformity with No. **501**, the station using the latter frequency assignment must immediately cease operations upon receipt of advice of this harmful interference.

611A Spa2 (6) If harmful interference to the reception of any station whose assignment is in accordance with No. **639BM** is actually caused by the use of a frequency assignment which is not in conformity with No. **501** or **570AB**, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

Section V. Review of Findings

612 § 36. (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.

613 Spa (2) The Board, in the light of all the data at its disposal, shall review the matter, taking into account No. **501** or **570AB** and No. **502, 503, 570AC** or **570AD**, as appropriate, and shall render an appropriate finding, informing the notifying administration prior either to the promulgation of its finding or to any recording action.

614 § 37. If a review of an unfavourable finding has been requested by the notifying administration on the grounds of special assistance to meet an urgent and essential need in a case where harmful interference has been experienced, the Board shall consult immediately the administrations concerned and shall make such suggestions as will facilitate the operation of the assignment of the administration which asked for special assistance; such amendments as result from this consultation shall be made to the Master Register.

615 Spa § 38. (1) After actual use for a reasonable period of an assignment which has been entered in the Master Register on the insistence of the notifying administration, following an unfavourable finding with respect to No. **502, 503** or **570AD**, as appropriate, this administration may request the Board to review the finding. Thereupon the Board shall review the matter, first having consulted the administrations concerned.

616 (2) 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.

617 (3) If the finding with regard to the probability of harmful interference remains unfavourable, no change shall be made in the original entry.

618 § 39. In the case where a frequency assignment has been entered in the Master Register on the insistence of the notifying administration, following an unfavourable finding with respect to Nos. **502** or **503**, and where the Board finds, after having consulted the administrations concerned, that harmful interference has not, in fact, occurred, although the assignment has been in actual use, according to be notified characteristics, during a period covering all the phases of a solar cycle in which the assignment could be normally used, the Board shall amend the entry in the Master Register in such a way that it shall appear in the future as if the original finding had been favourable with respect to Nos. **502** or **503**.

Section VI. Modification, Cancellation and Review of Entries in the Master Register

619 § 40. In case of permanent discontinuance of the use of any recorded frequency assignment, the notifying administration shall inform the Board within three months of such discontinuance, whereupon the entry shall be removed from the Master Register.

620 § 41. 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.

621 § 42. If, in connection with an enquiry by the Board under Nos. **516** or **620**, the notifying administration has failed to supply the Board within ninety days with the necessary or pertinent information, the Board shall disregard the assignment concerned when acting

upon any later notice, until such time as it has been informed that the assignment is being used as notified, or until it has received the information required. The Board shall make suitable entries in the Remarks Column of the Master Register to indicate the situation, and in particular the period when the assignment was not taken into account by the Board.

622 § 43. As far as possible, the Board shall maintain the entries in the Master Register under continuous review for those bands for which technical examination by the Board is prescribed in this Article, with a view to determining whether or not the assignments are being used in accordance with the notified basic characteristics, and shall take action under No. **620**.

Section VII. Studies and Recommendations

623 § 44. (1) 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 conduct a study of the following problems of frequency utilization :

624 *a)* in cases arising under No. **512** as to a possible alternative frequency assignment to avoid probable harmful interference ;

625 *b)* in cases where a need arises for additional frequency assignments within a specified portion of the radio spectrum ;

626 *c)* in cases where, due to harmful interference, two or more frequencies of the same megacycle order are being used alternately to maintain communication on a circuit requiring only one frequency of that order ; and

627 *d)* in cases of alleged contravention or non-observance of these Regulations, or of harmful interference.

628 (2) The Board shall thereupon prepare and forward to the administrations concerned a report containing its finding and recommendations for the solution of the problem.

629 § 45. If the Board finds, in particular following a request from an administration of a country in need of special assistance, that a change in the basic characteristics, including a change of frequency within a specific frequency range, of one or more assignments in conformity with the provisions of No. **501** will:

630 *a)* accommodate a new assignment; or

631 *b)* facilitate the solution of a problem of harmful interference; or

632 *c)* otherwise facilitate the more effective use of a particular portion of the radio spectrum; and

633 if such change is acceptable to the administration or administrations concerned, the change in basic characteristics shall be recorded in the Master Register without change in the original date or dates.

634 § 46. 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 thirty 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.

Section VIII. Miscellaneous Provisions

635 Aer § 47. The provisions of Sections V, VI (excepting No. **619**) and VII of this Article shall not be applied to frequency assignments in conformity with the Allotment Plans contained in Appendices 25, 26 and 27 to these Regulations.

635A § 47A. (1) If it is requested by any administration, particularly by an
Spa2 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) verification of the diagram showing the co-ordination area referred to in No. **639AN**;

b) computation of the interference level, as referred to in No. **492B**;

c) any other assistance of a technical nature for completion of the procedures in this Article.

635B (2) In making a request to the Board under No. **635A**, the admi-
Spa2 nistration shall furnish the Board with the necessary information.

636 § 48. The technical standards of the Board shall be based upon the relevant provisions of these Regulations and the Appendices thereto, the decisions of Administrative Conferences of the Union as appropriate, the Recommendations of the C.C.I.R., the state of the radio art, and the development of new transmission techniques.

637 § 49. The Board shall promulgate to administrations its findings and reasons therefor, together with all changes made to the Master Register, through the weekly circular referred to in No. **497**, which shall be published in the working languages of the Union as defined in the Convention. In carrying out the various procedures stipulated in this Article, the Board shall use the weekly circular as a means of communicating with administrations to the maximum extent practicable.

638 § 50. The Board shall inform administrations, at appropriate intervals, of the cases of special assistance which were studied under Nos. **614** and **623** to **634** inclusive of these Regulations.

639 § 51. In case a Member or Associate Member of the Union avails itself of the provisions of Article 28 of the Convention, the Board shall, upon request, make its records available for such proceedings as are prescribed in the Convention for the settlement of international disputes.

Spa2

ARTICLE 9A

Co-ordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments [1] to Radio Astronomy and Space Radiocommunication Stations except Stations in the Broadcasting-Satellite Service

Section I. Procedure for the Advance Publication of Information on Planned Satellite Systems

639AA § 1. (1) An administration (or one acting on behalf of a group of
Spa2 named administrations) which intends to establish a satellite system shall, prior to the co-ordination procedure in accordance with No. **639AJ** 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 1B.

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[1] The expression *frequency assignment*, wherever it appears in this Article, 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 *Master Register)*.

639AB (2) Any amendments to the information sent concerning a
Spa2 planned satellite system in accordance with No. **639AA** shall also be sent to the Board as soon as they become available.

639AC (3) The Board shall publish the information sent under
Spa2 Nos. **639AA** and **639AB** 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.

639AD (4) If, after studying the information published under
Spa2 No. **639AC**, any administration is of the opinion that interference, which may be unacceptable, may be caused to its existing or planned space radiocommunication services, it shall within ninety days after the date of the weekly circular publishing the information listed in Appendix 1B, 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 satellite network(s) of that system on which details have been published.

639AE (5) An administration receiving comments sent in accordance
Spa2 with No. **639AD** shall endeavour to resolve any difficulties that may arise.

639AF (6) In case of difficulties arising when any planned satellite
Spa2 network of a system is intended to use the geostationary satellite orbit:

a) the administration responsible for the planned system shall first explore all possible means of meeting its requirements, taking into account the characteristics of the geostationary satellite networks of other systems, and without considering the possibility of adjustment

to systems of other administrations. If no such means can be found, the administration concerned is then free to apply to other administrations concerned to solve these difficulties;

b) an administration receiving a request under *a)* above shall, in consultation with the requesting administration, explore all possible means of meeting the requirements of the requesting administration, for example, by relocating one or more of its own geostationary space stations involved, or by changing the emissions, frequency usage (including changes in frequency bands) or other technical or operational characteristics;

c) if after following the procedure outlined in *a)* and *b)* above there are unresolved difficulties, the administrations concerned shall together make every possible effort to resolve these difficulties by means of mutually acceptable adjustments, for example, to geostationary space station locations and to other characteristics of the systems involved in order to provide for the normal operation of both the planned and existing systems.

639AG (7) In their attempts to resolve the difficulties mentioned above
Spa2 administrations may seek the assistance of the Board.

639AH (8) In complying with the provisions of Nos. **639AE** to **639AG**,
Spa2 an administration responsible for a planned satellite system shall, if necessary, defer its commencement of the co-ordination procedure, 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 1B on the relevant satellite network. However, in respect of those administrations with

whom difficulties have been resolved or who have responded favourably, the co-ordination procedure, where applicable, may be commenced prior to the expiry of the one hundred and fifty days mentioned above.

639AI Spa2 (9) An administration on behalf of which details of planned satellite networks in its system have been published, in accordance with the provisions of Nos. **639AA** to **639AC**, 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. Co-ordination Procedures to be applied in appropriate Cases

639AJ Spa2 § 2. (1) Before an administration notifies to the Board or brings into use any frequency assignment to a space station on a geostationary satellite or to an earth station that is to communicate with a space station on a geostationary satellite, it shall effect co-ordination of the assignment with any other administration whose assignment in the same band for a space station on a geostationary satellite or for an earth station that communicates with a space station on a geostationary satellite is recorded in the Master Register, or has been co-ordinated or is being co-ordinated under the provisions of this paragraph. For this purpose, the administration requesting co-ordination shall send to any other such administration the information listed in Appendix 1A.

639AK Spa2 (2) No co-ordination under No. **639AJ** is required:

a) when the use of a new frequency assignment will cause, to any service of another administration, an increase in the noise temperature of any space station receiver or earth station receiver, or an increase in the equiv-

alent satellite link noise temperature, as appropriate, not exceeding the predetermined increase of noise temperature calculated in accordance with the method given in Appendix 29; or

b) when an administration proposes to change the characteristics of an existing assignment in such a way as will, in respect of any service of another administration, meet the requirements of sub-paragraph *a)* above, or, where this assignment has previously been coordinated, will cause an increase in noise temperature not exceeding the value agreed during co-ordination.

639AL (3) An administration initiating the co-ordination procedure
Spa2 referred to in No. **639AJ** shall at the same time send to the Board a copy of the request for co-ordination, with the information listed in Appendix 1A and the name(s) of the administration(s) with which co-ordination is sought. The Board 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.

639AM (4) An administration believing that it should have been
Spa2 included in the co-ordination procedure under No. **639AJ** shall have the right to request that it be brought into the co-ordination procedure.

639AN§ 3. (1) Before an administration notifies to the Board or brings
Spa2 into use any frequency assignment to an earth station, whether for transmitting or receiving, in a particular band allocated with equal

rights to space and terrestrial [1] radiocommunication services in the frequency spectrum above 1 GHz, it shall effect co-ordination of the assignment with any other administration whose territory lies wholly or partly within the co-ordination area [2] of the planned earth station. For this purpose it shall send to any other such administration a copy of a diagram drawn to an appropriate scale indicating the location of the earth station and showing the co-ordination areas [2] of the earth station for the cases of transmission and reception by the earth station and the data on which they are based, including all pertinent details of the proposed frequency assignment, as listed in Appendix 1A, and an indication of the approximate date on which it is planned to begin operations.

639AO (2) An administration with which co-ordination is sought
Spa2 under No. **639AJ** shall acknowledge receipt of the co-ordination data immediately by telegram. If no acknowledgement is received within thirty days after the date of the weekly circular publishing the information under No. **639AL**, the administration seeking co-ordination shall dispatch a telegram requesting acknowledgement, to which the receiving administration shall reply within a further period of thirty days. Upon receipt of the co-ordination data, an administration shall, having regard to the proposed date of bringing into use of the assignment for which co-ordination was requested,

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639AN.1 [1] Appendix 28 contains criteria relating only to co-ordination between
Spa2 earth stations and stations in the fixed or mobile service. Until the C.C.I.R., in accordance with Recommendation No. **Spa2**–9 provides criteria relating to other terrestrial radiocommunication services, the criteria to be employed in effecting co-ordination between earth stations and terrestrial radiocommunication stations, other than those of the fixed or mobile service, shall be agreed between the administrations concerned.

639AN.2 [2] Calculated, in relation to the fixed or mobile service, in accordance with
Spa2 the procedures described in Appendix 28.

promptly examine the matter with regard to interference [1] which would be caused to the service rendered by its stations in respect of which co-ordination is sought under No. **639AJ**; and shall, within ninety days from the date of the relevant weekly circular, notify the administration requesting co-ordination of its agreement. If the administration with which co-ordination is sought does not agree, it shall, within the same period, send to the administration seeking co-ordination 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.

639AP **Spa2** (3) An administration with which co-ordination is sought under No. **639AN** shall acknowledge receipt of the co-ordination data immediately by telegram. If no acknowledgement is received within fifteen days of dispatch of the co-ordination data, the administration seeking co-ordination shall dispatch a telegram requesting acknowledgement, to which the receiving administration shall reply within a further period of fifteen days. Upon receipt of the co-ordination data an administration shall, having regard to the proposed date of bringing into use of the assignment for which co-ordination was requested, promptly examine the matter with regard both to:

a) interference [2] which would be caused to the service rendered by its terrestrial radiocommunication stations operating in accordance with the Convention and these Regulations, or to be so operated prior to the planned date of bringing the earth station assignment into service, or within the next three years, whichever is the longer; and to

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639AO.1 **Spa2** [1] The criteria to be employed in evaluating interference levels shall be based upon relevant C.C.I.R. Recommendations or, in the absence of such Recommendations, shall be agreed between the administrations concerned.

639AP.1 **Spa2** [2] The criteria to be employed in evaluating interference levels shall be based upon relevant C.C.I.R. Recommendations or, in the absence of such Recommendations, shall be agreed between the administrations concerned.

b) interference [1] which would be caused to reception at the earth station by the service rendered by its terrestrial radiocommunication stations operating in accordance with the Convention and these Regulations, or to be so operated prior to the planned date of bringing the earth station assignment into service, or within the next three years, whichever is the longer.

The administration with which co-ordination is sought shall then, within sixty days from dispatch of the co-ordination data, notify the administration requesting co-ordination of its agreement. If the administration with which co-ordination is sought does not agree it shall, within the same period, send to the administration seeking co-ordination a copy of a diagram drawn to an appropriate scale showing the location of its terrestrial radiocommunication stations which are or will be within the co-ordination area of the earth transmitting or receiving station, as appropriate, together with all other relevant basic characteristics, and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem.

639AQ (4) When the administration with which co-ordination is sought
Spa2 sends to the administration seeking co-ordination the information mentioned in No. **639AP**, a copy thereof shall also be sent to the Board. The Board shall consider as notifications in accordance with Section I of Article 9, only that information relating to existing terrestrial radiocommunication stations or to those to be brought into use within the next three years.

639AR (5) No co-ordination under No. **639AN** is required when an
Spa2 administration proposes:

639AP.1 [1] The criteria to be employed in evaluating interference levels shall be based
Spa2 upon relevant C.C.I.R. Recommendations or, in the absence of such Recommendations, shall be agreed between the administrations concerned.

a) to bring into use an earth station, the co-ordination area of which does not include any of the territory of any other country;

b) to change the characteristics of an existing assignment in such a way as not to increase the level of interference to or from the terrestrial radiocommunication stations of other administrations;

c) to operate a mobile earth station. However, if the co-ordination area associated with the operation of such a mobile earth station, in a frequency band referred to in No. **639AN**, includes any of the territory of another country, it shall be subject to prior agreement between the administrations concerned in order to avoid harmful interference to existing terrestrial radiocommunication stations of that country. This agreement shall apply to the characteristics of the mobile earth station(s), or to the characteristics of a typical mobile earth station, and shall apply to a specified service area; unless otherwise stipulated in the agreement, it shall apply to any mobile earth stations in the specified service area provided that the probability of harmful interference caused by them shall not be greater than that caused by the typical earth station.

639AS § 4. (1) An administration seeking co-ordination may request the
Spa2 Board to endeavour to effect co-ordination in those cases where:

a) an administration with which co-ordination is sought under No. **639AJ** fails to acknowledge receipt, under

No. **639AO**, within sixty days after the date of the weekly circular publishing the information relating to the request for co-ordination;

b) an administration with which co-ordination is sought under No. **639AN** fails to acknowledge receipt, under No. **639AP**, within thirty days of dispatch of the co-ordination data;

c) an administration has acknowledged receipt under No. **639AO**, but fails to give a decision within ninety days from the date of the relevant weekly circular;

d) an administration has acknowledged receipt under No. **639AP**, but fails to give a decision within sixty days from dispatch of the co-ordination data;

e) there is disagreement between the administration seeking co-ordination and an administration with which co-ordination is sought as to the acceptable level of interference;

f) co-ordination 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 co-ordination.

639AT (2) Either the administration seeking co-ordination or an admin-
Spa2 istration with which co-ordination is sought, or the Board, may request additional information which they may require to assess the level of interference to the services concerned.

639AU (3) Where the Board receives a request under No. **639AS** *a)*
Spa2 or *b)*, it shall forthwith send a telegram to the administration concerned requesting immediate acknowledgement.

639AV (4) Where the Board receives an acknowledgement following
Spa2 its action under No. **639AU**, or where the Board receives a request under No. **639AS** *c)* or *d)*, it shall forthwith send a telegram to the administration concerned requesting an early decision in the matter.

639AW (5) Where the Board receives a request under No. **639AS** *f)*,
Spa2 it shall endeavour to effect co-ordination in accordance with the provisions of Nos. **639AJ** and **639AN**, as appropriate. The Board shall also, where appropriate, act in accordance with No. **639AL**. Where the Board receives no acknowledgement to its request for co-ordination within the periods specified in No. **639AO** or **639AP**, as appropriate, it shall act in accordance with No. **639AU**.

639AX (6) Where an administration fails to reply within thirty days
Spa2 of dispatch of the Board's telegram requesting an acknowledgement sent under No. **639AU**, or fails to give a decision in the matter within thirty days of dispatch of the Board's telegram of request under No. **639AV**, it shall be deemed that the administration with which co-ordination 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 space or terrestrial radiocommunication stations by the use of the assignment for which co-ordination was requested;

b) that its space or terrestrial radiocommunication stations will not cause harmful interference to the use

of the assignment for which co-ordination was requested.

639AY (7) Where necessary, as part of the procedure under No. **639AS**,
Spa2 the Board shall assess the level of interference. In any case, the Board shall inform the administrations concerned of the results obtained.

639AZ § 5. In the event of continuing disagreement between one
Spa2 administration seeking to effect co-ordination and one with which co-ordination has been sought, provided that the assistance of the Board has been requested, the administration seeking co-ordination may, after one hundred and fifty days from the date of the request for co-ordination, taking into consideration the provisions of No. **639BF**, send its notice concerning the proposed assignment to the Board.

Section III. Notification of Frequency Assignments

639BA § 6. (1) Any frequency assignment to an earth or space station shall
Spa2 be notified to the Board:

a) if the use of the frequency concerned is capable of causing harmful interference to any service of another administration; or

b) if the frequency is to be used for international radiocommunications; or

c) if it is desired to obtain international recognition of the use of the frequency.

639BB (2) Similar notice shall be given for any frequency to be used for
Spa2 the reception of transmissions from earth or space stations by a particular space or earth station in each case where one or more of the conditions specified in No. **639BA** are applicable.

639BC (3) Similar notice may be given for any frequency or frequency
Spa2 band to be used for reception by a particular radio astronomy station, if it is desired that such data should be included in the Master Register.

639BD (4) A notice submitted in accordance with No. **639BA** or
Spa2 **639BB** and relating to a frequency assignment to mobile earth stations in a satellite system shall include the technical characteristics either of each mobile earth station, or of a typical mobile earth station, and an indication of the service area within which these stations are to be operated.

639BE § 7. For any notification under No. **639BA**, **639BB**, **639BC**, or
Spa2 **639BD**, an individual notice for each frequency assignment shall be drawn up as prescribed in Appendix 1A, the various Sections of which specify the basic characteristics to be furnished according to the case. It is recommended that the notifying administration should also supply the additional data called for in Section A of that Appendix, together with such further data as it may consider appropriate.

639BF § 8. (1) For a frequency assignment to an earth or space station,
Spa2 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 days [1] before this date, except in the case of assignments in the space research service in bands allocated exclusively to this service or in shared bands in which this service is the sole primary service. In the case of such an assignment in the space research service, the notice should, whenever practicable, reach the Board before the date on which the assignment is brought into use, but it must in any case reach the Board not later than thirty days after the date it is actually brought into use.

639BF.1 [1] The notifying administration shall take this limit into account when decid-
Spa2 ing, where appropriate, to initiate the co-ordination procedure(s).

639BG (2) Any frequency assignment to an earth or space station, the
Spa2 notice of which reaches the Board after the applicable period specified in No. **639BF**, shall, where it is to be recorded, bear a mark in the Master Register to indicate that it is not in conformity with No. **639BF**.

Section IV. Procedure for the Examination of Notices and the Recording of Frequency Assignments in the Master Register

639BH § 9. Any notice which does not contain at least those basic
Spa2 characteristics specified in Appendix 1A shall be returned by the Board immediately, by airmail, to the notifying administration with the reasons therefor.

639BI § 10. Upon receipt of a complete notice, the Board shall include
Spa2 the particulars thereof, with the date of receipt, in the weekly circular referred to in No. **497**, which shall contain the particulars of all such notices received since the publication of the previous circular.

639BJ § 11. The circular shall constitute the acknowledgement to the
Spa2 notifying administration of the receipt of a complete notice.

639BK § 12. Complete notices shall be considered by the Board in the
Spa2 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.

639BL § 13. The Board shall examine each notice:
Spa2

639BM *a)* with respect to its conformity with the Convention,
Spa2 the Table of Frequency Allocations and the other pro-

visions of the Radio Regulations (with the exception of those relating to the co-ordination procedures and the probability of harmful interference);

639BN **Spa2**

b) where appropriate, with respect to its conformity with the provisions of No. **639AJ**, relating to the co-ordination of the use of the frequency assignment with the other administrations concerned vis-à-vis space radiocommunication stations;

639BO **Spa2**

c) where appropriate, with respect to its conformity with the provisions of No. **639AN** relating to the co-ordination of the use of the frequency assignment with the other administrations concerned vis-à-vis terrestrial radiocommunication stations;

639BP **Spa2**

d) where appropriate, with respect to the probability of harmful interference to the service rendered by a space radiocommunication station for which a frequency assignment already recorded in the Master Register is in conformity with the provisions of No. **639BM** if this frequency assignment has not in fact caused harmful interference to any frequency assignment in conformity with No. **639BM** previously recorded in the Master Register;

639BQ **Spa2**

e) where appropriate, with respect to the probability of harmful interference to the service rendered by a terrestrial radiocommunication station for which a frequency assignment already recorded in the Master Register is in conformity with the provisions of No. **501** or **570AB**, as appropriate, if this frequency assignment has not, in fact, caused harmful interference to any frequency assignment in conformity with No. **639BM** previously recorded in the Master Register;

639BR Spa2 *f)* where appropriate, with respect to the probability of harmful interference caused to the receiving earth station by a terrestrial radiocommunication station for which a frequency assignment already recorded in the Master Register is in conformity with No. **501** or **570AB**, as appropriate.

639BS Spa2 § 14. When, following an examination of a notice with respect to No. **639BP**, the Board reaches an unfavourable finding based upon the probability of harmful interference to a recorded assignment for a space station which the Board has reason to believe may not be in regular use, the Board shall forthwith consult the administration responsible for the registered assignment. If it is established, after such consultation and on the basis of the information available, that the recorded assignment has not been in use for two years, it shall not be taken into account for the purposes of the examination in progress or any other further examination under No. **639BP** conducted before the date on which the assignment is brought back into use. Before the assignment is brought back into use, it shall be subject to further co-ordination in accordance with the provisions of No. **639AJ** or further examination by the Board with respect to No. **639BP**, as appropriate. The date on which the assignment is brought back into use shall then be entered in the Master Register.

639BT Spa2 § 15. Depending upon the findings of the Board subsequent to the examination prescribed in Nos. **639BM**, **639BN**, **639BO**, **639BP**, **639BQ** and **639BR**, as appropriate, further action shall be as follows:

639BU Spa2 § 16. (1) *Finding favourable with respect to No.* **639BM** *in cases where the provisions of Nos.* **639BN** *and* **639BO** *are not applicable.*

639BV Spa2 (2) 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.

639BW § 17. (1) *Finding unfavourable with respect to No.* **639BM**.
Spa2

639BX (2) Where the notice includes a specific reference to the fact
Spa2 that the station will be operated in accordance with the provisions of No. **115**, and the finding is favourable with respect to Nos. **639BN**, **639BO**, **639BP**, **639BQ** and **639BR**, 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.

639BY (3) Where the notice includes a specific reference to the fact
Spa2 that the station will be operated in accordance with the provisions of No. **115** and the finding is unfavourable with respect to No. **639BN**, **639BO**, **639BP**, **639BQ** or **639BR**, as appropriate, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding. Should the administration insist upon reconsideration of the notice, 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 one hundred and twenty days 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. The date of receipt by the Board of the advice that no complaint of harmful interference has been received shall be indicated in the Remarks Column.

639BZ (4) The period of one hundred and twenty days mentioned in
Spa2 Nos. **639BY** and **639CP** shall count:

— from the date when the assignment to the space radiocommunication station which received an unfavourable finding is brought into use, if the assignment to the station which was the basis for the unfavourable finding is then in use;

— otherwise, from the date when the assignment to the station which was the basis for the unfavourable finding is brought into use.

But if the assignment to the station which was the basis for the unfavourable finding has not been brought into use by the notified date, the period of one hundred and twenty days shall be counted from this date. Allowance shall, if necessary, be made for the additional period mentioned in No. **639CY**.

639CA (5) Where the notice does not include a specific reference to the
Spa2 fact that the station will be operated in accordance with the provisions of No. **115**, 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.

639CB (6) If the notifying administration resubmits the notice un-
Spa2 changed, it shall be treated in accordance with the provisions of No. **639CA**. If it is resubmitted with a specific reference to the fact that the station will be operated in accordance with the provisions of No. **115**, it shall be treated in accordance with the provisions of No. **639BX** or **639BY**, as appropriate. If it is resubmitted with modifications which, after re-examination, result in a favourable finding by the Board with respect to No. **639BM**, it shall be treated as a new notice.

639CC § 18. (1) *Finding favourable with respect to No.* **639BM** *in cases where*
Spa2 *the provisions of No.* **639BN** *or* **639BO** *are applicable.*

639CD (2) Where the Board finds that the co-ordination procedures
Spa2 mentioned in No. **639BN** or **639BO** have been successfully completed with all administrations whose space or terrestrial radiocommunication stations 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.

639CE (3) Where the Board finds that either of the co-ordination
Spa2 procedures mentioned in Nos. **639BN** and **639BO** has not been applied, and the notifying administration requests the Board to effect the required co-ordination, 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 No. **639CD**. If the Board's efforts are unsuccessful, the notice shall be examined by the Board with respect to the provisions of Nos. **639BP**, **639BQ** and **639BR**, as appropriate.

639CF (4) Where the Board finds that either of the co-ordination
Spa2 procedures mentioned in Nos. **639BN** and **639BO** has not been applied, and the notifying administration does not request the Board to effect the required co-ordination, 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.

639CG (5) Where the notifying administration resubmits the notice
Spa2 and the Board finds that the co-ordination procedures mentioned in Nos. **639BN** and **639BO** have been successfully completed with all administrations whose space or terrestrial radiocommunication stations 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.

639CH (6) Where the notifying administration resubmits the notice
Spa2 with a request that the Board effect the required co-ordination under No. **639AJ** or **639AN**, it shall be treated in accordance with the provisions of No. **639CE**. 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.

639CI (7) Where the notifying administration resubmits the notice and
Spa2 states it has been unsuccessful in effecting the co-ordination, the Board shall inform the administrations concerned thereof. The notice shall be examined by the Board with respect to the provisions of Nos. **639BP**, **639BQ** and **639BR**, as appropriate. 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.

639CJ § 19. (1) *Finding favourable with respect to Nos.* **639BM**, **639BP**,
Spa2 **639BQ** *and* **639BR**, *as appropriate.*

639CK (2) The assignment shall be recorded in the Master Register.
Spa2 The date of receipt by the Board of the notice shall be entered in Column 2d.

639CL (3) However, should the examination show that the level of
Spa2 the interference noise and the percentage of time during which it is likely to occur have values slightly greater than those used for assessing the probability of harmful interference (extreme propagation conditions, abnormal atmospheric humidity, etc.), a remark shall be included in the Master Register to show that there may be a slight risk of harmful interference and hence additional precautions must be taken in the use of the assignment to avoid harmful interference to assignments already recorded in the Master Register.

639CM § 20. (1) *Finding favourable with respect to No.* **639BM** *but un-*
Spa2 *favourable with respect to No.* **639BP**, **639BQ** *or* **639BR**, *as appropriate.*

639CN (2) The notice shall be returned immediately by airmail to the
Spa2 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.

639CO (3) Should the notifying administration resubmit the notice
Spa2 with modifications which result, after re-examination, in a favourable finding by the Board with respect to Nos. **639BP**, **639BQ** and **639BR**, as appropriate, 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.

639CP (4) Should the notifying administration resubmit the notice,
Spa2 either unchanged, or with modifications which decrease the probability of harmful interference, but not sufficiently to permit the provisions of No. **639CO** to be applied, and should that administration insist upon reconsideration of the notice, but should the Board's finding 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 one hundred and twenty days 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. The date of receipt by the Board of the advice that no complaint of harmful interference has been received shall be indicated in the Remarks Column. The period of one hundred and twenty days shall count from the date indicated in No. **639BZ**.

639CQ § 21. (1) *Notices relating to radio astronomy stations.*
Spa2

639CR (2) A notice relating to a radio astronomy station shall not
Spa2 be examined by the Board with respect to Nos. **639BN**, **639BO**, **639BP**, **639BQ** and **639BR**. Whatever the finding, the assignment

shall be recorded in the Master Register with a date in Column 2c. The date of receipt by the Board of the notice shall be recorded in the Remarks Column.

639CS § 22. (1) *Change in the basic characteristics of assignments already*
Spa2 *recorded in the Master Register.*

639CT (2) A notice of a change in the basic characteristics of an
Spa2 assignment already recorded, as specified in Appendix 1A (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 No. **639BM**, and, where appropriate, Nos. **639BN**, **639BO**, **639BP**, **639BQ** and **639BR**, and the provisions of Nos. **639BU** to **639CR** inclusive shall apply. Where the change should be recorded, the original assignment shall be amended according to the notice.

639CU (3) However, in the case of a change in the characteristics of
Spa2 an assignment which is in conformity with No. **639BM**, should the Board reach a favourable finding with respect to Nos. **639BN**, **639BO**, **639BP**, **639BQ** and **639BR**, where appropriate, or find that the changes do not increase the probability of harmful interference to assignments already recorded, 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.

639CV § 23. In applying the provisions of this section, any resubmitted
Spa2 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.

639CW § 24. (1) *Recording of frequency assignments notified before being*
Spa2 *brought into use.*

639CX (2) If a frequency assignment notified in advance of bringing
Spa2 into use has received a favourable finding by the Board with respect to No. **639BM** and, where appropriate, Nos. **639BN**, **639BO**, **639BP**, **639BQ** and **639BR**, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

639CY (3) If, within thirty days after the projected date of bringing
Spa2 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.

639CZ (4) In the circumstances described in Nos. **639BY** and **639CP**,
Spa2 and as long as an assignment which received an unfavourable finding cannot be resubmitted as a consequence of the provisions of No. **639BZ**, the notifying administration may ask the Board to enter the assignment provisionally in the Master Register, in which event a special symbol to denote the provisional nature of the entry shall be entered in the Remarks Column. The Board shall delete this symbol when it receives from the notifying administration, at the end of the period specified in No. **639BY** or **639CP**, as appropriate, the information relating to the absence of complaint of harmful interference.

639DA (5) If the Board does not receive this confirmation within the
Spa2 period referred to in No. **639CY** or at the end of the period referred to in No. **639BY** or **639CP**, as appropriate, 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

639DB § 25. In any case where a frequency assignment is recorded in the
Spa2 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

639DC § 26. (1) The date in Column 2c shall be the date of putting into use
Spa2 notified by the administration concerned. It is given for information only.

639DD (2) If harmful interference is actually caused to the reception
Spa2 of any space radiocommunication station whose frequency assignment has been recorded in the Master Register as a result of a favourable finding with respect to Nos. **639BM**, **639BN**, **639BO**, **639BP**, **639BQ** and **639BR**, as appropriate, by the use of a frequency assignment to a space radiocommunication station subsequently recorded in the Master Register in accordance with the provisions of No. **639CP**, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

639DE (3) If harmful interference to the reception of any station whose
Spa2 assignment is in accordance with No. **501**, **570AB** or **639BM**, as appropriate, is actually caused by the use of a frequency assignment which is not in conformity with No. **639BM**, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

Section VII. Review of Findings

639DF § 27. (1) The review of a finding by the Board may be undertaken:
Spa2

— 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.

639DG (2) The Board, in the light of all the data at its disposal shall
Spa2 review the matter, taking into account No. **639BM** and, where appropriate, Nos. **639BN**, **639BO**, **639BP**, **639BQ** and **639BR** and shall render an appropriate finding, informing the notifying administration prior either to the promulgation of its finding or to any recording action.

639DH § 28. (1) After actual use for a reasonable period of an assignment
Spa2 which has been entered in the Master Register on the insistence of the notifying administration, following an unfavourable finding with respect to No. **639BP**, **639BQ** or **639BR**, this administration may request the Board to review the finding. Thereupon, the Board shall review the matter, having first consulted the administrations concerned.

639DI (2) If the finding of the Board is then favourable it shall enter
Spa2 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.

639DJ (3) If the finding with regard to the probability of harmful
Spa2 interference remains unfavourable, no change shall be made in the original entry.

Section VIII. Modification, Cancellation and Review of Entries in the Master Register

639DK § 29. (1) Where the use of a recorded assignment to a space station
Spa2 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.

639DL (2) Whenever it appears to the Board, whether or not as a
Spa2 result of action under No. **639DK**, that a recorded assignment to a space station 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.

639DM (3) If no reply is received within six months of action by the
Spa2 Board under No. **639DL**, or if the reply does not confirm that the assignment to a space station is to be brought back into regular use within this six-month limit, a mark shall be applied against the entry in the Master Register. Thereafter, the assignment shall be treated in accordance with No. **639BS** as one which has been established as having been out of regular use for two years.

639DN § 30. In case of permanent discontinuance of the use of any
Spa2 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.

639DO § 31. Whenever it appears to the Board from the information
Spa2 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.

639DP § 32. If, in connection with an inquiry by the Board under
Spa2 No. **639DO**, 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.

Section IX. Studies and Recommendations

639DQ § 33. (1) If it is requested by any administration, and if the circum-
Spa2 stances 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 Regulations, or of harmful interference.

639DR (2) The Board shall thereupon prepare and forward to the
Spa2 administration concerned a report containing its findings and recommendations for the solution of the problem.

639DS § 34. In a case where, as a result of a study, the Board submits to
Spa2 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.

Section X. Miscellaneous Provisions

639DT § 35. (1) If it is requested by any administration, particularly by an
Spa2 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 of the increases in noise temperatures in accordance with No. **639AK**;

b) preparation of diagrams showing the co-ordination areas as in No. **639AN**;

c) any other assistance of a technical nature for completion of the procedures in this Article.

639DU (2) In making a request to the Board under No. **639DT**, the
Spa2 administration shall furnish the Board with the necessary information.

639DV § 36. The technical standards of the Board shall be based upon
Spa2 the relevant provisions of these Regulations and the Appendices thereto, the decisions of Administrative Conferences of the Union, as appropriate, the Recommendations of the C.C.I.R., the state of the radio art and the development of new transmission techniques.

639DW § 37. The Board shall promulgate to administrations its findings
Spa2 and reasons therefor, together with all changes made to the Master Register, through the weekly circular referred to in No. **497**.

639DX § 38. In case a Member or Associate Member of the Union avails
Spa2 itself of the provisions of Article 28 of the Convention, the Board shall, upon request, make its records available for such proceedings as are prescribed in the Convention for the settlement of international disputes.

ARTICLE 14

Interference and Tests

Section I. General Interference

693 § 1. All stations are forbidden to carry out:

— unnecessary transmissions;

— the transmission of superfluous signals and correspondence;

— the transmission of signals without identification (see Article 19).[1]

694 § 2. All stations shall radiate only as much power as is necessary to ensure a satisfactory service.

695 § 3. In order to avoid interference:

Spa2

— locations of transmitting stations and, where the nature of the service permits, locations of receiving stations shall be selected with particular care;

— radiation in and reception from unnecessary directions shall be minimized, where the nature of the service permits, by taking the maximum practical advantage of the properties of directional antennae;

— the choice and use of transmitters and receivers shall be in accordance with the provisions of Article 12;

— the conditions specified under No. **470V** shall be fulfilled.

693·1 Spa * [1] In the present state of the technique, it is recognized nevertheless that the transmission of identifying signals for certain radio systems (e.g. radiodetermination, radio relay systems and space systems) is not always possible.

696 § 4. The class of emission to be employed by a station should be such as to achieve minimum interference and to assure efficient spectrum utilization. In selecting the class of emission to meet these objectives every effort shall be made to minimize the bandwidth occupied, taking into account the practical and technical considerations of the service to be performed.

697 § 5. If, while complying with the provisions of Article 12, a station causes harmful interference through its spurious emissions, special measures shall be taken to eliminate such interference.

Section II. Industrial Interference

698 § 6. Administrations shall take all practicable and necessary steps to ensure that the operation of electrical apparatus or installations of any kind, including power networks, does not cause harmful interference to a radio service operating in accordance with the provisions of these Regulations.

Section III. Special Cases of Interference

699 § 7. Administrations authorizing the use of frequencies below 10 kc/s for special national purposes shall ensure that no harmful interference is caused thereby to the services to which the bands above 10 kc/s are allocated.

Section IV. Tests

700 § 8. (1) Before authorizing tests and experiments in any station, each administration, in order to avoid harmful interference, shall prescribe the taking of all possible precautions such as the choice of frequency and of time and the reduction or, in all cases where this is possible, the suppression of radiation. Any harmful interference resulting from tests and experiments shall be eliminated with the least possible delay.

715 § 12. If there is a specialized international organization for a particular service, reports of irregularities and of infractions relating to interference caused by the stations in this service may be addressed to such organization at the same time as to the administration concerned.

716 § 13. (1) If it is considered necessary, and particularly if the steps taken in accordance with the procedures described above have not produced satisfactory results, the administration concerned shall forward details of the case to the International Frequency Registration Board for its information.

717 (2) In such a case, the administration concerned may also
Spa2 request the Board to act in accordance with the provisions of Sections VII and VIII of Article 9 and Sections IX and X of Article 9A; but it shall then supply the Board with the full facts of the case, including all the technical and operational details and copies of the correspondence.

718 (3) However, the Board shall not be required to deal with problems of harmful interference between stations operating in the same band and in conformity with the Table of Frequency Allocations, when at least one of these stations is in a class the frequency of which is not required to be notified according to Nos. **486** or **487** of these Regulations; or between stations in the band 535-1 605 kc/s in Region 2. Such cases of interference shall be resolved by appropriate bilateral or multilateral arrangements in which administrations should particularly observe the provisions of No. **704**.

Note by the General Secretariat

Since 1959 and until 31 December 1971, the following call sign series have been allocated on a provisional basis under the terms of No. 749 :

Call Sign Series	Allocated to:	Call Sign Series	Allocated to:
A2A-A2Z	Botswana (Republic of)	3DA-3DM	Swaziland (Kingdom of)
A5A-A5Z	Bhutan	3DN-3DZ	Fiji
C2A-C2Z	Nauru (Republic of)	3EA-3FZ	Panama
C3A-C3Z	Principality of Andorra)	5BA-5BZ	Cyprus (Republic of)
L2A-L9Z	Argentine Republic	5HA-5IZ	Tanzania (United Republic of)
TJA-TJZ	Cameroon (Federal Republic of)	5NA-5OZ	Nigeria (Federal Republic of)
TLA-TLZ	Central African Republic	5RA-5SZ	Malagasy Republic
TNA-TNZ	Congo (People's Republic of the)	5TA-5TZ	Mauritania (Islamic Republic of)
TRA-TRZ	Gabon Republic	5UA-5UZ	Niger (Republic of the)
TSN-TSZ	Tunisia	5VA-5VZ	Togolese Republic
TTA-TTZ	Chad (Republic of the)	5WA-5WZ	Western Samoa
TUA-TUZ	Ivory Coast (Republic of the)	5XA-5XZ	Uganda
TYA-TYZ	Dahomey (Republic of)	5YA-5ZZ	Kenya
TZA-TZZ	Mali (Republic of)	6VA-6WZ	Senegal (Republic of the)
XTA-XTZ	Upper Volta (Republic of)	6XA-6XZ	Malagasy Republic
3BA-3BZ	Mauritius	6YA-6YZ	Jamaica
3CA-3CZ	Equatorial Guinea (Republic of)	6ZA-6ZZ	Liberia (Republic of)
		7OA-7OZ	Yemen (People's Democratic Republic of)
		7PA-7PZ	Lesotho (Kingdom of)

Call Sign Series	Allocated to:	Call Sign Series	Allocated to:
7QA-7QZ	Malawi	8RA-8RZ	Guyana
7RA-7RZ	Algeria (Algerian Democratic and Popular Republic)	9HA-9HZ	Malta
		9IA-9JZ	Zambia (Republic of)
		9LA-9LZ	Sierra Leone
7TA-7YZ	Algeria (Algerian Democratic and Popular Republic)	9UA-9UZ	Burundi (Republic of)
		9VA-9VZ	Singapore (Republic of)
		9WA-9WZ	Malaysia
8OA-8OZ	Botswana (Republic of)	9XA-9XZ	Rwanda (Republic of)
8PA-8PZ	Barbados	9YA-9ZZ	Trinidad and Tobago
8QA-8QZ	Maldives (Republic of)		

CHAPTER VII

Working Conditions in the Mobile Services

ARTICLE 27

Aircraft and Aeronautical Stations

949 § 1. Except as otherwise provided in these Regulations, the aeronautical mobile service may be regulated by special agreements between governments concerned (see Article 44 of the Convention).

950 § 2. In the absence of special agreements, the provisions of these Regulations concerning the exchanging of and accounting for public correspondence shall be applicable to stations in the aeronautical mobile service.

951 Spa2 § 3. (1) Stations on board aircraft may communicate with stations of the maritime mobile or maritime mobile-satellite services. They shall conform to those provisions of these Regulations which relate to these services.

952 Spa2 (2) For this purpose stations on board aircraft should use the frequencies allocated to the maritime mobile or maritime mobile-satellite services. However, having regard to interference which may be caused by aircraft stations at high altitudes, maritime mobile frequencies in the bands above 30 MHz shall not be used by aircraft stations in any specific area without the prior agreement of all the administrations of the area in which interference is likely to be caused. In particular, aircraft stations operating in Region I should not use frequencies in the bands above 30 MHz allocated to the maritime mobile service by virtue of any agreement between administrations in that Region.

953 (3) However, the frequencies 156·30 Mc/s and 156·80 Mc/s may be used by aircraft stations for safety purposes only.

General

954 (4) Aircraft stations when handling public correspondence with stations of the maritime mobile service shall comply with all the provisions applicable to the handling of public correspondence in the maritime mobile service (see particularly Articles 37 to 40).

CHAPTER X

Miscellaneous Stations and Services

ARTICLE 41

Amateur Stations

1560 § 1. Radiocommunications between amateur stations of different countries shall be forbidden if the administration of one of the countries concerned has notified that it objects to such radiocommunications.

1561 § 2. (1) When transmissions between amateur stations of different countries are permitted, they shall be made in plain language and shall be limited to messages of a technical nature relating to tests and to remarks of a personal character for which, by reason of their unimportance, recourse to the public telecommunications service is not justified. It is absolutely forbidden for amateur stations to be used for transmitting international communications on behalf of third parties.

1562 (2) The preceding provisions may be modified by special arrangements between the administrations of the countries concerned.

1563 § 3. (1) Any person operating the apparatus of an amateur station shall have proved that he is able to send correctly by hand and to receive correctly by ear, texts in Morse code signals. Administrations concerned may, however, waive this requirement in the case of stations making use exclusively of frequencies above 144 Mc/s.

1564 (2) Administrations shall take such measures as they judge necessary to verify the technical qualifications of any person operating the apparatus of an amateur station.

1565 § 4. The maximum power of amateur stations shall be fixed by the administrations concerned, having regard to the technical qualifications of the operators and to the conditions under which these stations are to work.

1566 § 5. (1) All the general rules of the Convention and of these Regulations shall apply to amateur stations. In particular, the emitted frequency shall be as stable and as free from spurious emissions as the state of technical development for such stations permits.

1567 (2) During the course of their transmissions, amateur stations shall transmit their call sign at short intervals.

1567A § 6. Space stations in the amateur-satellite service operating in
Spa2 bands shared with other services shall be fitted with appropriate devices for controlling emissions in the event that harmful interference is reported in accordance with the procedure laid down in Article 15. Administrations authorizing such space stations shall inform the I.F.R.B., and shall insure that sufficient earth command stations are established before launch to guarantee that any harmful interference that might be reported can be terminated by the authorizing Administration (see No. **470V**).

CHAPTER XI

ARTICLE 45

Effective Date of the Radio Regulations

The Radio Regulations (Geneva, 1959) signed on 21 December 1959, include the following provisions:

1629 § 1. These Regulations, which are annexed to the International Telecommunication Convention, shall come into force on first May, 1961.

1630 § 2. The provisions of the Extraordinary Administrative Radio Conference Agreement, Geneva, 1951, shall be abrogated upon the coming into force of the provisions of these Regulations.

1631 § 3. The delegates signing these Regulations hereby declare that, should an administration make reservations about the application of one or more provisions of these Regulations, no other administration shall be obliged to observe that provision or those provisions in its relations with that particular administration.

The Final Acts of the Extraordinary Administrative Radio Conference to allocate frequency bands for Space Radiocommunication purposes (Geneva, 1963), signed on 8 November 1963, include the following provisions:

«The revised provisions of the Radio Regulations, Geneva, 1959, shall form an integral part of the Radio Regulations, which are annexed to the

International Telecommunication Convention. They shall come into force on the first of January, 1965, upon which date the provisions of the Radio Regulations, Geneva, 1959, which are cancelled or modified by these revisions, shall be abrogated.

The delegates signing this revision of the Radio Regulations, Geneva, 1959, hereby declare that should an administration make reservations concerning the application of one or more of the revised provisions of the Radio Regulations, Geneva, 1959, no other administration shall be obliged to observe that provision or those provisions in its relations with that particular administration.»

The Final Acts of the Extraordinary Administrative Radio Conference for the preparation of a revised allotment plan for the Aeronautical Mobile (R) Service (Geneva, 1966), signed on 29 April 1966, include the following provisions:

«The revised provisions of the Radio Regulations, Geneva, 1959, shall form an integral part of the Radio Regulations which are annexed to the International Telecommunication Convention. These revised provisions shall come into force on and from the first of July, 1967, except for the Frequency Allotment Plan for the Aeronautical Mobile (R) Service contained in Appendix 27 which shall come into force on and from 0001 hours G.M.T. on the tenth of April, 1970. The provisions of the Radio Regulations, Geneva, 1959, which are cancelled, superseded or modified by these revised provisions shall be abrogated on the dates of coming into force of the respective revised provisions.

The delegates signing this revision of the Radio Regulations, Geneva, 1959, hereby declare that should an administration make reservations concerning the application of one or more of the revised provisions of the Radio Regulations, Geneva, 1959, no other administration shall be obliged to observe that provision or those provisions in its relations with that particular administration.»

The Final Acts of the World Administrative Radio Conference to deal with matters relating to the Maritime Mobile Service (Geneva, 1967), signed on 3 November 1967, include the following provisions:

«The revised provisions of the Radio Regulations, Geneva, 1959, shall form an integral part of the Radio Regulations which are annexed to the International Telecommunication Convention. They shall come into force on 1 April 1969 upon which date the provisions of the Radio Regulations, Geneva, 1959, which are cancelled or modified by these revisions shall be abrogated.

The delegates signing this revision of the Radio Regulations, Geneva, 1959, hereby declare that, should an administration make reservations concerning the application of one or more of the revised provisions of the Radio Regulations, Geneva, 1959, no other administration shall be obliged to observe that provision or those provisions in its relations with that particular administration.»

The Final Acts of the World Administrative Radio Conference for Space Telecommunications, (Geneva, 1971), signed on 17 July 1971, include the following provisions:

"The revised provisions of the Radio Regulations shall form an integral part of the Radio Regulations which are annexed to the International Telecommunication Convention. They shall come into force on 1 January, 1973, on which date the provisions of the Radio Regulations which are cancelled or modified by this revision shall be abrogated.

The delegates signing this revision of the Radio Regulations hereby declare that, should an administration make reservations concerning the application of one or more of the revised provisions of the Radio Regulations, no other administration shall be obliged to observe that provision or those provisions in its relations with that particular administration."

APPENDIX 1

Spa Aer
(Spa2)

(See Article 9)

Section A. Basic Characteristics to be Furnished for Notification under No. 486 of the Regulations

Column 1 Assigned frequency.

Column 2c Date of putting into use.

Column 3 Call sign (Identification).

This is not a basic characteristic for stations referred to in No. **735.1**.

Column 4a Name of the transmitting station.

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

Column 4c Longitude and latitude of the transmitter site.

Column 5a Locality(ies) or area(s) with which communication is established.

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

Column 5b Length of circuit (km)

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

Column 6 Class of station and nature of service.

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

Column 8 Power (in kW).

Column 9a Azimuth of maximum radiation.

Column 10 Maximum hours of operation of the circuit to each locality or area (G.M.T.).

Column 11 Megacycle order of the other frequencies normally utilized for the same circuit.

This is a basic characteristic only for fixed stations within the range 4 000 kc/s to 28 000 kc/s.

Spa2 Supplementary information:

a) reference frequency, if any, and any co-ordination required by No. **492A**;

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 B. Basic Characteristics to be Furnished for Notification under No. 487 of the Regulations

Column 1 Assigned frequency.

Column 2c Date of putting into use.

Column 4a The letter " R ".

Column 4b Country in which the receiving land station is located.

Column 4c Longitude and latitude of the site of the receiving land station.

Column 5a Name of the receiving land station.

Column 5b Maximum distance in km between mobile stations and the receiving land station.

Column 6 Class of mobile stations and nature of service.

Column 7 Class of emission of mobile stations and necessary bandwidth.

Column 8 Highest power used by the mobile stations.

Column 10 Maximum hours of operation of the mobile stations (G.M.T.).

Spa2 Supplementary information:

a) any co-ordination required by No. **492A**;

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 No. 490 of the Regulations

Column 1 Assigned frequency.

Column 2c Date of putting into use.

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

Column 5a Locality(ies) or area(s) with which communication is established.

Column 6 Class of station and nature of service.

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

Column 8 Power (in kW).

Column 10 Maximum hours of operation of the circuit to each locality or area (G.M.T.).

Spa2 Supplementary information:

a) any co-ordination required by No. **492A**;

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.

Form of Notice*

For Use when Notifying to the International Frequency Registration Board a Frequency Assignment or a Change to an Assignment Recorded in the Master International Frequency Register

(see Article 9)

(a) _____
Notifying administration

(e) Notice No. _____
Date _____

_____ kc/s
_____ Mc/s
1 Assigned frequency

☐ (b) New assignment

☐ (c) Change of characteristics of a recorded assignment in the Master Register

☐ (d) Deletion of an assignment

_____ For I.F.R.B. use

2c _____
Date of putting into use

3 _____
Call sign (Identification)

4a _____
Name of transmitting station

4b _____
Country

4c _____
Longitude and latitude of the transmitter site

Locality(ies) or area(s) with which communication is established	Length of circuit (km)	Class of station and nature of service	Class of emission, necessary bandwidth and description of transmission	Power (in kW) P_c P_m P_p e	Transmitting antenna characteristics			Maximum hours of operation of the circuit to each locality or area (G.M.T.)	Megacycle order of the other frequencies normally utilized for the same circuit	Supplementary information
					Azimuth of maximum radiation	Angular width of radiation main lobe	Antenna gain (db)			
5a	5b	6		8	9a	9b	9c	10	11	

12a _____ Operating Administration or Company

12b _____ Name and postal address } of administration (Article 15)

_____ Telegraphic address

Regional or service agreement _____ COORD/ _____

Other information:

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

Spa2

APPENDIX 1A

Notices relating to Space Radiocommunication and Radio Astronomy Stations

(See Article 9A)

Section A. 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 submitting notices under No. **639BA** for earth and space transmitting assignments and under No. **639BB** for space and earth receiving assignments, separate notices shall be submitted to the Board for each assignment to an earth or space station. In the case of a passive satellite system, only earth transmitting and receiving assignments shall be notified.

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

— when it is aboard a geostationary satellite; or

— 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.

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;

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); or

3) a deletion of an assignment in all of its notified characteristics;

e) reference to the I.F.R.B. weekly circular providing the advance publication information required in accordance with No. **639AA**;

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 co-ordination area and also any indication that the assignment concerned would be operating

in accordance with No. **115**, 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

Indicate the assigned frequency as defined in Article 1, in kHz up to 30000 kHz inclusive, and in MHz above 30000 kHz (see No. **85**).

Item 2 Assigned frequency band

Indicate the bandwidth of the assigned frequency band in kHz (see No. **89**).

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 in which the station is located. Symbols from the Preface to the International Frequency List should be used.

c) Indicate the geographical co-ordinates (in degrees and minutes) of the transmitter site.

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 passive satellite, the identity of the satellite and the location of the associated receiving earth station(s).

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 transmission

In accordance with Article 2 and Appendix 5:

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.

Item 8 Power characteristics of the transmission

a) [1] Indicate for each carrier, the peak power supplied to the input of the antenna.

b) Indicate the total peak power and the maximum power density per Hz 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.

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[1] This information need only be furnished when such information has been used as a basis to effect co-ordination with another administration.

Item 9 Transmitting antenna characteristics

a) Indicate the isotropic gain (dB) of the antenna in the direction of maximum radiation (see No. **100**).

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 co-ordination.

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 sense in the case of circular polarization and the plane in the case of linear polarization.

h) Indicate the altitude (metres) of the antenna above mean sea level.

Item 10[1] Modulation characteristics

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

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[1] This information need only be furnished when such information has been used as a basis to effect co-ordination with another administration.

a) carrier frequency modulated by a frequency-division multichannel telephony baseband (FDM-FM) or by a signal that can be represented by a multichannel 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;

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 11 Maximum hours of operation

Indicate in G.M.T. the maximum hours of operation on the frequency of each carrier.

Item 12 Co-ordination

Give the name of any administration with which the use of this frequency has been successfully co-ordinated in accordance

with Nos. **639AJ** and **639AN** and, if appropriate, the name of any administration with which co-ordination 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 address 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 15).

Section C. Basic Characteristics to be furnished in Notices relating to Frequencies to be received by Earth Stations

Item 1 Assigned frequency

Indicate the assigned frequency of the emission to be received, as defined in Article 1, in kHz up to 30 000 kHz inclusive, and in MHz above 30 000 kHz (see No. **85**).

Item 2 Assigned frequency band

Indicate the bandwidth of the assigned frequency band in kHz (see No. **89**).

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 in which the receiving earth station is located. Symbols from the Preface to the International Frequency List should be used.

c) Indicate the geographical co-ordinates (in degrees and minutes) of the receiver site.

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 passive satellite, the identity of the satellite and the associated transmitting earth station(s).

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 2 and Appendix 5:

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

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 gain (dB) of the antenna in the direction of maximum radiation (see No. **100**).

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 co-ordination.

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.

Item 9 Noise temperature

Indicate the lowest equivalent satellite link noise temperature in kelvins (see No. **103A**) under "quiet sky conditions". This

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[1] This information need only be furnished when such information has been used as a basis to effect co-ordination with another administration.

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.

Item 10 Maximum hours of reception

Indicate in G.M.T. the maximum hours of reception of the frequency of each carrier.

Item 11 Co-ordination

Give the name of any administration with which the use of this frequency has been successfully co-ordinated in accordance with Nos. **639AJ** and **639AN** and, if appropriate, the name of any administration with which co-ordination 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 15).

Section D. Basic Characteristics to be furnished in Notices relating to Frequencies used by Space Stations for Transmitting

Item 1 Assigned frequency

Indicate the assigned frequency as defined in Article 1, in kHz up to 30 000 kHz inclusive, and in MHz above 30 000 kHz (see

No. **85**). 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. **89**).

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), 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 longitudinal and inclination tolerances. 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; and

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; and

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

Indicate the service area or areas on the Earth or the name of the locality and country in which the associated receiving station(s) is (are) located.

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 2 and Appendix 5:

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.

---

[1] This information need only be furnished when such information has been used as a basis to effect co-ordination with another administration.

Item 9 Power characteristics of the transmission

a) [1] Indicate for each carrier the peak power supplied to the input of the antenna.

b) Indicate the total peak power and the maximum power density per Hz 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.

Item 10 Space station transmitting antenna characteristics

For each service area:

a) in the case of a space station aboard a geostationary satellite, indicate the gain of the space station transmitting antenna by means of gain contours plotted on a map of the Earth's surface. The isotropic 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;

b) in the case of a space station aboard a non-geostationary satellite, indicate the isotropic gain of the space station transmitting antenna in the main direction of radiation and indicate the antenna radiation pattern in those directions which can intersect with the Earth's surface, taking the gain in the main direction of radiation as a reference;

c) [1] indicate the type of polarization of the antenna, the sense in the case of circular polarization, and the plane in the case of linear polarization; also indicate the worst case axial ratio in the half power beam;

d) for a geostationary satellite, indicate the pointing accuracy of the antenna.

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[1] This information need only be furnished when such information has been used as a basis to effect co-ordination with another administration.

Item 11[1] 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 multichannel telephony baseband (FDM-FM) or by a signal that can be represented by a multichannel 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;

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.

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[1] This information need only be furnished when such information has been used as a basis to effect co-ordination with another administration.

Item 12 Maximum hours of operation

Indicate in G.M.T. the maximum hours of operation on the frequency of each carrier.

Item 13 Co-ordination

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 co-ordinated in accordance with No. **639AJ**.

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 15).

Section E. Basic Characteristics to be furnished in Notices relating to Frequencies to be received by Space Stations

Item 1 Assigned frequency

Indicate the assigned frequency of the emission to be received, as defined in Article 1, in kHz up to 30 000 kHz inclusive, and in MHz above 30 000 kHz (see No. **85**). 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. **89**).

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, 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 and inclination tolerances. 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; and

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; and

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)

Identify the associated transmitting earth station(s) 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 the transmission(s) to be received

In accordance with Article 2 and Appendix 5:

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;

c) [1] indicate, for each carrier to be received, the class of emission, necessary bandwidth and description 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 co-ordination with another administration.

Item 9 Space station receiving antenna characteristics

For each receiving beam:

a) in the case of a space station aboard a geostationary satellite, indicate the gain of the space station receiving antenna by means of gain contours plotted on a map of the Earth's surface. The isotropic 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;

b) in the case of a space station aboard a non-geostationary satellite, indicate the isotropic gain of the space station receiving antenna in the main direction of radiation and indicate the antenna radiation pattern in those directions which can intersect with the Earth's surface, taking the gain in the main direction of radiation as a reference;

c) [1] indicate the type of polarization of the antenna, the sense in the case of circular polarization, and the plane in the case of linear polarization, also indicate the worst case axial ratio in the half power beam;

d) indicate, for a geostationary satellite, the pointing accuracy of the antenna.

Item 10 Noise temperature

Indicate the total receiving system noise temperature (in kelvins) at the input of the space station receiver.

Item 11 Maximum hours of reception

Indicate in G.M.T. the maximum hours of reception of the frequency of each carrier.

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[1] This information need only be furnished when such information has been used as a basis to effect co-ordination with another administration.

Item 12 Co-ordination

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 co-ordinated in accordance with No. **639AJ**.

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 15).

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 30 000 kHz inclusive, and in MHz above 30 000 kHz.

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) Indicate 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 in which the station is located. Symbols from the Preface to the International Frequency List should be used.

d) Indicate the geographical co-ordinates (in degrees and minutes) of the station site.

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 Maximum hours of reception

Indicate in G.M.T. the maximum hours of reception of the frequency band shown in Item 4.

Item 7 Noise temperature

Indicate the over-all receiving system noise temperature (in kelvins).

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 communication should be sent on urgent matters regarding interference and questions referring to the technical operation of stations (see Article 15).

Section G. Form of Notice (Earth Station)

Form of Notice (1)

for use when notifying to the International Frequency Registration Board a Frequency Assignment or a Change to an Assignment recorded in the Master International Frequency Register (see Article 9A)

(b) ..... Notifying administration

EARTH STATION { for transmitting (E), see Section B of Appendix 1A / for receiving (R), see Section C of Appendix 1A }

(a) Notice No. .....
Date .....

(c) ..... Identity of satellite network

(e) ..... Reference of weekly circular relating to No. 639AA

..... kHz
..... MHz
1 Assigned frequency

2 ..... Assigned frequency band in kHz

3 ..... Date of bringing into use

(d1) New assignment [ ] (d2) Change [ ] (d3) Deletion of an assignment [ ]

4a ..... Name of earth station

4b ..... Country

4c ..... Longitude and latitude of earth station site

For I.F.R.B. use

Space station(s) with which communication is to be established 5	Class of station and nature of service performed 6	Class of emission of assignment 7a	Carrier frequency (frequencies) (2 7b	Class of emission, necessary bandwidth and description of transmission (2) 7c	Power characteristics: Peak power (2) 8a(E)	Total peak power 8b(E)	Maximum power density 8b(E)	Antenna characteristics (3): Isotropic gain 8a(R) 9a(E)	Half power beam-width 8b(R) 9b(E)	Minimum angle of elevation 8e(R) 9e(E)	Azimuthal limits 8f(R) 9f(E)	Polarization (2) 9g(E)	Altitude (m) 8g(R) 9h(E)	Modulation characteristics (2) 10(E)	Lowest equivalent satellite link noise temperature 9(R)	Maximum hours of operation on each carrier (G.M.T.) 10(R) 11(E)	(g) Supplementary information

13(R), 14(E) { ..... Operating administration or company / ..... Name and address of administration }

(1) The actual size of the notice is a matter for individual administrations.

(2) This information need only be furnished when such information has been used as a basis to effect co-ordination with another administration.

(3) NOTE: For *radiation diagram* 8c(R), 9c(E) and *horizon elevation angle diagram* 8d(R), 9d(E), attach the relevant information to this form.

11(R), 12(E) COORD/ .....

12(R), 13(E) Agreements/ .....

(g) Other information:

Form of Notice (1)

for use when notifying to the International Frequency Registration Board a Frequency Assignment or a Change to an Assignment recorded in the Master International Frequency Register (see Article 9A)

(b) ..... Notifying administration

SPACE STATION { for transmitting (E), see Section D of Appendix 1A / for receiving (R), see Section E of Appendix 1A

(a) Notice No. .....
Date .....

(c) ..... Identity of satellite network

(e) ..... Reference of weekly circular relating to No. 639AA

..... kHz
..... MHz
1 Assigned frequency

(d1) New assignment [ ] (d2) Change [ ] (d3) Deletion of an assignment [ ]

2 ..... Assigned frequency band in kHz

4 ..... Name of space station

For I.F.R.B. use

3 ..... Date of bringing into use

5 Orbital information

Satellite's nominal longitude and longitudinal and inclination tolerances 5a (3)		Angle of inclination of orbit 5b	Period of object in space 5b	Altitudes of apogee and perigee (km) 5b	Number of space stations 5b
Longitude	Tolerances				

Service area(s) or station(s) with which communication is to be established 6	Class of station and nature of service performed 7	Class of emission of assignment 8a	Carrier frequency (frequencies) (2) 8b	Class of emission, necessary bandwidth and description of transmission (2) 8c	Power characteristics: Peak power (2) 9a(E)	Power characteristics: Total peak power 9b(E)	Power characteristics: Maximum power density 9b(E)	Antenna characteristics (4): Polarization (2) 9c(R) 10c(E)	Antenna characteristics (4): Geo-stationary satellite pointing accuracy 9d(R) 10d(E)	Modulation characteristics (2) 11(E)	Receiving system noise temperature 10(R)	Maximum hours of operation on each carrier (G.M.T.) 11(R) 12(E)	(g) Supplementary information

14(R), 15(E) { ..... Operating administration or company
..... Name and address of administration

(1) The actual size of the notice is a matter for individual administrations.

(2) This information need only be furnished when such information has been used as a basis to effect co-ordination with another administration.

(3) Information on *visible arc*, *service arc* and reasons if service arc is less than visible are to be attached (5a.1, 5a.2, 5a.3).

(4) NOTE: For *antenna characteristics* 10a(E) or 10b(E) and 9a(R) or 9b(R), attach the relevant information to this form.

12(R), 13(E) COORD/ .....

13(R), 14(E) Agreements/ .....

(g) Other information:

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APPENDIX 1B

Advance Publication Information to be furnished for a Satellite Network

(see Article 9A)

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).

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

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 and inclination tolerances. 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; and

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 (W/Hz) 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).

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.

Item 5 Characterisitcs 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 estimated gain of the space station receiving antenna by means of gain contours plotted on a map of the Earth's surface; the isotropic 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;

b) in the case of a space station aboard a non-geostationary satellite, indicate the estimated isotropic gain of the space station receiving antenna in the main direction of reception and indicate the antenna radiation pattern in those directions which can intersect with the Earth's surface, taking the gain in the main direction of radiation as a reference.

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.

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

For each space-to-Earth service area, indicate the maximum spectral power density (W/Hz) 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).

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 estimated gain of the space station transmitting antenna by means of gain contours plotted on a map of the Earth's surface; the isotropic 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;

b) in the case of space station aboard a non-geostationary satellite, indicate the estimated isotropic gain of the space station transmitting antenna in the main direction of transmission and indicate the antenna radiation pattern in those directions which can intersect with the Earth's surface, taking the gain in the main direction of transmission as a reference.

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 of the earth stations.

For each space-to-Earth service area and for each projected usage [1], when simple frequency changing transponders are used on the space station, indicate the lowest equivalent satellite link noise temperature and the associated value of transmission gain 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 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.

Section E. Characteristics to be furnished for Space-to-Space Relay

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) on the beam axis.

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[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).

APPENDIX 9
Service Documents
(See Articles 8, 9, 9A, 10 and 20)

List I. International Frequency List

Assigned frequency (kc/s or Mc/s) [1]	Dates 2				Call sign (Identification)	Location of transmitting station 4			Reception 5		Class of station and nature of service	Class of emission, necessary bandwidth and description of transmission	Power (kW)	Transmitting Antenna Characteristics [4] 9			Maximum hours of operation of the circuit to each locality or area (G.M.T.)	Megacycle order of the other frequencies normally utilized for the same circuit [4]	Operating Administration or Company [5]	Postal and telegraphic address of the administration responsible for the station [5]	Remarks 13		
	Of registration [2]	Of notification [2]	Of putting into use	Of receipt of the notice by the I.F.R.B. when columns 2a or 2b are not to be used [3]		Name of the transmitting station	Country in which the transmitting station is located	Geographical co-ordinates of the transmitter site (longitude and latitude) in degrees and minutes	Locality(ies) or area(s) with which communication is established	Length of circuit (km)				Azimuth of maximum radiation (ND if a transmitting antenna with non-directional characteristics is used)	Angular width of radiation main lobe	Antenna gain (db)					Results of examination [6] and investigations [7] by the I.F.R.B.	Remarks related to the finding by the I.F.R.B.	Other remarks [8]
1	2a	2b	2c	2d	3	4a	4b	4c	5a	5b	6	7	8	9a	9b	9c	10	11	12a	12b	13a	13b	13c

Spa2 [1] In the case of television broadcasting stations in Region 1, the frequency in this column is that of the sound and vision carriers (See Appendix 1 to the Radio Regulations). [2] See Nos. **607** and **608** of the Radio Regulations. [3] A symbol instead of a date indicates an assignment notified pursuant to No. **272** of the Extraordinary Administrative Radio Conference Agreement (Geneva, 1951), or, in the frequency bands above 27 500 kHz, an assignment for which the notice was received by the I.F.R.B. before 1st April 1952. [4] See Appendix 1 to the Radio Regulations. [5] Columns 12a and 12b contain numbers or letters which are explained in the Preface to the International Frequency List. [6] See Article 9, Section II and Article 9A, Section IV, of the Radio Regulations. [7] See Nos. **516, 517, 621, 622, 639BS, 639DM, 639DO** and **639DP** of the Radio Regulations. [8] Including dates referred to in Section II of Article 9 and Section IV of Article 9A of 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 (kc/s or Mc/s)	Locality(ies) or Area(s) with which communication is established	Remarks
1	2	3	4	5

List III A. List of Broadcasting Stations Operating in Bands below 5 950 kc/s

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

Name of the transmitting station	Assigned frequency in kc/s	Call sign (Identification)	Geographical co-ordinates of the transmitter site (longitude and latitude in degrees and minutes)	Zones or areas of reception	Power (kW)	Azimuth of maximum radiation (ND if a transmitting antenna with non-directional characteristics is used)	Maximum hours of operation (G.M.T.)	Operating Administration or Company	Other remarks
1	2	3	4	5	6	7	8	9	10

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List VIIIA. — List of Space Radiocommunication Stations and Radio Astronomy Stations [1]

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1 — Earth stations in the fixed-satellite service

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

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Name by which the station is known or the name of the locality in which it is situated	Geographical co-ordinates (in degrees and minutes) of the transmitter site	Transmission						Reception						Identity of the associated space station(s) with which communication is to be established	Operating administration or company	Remarks
		Telecommand where appropriate			Communications			Telemetering		Tracking		Communications				
		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	Power (kW)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission			1. Special channelling arrangements for: *a)* telegraphy; *b)* telephony; *c)* other types of communication, as appropriate. 2. Special methods of modulation.
1	2	3a	3b	3c	4a	4b	4c	5a	5b	6a	6b	7a	7b	8	9	10

[1] For the cases where these data must be supplied, see Nos. **639BA**, **639BB** and **639BC**.

2 — *Space stations in the fixed-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 station.

Spa2

Identity of the station	Transmission									Reception				Service area or areas on the Earth or the name of the locality and country in which the associated earth station(s) is (are) located	Operating administration or company	Remarks
	Telemetering			Tracking			Communications			Telecommand where appropriate		Communications				
	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission			1. Orbital information: *a)* angle of inclination of the orbit; *b)* period of the object in space; *c)* altitude of apogee (km) *d)* altitude of perigee (km) *e)* number of satellites used, if appropriate; *f)* in the case of geostationary satellite: – nominal geographical longitude on the geostationary satellite orbit; – arc of the geostationary satellite orbit within which the space station could provide the required service to its associated earth stations or service areas. 2. Special channelling arrangements for: *a)* telegraphy; *b)* telephony; *c)* other types of communication, as appropriate. 3. Special methods of modulation.
1	2a	2b	2c	3a	3b	3c	4a	4b	4c	5a	5b	6a	6b	7	8	9

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3 — *Earth stations in the earth exploration-satellite service*

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

Spa2

Name by which the station is known or the name of the locality in which it is situated	Geographical co-ordinates (in degrees and minutes) of the transmitter site	Transmission			Reception						Identity of the associated space station(s) with which communication is to be established	Operating administration or company	Remarks
			Telecommand where appropriate		Telemetering		Tracking		Reception of earth exploration information				
		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	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission			Special methods of modulation.
1	2	3a	3b	3c	4a	4b	5a	5b	6a	6b	7	8	9

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4 — *Space stations in the earth exploration-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 station.

Spa2

Identity of the station	Transmission									Reception		Service area or areas on the Earth or the name of the locality and country in which the associated earth station(s) is (are) located	Operating administration or company	Remarks
	Telemetering			Tracking			Transmission of earth exploration information			Telecommand where appropriate				
	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission			1. Orbital information: *a)* angle of inclination of the orbit; *b)* period of the object in space; *c)* altitude of apogee (km); *d)* altitude of perigee (km); *e)* number of satellites used, if appropriate; *f)* in the case of a geostationary satellite: – nominal geographical longitude on the geostationary satellite orbit; – arc of the geostationary satellite orbit within which the space station could provide the required service to its associated earth stations or service areas. 2. Special channelling arrangements for: *a)* telegraphy; *b)* telephony; *c)* other types of communication, as appropriate. 3. Special methods of modulation.
1	2a	2b	2c	3a	3b	3c	4a	4b	4c	5a	5b	6	7	8

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5 — *Earth stations in the radiodetermination-satellite service*

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

Spa2

Name by which the station is known or the name of the locality in which it is situated	Geographical co-ordinates (in degrees and minutes) of the transmitter site	Transmission			Reception						Identity of the associated space station(s) with which communication is to be established	Operating administration or company	Remarks
		Telecommand where appropriate			Telemetering		Tracking		Supplementary inform. necessary for the operation of the radiodetermination system				
		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	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission			Special methods of modulation.
1	2	3a	3b	3c	4a	4b	5a	5b	6a	6b	7	8	9

6 — *Space stations in the radiodetermination-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.

Spa2

Identity of the station	Transmission									Reception		Service area or areas on the Earth or the name of the locality and country in which the associated earth station(s) is (are) located	Operating administration or company	Remarks
	Telemetering			Tracking			Transmission of radiodetermination information			Telecommand where appropriate				
	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission			1. Orbital information: *a)* angle of inclination of the orbit; *b)* period of the object in space; *c)* altitude of apogee (km); *d)* altitude of perigee (km); *e)* number of satellites used, if appropriate; *f)* in the case of a geostationary satellite: – nominal geographical longitude on the geostationary satellite orbit; – arc of the geostationary satellite orbit within which the space station could provide the required service to its associated earth stations or service areas. 2. Special channelling arrangements for: *a)* telegraphy; *b)* telephony; *c)* other types of communication, as appropriate. 3. Special methods of modulation.
1	2a	2b	2c	3a	3b	3c	4a	4b	4c	5a	5b	6	7	8

Spa2

7 — *Earth stations in the space research service*

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

Spa2

Name by which the station is known or the name of the locality in which it is situated	Geographical co-ordinates (in degrees and minutes) of the transmitter site	Transmission			Reception						Identity of the associated space station(s) with which communication is to be established	Operating administration or company	Remarks
				Telecommand where appropriate	Telemetering		Tracking		Reception of research information				
		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	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission			Any special characteristics of the station and scope of research.
1	2	3a	3b	3c	4a	4b	5a	5b	6a	6b	7	8	9

8 — *Space stations in the space research 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 station.

Spa2

Identity of the station	Transmission									Reception		Service area or areas on the Earth or the name of the locality and country in which the associated earth station(s) is (are) located	Operating administration or company	Remarks
	Telemetering			Tracking			Transmission of information			Telecommand where appropriate				
	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission	Power (watts)	Frequency (MHz or GHz)	Class of emission, necessary bandwidth and description of transmission			1. In the case of an earth satellite, orbital information: *a)* angle of inclination of the orbit; *b)* period of the object in space; *c)* altitude of apogee (km); *d)* altitude of perigee (km); *e)* number of satellites used, if appropriate; *f)* In the case of geostationary satellite: – nominal geographical longitude on the geostationary satellite orbit; – arc of the geostationary satellite orbit within which the space station could provide the required service to its associated earth stations or service areas. 2. In the case of a space probe, general indication of its trajectory. 3. Special methods of modulation.
1	2a	2b	2c	3a	3b	3c	4a	4b	4c	5a	5b	6	7	8

9 — *Stations in the radio astronomy service*

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

Name by which the station is known or the name of the locality in which it is situated	Geographical co-ordinates (in degrees and minutes) of the station	Centre of the frequency band observed (Mc/s or Gc/s)	Width of the frequency band observed	Antenna characteristics	Maximum hours of reception (G.M.T.)	Noise temperature (°K)	Class of observation	Operating administration or company	Remarks
1	2	3	4	5	6	7	8	9	10
									Any special additional characteristics of the station including: 1) altitude in metres above sea level, 2) main particulars of antenna, 3) scope of observations.

APPENDIX 10

Mar Spa

(Spa2)

Service Document Symbols

(See Article 20 and Appendix 9)

■	Station classified as situated in a region of heavy traffic (Article 32) ("TI")[1]
o	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]
△	High-traffic ship ("HS")[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

[1] The symbol shown in parenthesis may be used in notifications and service documents.

D30°	Directive antenna having maximum radiation in the direction of 30° (expressed in degrees from True North, from 0 to 360 clockwise)
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
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
FE	SUP (Spa2)
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	Scheduled 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 throughout the twenty-four hours
HJ	Day service
HN	Night service
HT	Transition period service
HX	Intermittent 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
SS	Standard frequency 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
TH	Earth station in the space research service
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 telemetering earth station
TS	Television, sound channel
TT	Earth station in the space operation service
TV	Television, vision channel

APPENDIX 25 MOD
Mar

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

This Appendix to the Radio Regulations, (Geneva, 1959), is published as a separate booklet.

APPENDIX 26

Frequency Allotment Plan for the Aeronautical Mobile Service and Related Information

This Appendix to the Radio Regulations, (Geneva, 1959), 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 I.T.U.

APPENDIX 27
Aer

Frequency Allotment Plan for the Aeronautical Mobile (R) Service and Related Information

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.

APPENDIX A

Studies and Prediction of Radio Propagation and Radio Noise

Recognizing the vital dependence of maximum utilization of radio frequencies and efficient planning of radiocommunication services upon the fullest use of radio propagation and radio noise data, the Members and Associate Members of the Union shall continue to promote the establishment and operation of world-wide systems of observation stations to obtain data on radio noise and on ionospheric, tropospheric and other phenomena affecting radio propagation. Each Member or Associate Member shall provide, by the best means possible, for the study, co-ordination and rapid dissemination of such data and of their predictions. In formulating and carrying out their programme of work in this field, Members and Associate Members shall take note of the relevant C.C.I.R. 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.

APPENDIX 28

Procedure for Determination of the Co-ordination Area around an Earth Station in Frequency Bands between 1 and 40 GHz shared between Space and Terrestrial Radiocommunication Services

1. *Objectives*

The co-ordination area (see No. **103D**) is determined by calculating, in all directions of azimuth from the earth station, the co-ordination distances (see No. **103B**), and drawing to scale on an appropriate map the co-ordination contour (see No. **103C**).

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

For the determination of the co-ordination area two cases may have to be considered:

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

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

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

The procedure given in this Appendix for the determination of the co-ordination area is fairly complex. For this reason, it is considered useful to present in Annex A a simplified version of this procedure which will assist a user in following the necessary steps to produce co-ordination contours. The simplified presentation is given for certain allocated frequency bands.

It is suggested to draw, together with the co-ordination contour, auxiliary contours based on less unfavourable assumptions than those chosen for determination of the co-ordination 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 co-ordination area. The determination and use of these auxiliary contours is explained in Annex B to this Appendix.

2. *Permissible values of interference*

The permissible interference power (in dBW) in the reference bandwidth to be exceeded for no more than p percent of the time at the receiver input of a station suffering interference, from each source of interference, is given by the general formula below:

$$P_r(p) = 10 \log_{10} (kT_rB) + J + M(p) - W \qquad (1)$$

where

with

$$M(p) \equiv M(p_o/n) = M_o(p_o) \qquad (1a)$$

k = Boltzmann's constant ($1{\cdot}38 \times 10^{-23}$ joule per K);

T_r = thermal noise temperature of the receiving system (K);

B = reference bandwidth (in Hz) (bandwidth, of concern to the interfered with system, over which the interference power can be averaged);

J = ratio (in dB) of the permissible long term (20% of the time) interfering power to the thermal noise power in the receiving system ([1]);

([1]) see note ([1]) on following page.

p_o = 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 are not likely to occur simultaneously $p = p_o/n$;

$M_o(p_o)$ = ratio (in dB) between the permissible interference powers during p_o% and 20% of the time respectively, for all entries of interference (2);

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

Notes

(1) The factor J (in dB) is defined as the ratio of total permissible long-term (20% of the time) interference power in the system, to the long-term thermal noise power in a single receiver. For example, in a 50-hop terrestrial line-of-sight radio relay hypothetical reference circuit, the total allowable additive interference power is 1 000 pW0p (C.C.I.R. Recommendation 357-1) and the mean thermal noise power in a single hop may be assumed to be 25 pW0p.Therefore, since in a FDM/FM system the ratio of the interference noise power to the thermal noise power in a 4 kHz band is the same before and after demodulation, J = 16 dB. In a satellite link in the fixed-satellite service, the total allowable interference power is also 1 000 pW0p (C.C.I.R. Recommendation 356-2), but the thermal noise contribution of the down path is not likely to exceed 7 000 pW0p, hence $J \geqslant -8{\cdot}5$ dB. In digital systems it may be necessary to protect each communication path individually, and in that case, long term interference power may be of the same order of magnitude as long-term thermal noise, hence J = 0 dB.

(2) $M_o(p_o)$ (in dB) is the "interference margin" between the long-term (20%) and the short-term (p_o%) allowable interference powers. For analogue radio-relay and fixed-satellite systems in bands between 1 and 15 GHz, this is the ratio (in dB) between 50 000 and 1 000 pW0p (17 dB). In the case of digital systems, $M_o(p_o)$ may tentatively be set equal to the fading margin which depends, inter alia, on the local rain climate.

W = equivalence factor (in dB) relating the effect of interference to that of thermal noise of equal power in the reference bandwidth (1).

Tables I and II list values for the above parameters.

3. *Determination of co-ordination distance for near great circle propagation mechanisms*

When determining the co-ordination distance for an earth station, a number of mechanisms of radio-wave propagation need to be considered. This section deals with the determination of co-ordination distance in conditions associated with super-refraction, ducting, scattering and reflection due to irregularities in the refractive index of the lower atmosphere in the absence of precipitation. The determination of the co-ordination distance associated with propagation due to scattering from hydrometeors is discussed in Section 4.

---

(1) The factor W (in dB) is the ratio of thermal noise power to interference power, in the reference bandwidth, producing the same interference effect 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:

$$W = 10 \log_{10} \left\{ \frac{\text{Interfering power in the receiving system after demodulation}}{\text{Thermal noise power in the receiving system after demodulation}} \times \frac{\text{Thermal noise power at the receiver input in the reference bandwidth}}{\text{Interfering power at the radio frequency in the reference bandwidth}} \right\}$$

Also, when the wanted signal uses FM modulation with r.m.s. modulation indices which are greater than unity, W is approximately 4 dB, regardless of the characteristics of the interfering signal. For low-index FDM/FM systems a very small reference bandwidth (4 kHz) has been used in order to avoid the necessity of dealing with a large range of characteristics of both wanted and unwanted signals upon which, for greater reference bandwidths, the value of W would depend.

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

3.1 *Normalized basic transmission loss $L_o(0{\cdot}01)$*

To facilitate the graphical determination of the co-ordination distance, it is convenient to normalize the percentage of time to 0·01% and the frequency to 4 GHz.

The first step in the determination of the co-ordination distance is the calculation of a normalized basic transmission loss L_o (0·01) given by:

$$L_o(0{\cdot}01) = P_{t'} + G_{t'} + G_r - P_r(p) - F(p) - 20 \log_{10} (f/4) \qquad (2)$$

where

$P_{t'}$ = maximum available transmitting power (in dBW) in reference bandwidth B at the input to the antenna of an interfering station *;

$G_{t'}$ = gain (in dB relative to isotropic) of the transmitting antenna of the interfering station. If the interfering station is an earth station, this is the isotropic gain in the pertinent direction. If it is a terrestrial station, $P_{t'}$ and $G_{t'}$ are combined in the main beam equivalent isotropically radiated power E, for which the values given in Table II shall be used. When $G_{t'}$ is the gain in the main direction of radiation it is denoted $G_{t'}max.$;

G_r = gain (in dB relative to isotropic) of the receiving antenna of the station suffering interference. If that station is an earth station, this is the isotropic gain in the pertinent direction; in the case of a terrestrial station, the maximum antenna gain is to be used. When G_r is the main beam gain, it is denoted $G_r max.$ (In the case of terrestrial stations, see Table I);

$F(p)$ = correction factor in dB to relate the effective percentage of the time p to 0·01% (see Figure 1);

f = operating frequency in GHz.

The "pertinent direction" referred to in the definitions of $G_{t'}$ and G_r is usually the direction toward the physical horizon on the azimuth

* Primes refer to the parameters associated with the interfering station.

considered (see Section 3.2) except when an earth station points its main beam at elevation angles below 12°. In the latter case, the path of minimum transmission loss may not be the horizon path but rather the main beam path (see Section 3.6).

When considering moving satellites, $G_{t'}$ or G_r (whichever pertains to the earth station antenna) is variable with time. In such cases, it is suggested that an equivalent time-invariant earth station antenna gain * should 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, whichever is the greater.

3.2 *Antenna gain at the earth station horizon for geostationary satellites*

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 direction 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 λ are uniquely related. Figure 2 shows the "permissible" 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.

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

With the correct arc or segment of arc chosen and suitably marked, the horizon profile $\theta(\alpha)$ is superimposed on the plot of Figure 3, which shows an example 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, with the site horizon profile drawn as shown.

For each point on the local horizon $\theta(\alpha)$, the smallest distance to the arc is determined and measured on the elevation scale. The example of Figure 3 shows the determination of the off-beam angle φ at an azimuth $\alpha_0 = 210°$ with a horizon elevation $\theta = 4°$.

If this is done for all azimuths (in suitable increments, e.g. 5°), a relationship $\varphi(\alpha)$ results. The relationship $\varphi(\alpha)$ may be used to derive a function for the horizon antenna gain, $G(\alpha)$, 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 exceeds 100, the following equation should be used:

$$G(\varphi) = 32 - 25 \log_{10} \varphi \text{ (dB)} \qquad (1° \leqslant \varphi < 48°)$$
$$= -10 \text{ dB} \qquad (48° \leqslant \varphi \leqslant 180°)$$

The application of this gain equation to the $\varphi(\alpha)$ plot yields the desired horizon antenna gain as a function of azimuth.

The parameters used above are defined as follows:

α = azimuthal angle under consideration, east of True North;

φ = the smaller angle in degrees between the main beam direction of the earth station antenna and the straight line connecting the earth station to the physical horizon on azimuth α;

ε = earth station main beam elevation angle above horizontal plane;

λ = latitude of earth station;

θ = elevation angle of the physical horizon above the horizontal plane on azimuth α.

3.3 *Radio-climatic Zones*

The world has been divided into three basic radio-climatic regions termed Zones A, B and C, respectively.

These zones are defined as follows:

— Zone A: land, with the exception of a coastal strip the width of which is either 100 km or that distance from the actual coast at which the terrain begins to exceed an altitude of 1000 m, whichever is the lesser distance;

— Zone B: sea, at latitudes greater than 23·5° (North or South), excluding the Mediterranean and Black Seas, but including the coastal strip defined above wherever land borders on sea at latitudes greater than 23·5°;

— Zone C: sea, at latitudes smaller than 23·5° (North or South), including the Mediterranean and Black Seas, and the coastal strip defined above wherever land borders on sea at latitudes smaller than 23·5°.

3.4 *Procedure for the determination of the co-ordination distance for propagation mode (a)*

To obtain the co-ordination distance for Zone A, it is necessary to subtract from $L_0(0{\cdot}01)$ a correction ΔL which accounts for the difference in basic transmission loss over paths that have different horizon elevation angles at the earth station. ΔL is computed in two steps. First a correction ΔL_0 for unit elevation angle (i.e., for a 1° elevation angle) is obtained from Figure 4 as a function of the normalized basic transmission loss and the frequency. Linear interpolation should be used between the curves of Figure 4 for frequencies not shown.

For any other horizon elevation angle θ, the horizon angle correction ΔL (in dB) is obtained from Figure 5 using the value of ΔL_0 previously obtained from Figure 4. If values are required at elevation angles

other than those indicated, linear interpolation should again be used. In cases where the elevation angle is less than 0·2°, ΔL is always 0 dB.

The horizon angle correction ΔL so obtained should be subtracted from the normalized basic transmission loss to result in a "co-ordination loss" L_c :

$$L_c = L_o(0{\cdot}01) - \Delta L \qquad (3)$$

This co-ordination loss, used with the appropriate frequency in Figure 6, yields the co-ordination distance.

In a similar manner, the Zone B and Zone C co-ordination distance can be determined using Figures 7, 8 and 9 for Zone B and Figures 10, 11 and 12 for Zone C.

Distances so obtained are, for reference purposes, to be labelled d_{aA}, d_{aB} and d_{aC} for Zones A, B and C, respectively.

3.5 *Co-ordination distance for mixed paths*

3.5.1 *Two Zones*

The procedure to be followed in the case of a mixed path involving two zones is illustrated by the example shown in Figure 13b. 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.

It is assumed that, at a frequency of 4 GHz, the normalized basic transmission loss $L_o(0{\cdot}01)$ is 200 dB, and that the horizon elevation angle is zero degrees. This results in identical values of 200 dB for L_c in any zone (which would, of course, not be the case if the horizon elevation angle were greater than 0·2°). The procedure is as follows:

i) determine the distance entirely in Zone A that would give the co-ordination loss. Mark this distance (in this case it is 350 km) from the origin along the abscissa axis of linear graph paper as indicated by the point A (Figure 13a);

ii) determine the distance entirely in Zone B that would give the same co-ordination 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;

iii) draw a straight line between points A and B representing these distances from the origin;

iv) 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;

v) starting from point A_1 the Zone B path length of 375 km is then set off parallel to the ordinate axis of the chart as indicated by the point B_1;

vi) 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. On Figure 13a, this distance is 30 km;

vii) the co-ordination distance is the sum of the distances OA_1, A_1B_1 and B_1X and is equal to

$$75 + 375 + 30 = 480 \text{ km}$$

The distance B_1X can also, more precisely, be found numerically from the total distance of the two parts in Zone A, $OA_1 + B_1X$ given by

$$OA_1 + B_1X = OA\left(1 - \frac{A_1B_1}{OB}\right)$$

whence:

$$B_1X = OA\left(1 - \frac{A_1B_1}{OB}\right) - OA_1$$

hence,

$$B_1X = 350\left(1 - \frac{375}{530}\right) - 75 = 27 \text{ km}$$

3.5.2 *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 Figure 14, assuming for example a co-ordination loss (L_c) of 200 dB at a frequency of 4 GHz. It is required to find the co-ordination distance from the earth station in the direction given in Figure 14a. 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 375 km long and followed by an unknown portion in Zone C (Figure 14a).

In this case, the procedure to be applied should be as follows (Figure 14b):

i) repeat the same procedure as for mixed paths involving only two zones, given in steps (i) to (v) above, and continue as follows:

ii) from the point B_1 draw a line parallel to the line AB to intersect the abscissa axis as indicated by the point D;

iii) determine the distance entirely in Zone C that would give the co-ordination loss. Mark this distance (in this case it is 930 km) from the origin along the ordinate axis of the chart as indicated by the point C. Draw a straight line between the points C and A;

iv) at the point D, draw a line parallel to the ordinate axis to intersect the line CA as indicated by X;

v) the distance between the points D and X, which is the unknown distance in Zone C, is found to be 75 km;

vi) the co-ordination distance is then the sum of the distances $OA_1 + A_1B_1 + DX$ and in this example is equal to

$$75 + 375 + 75 = 525 \text{ km}$$

The distance DX can also, more precisely, be found numerically from the formula:

$$DX = OC\left(1 - \frac{OA_1}{OA} - \frac{A_1B_1}{OB}\right)$$

hence,

$$DX = 930\left(1 - \frac{75}{350} - \frac{375}{530}\right) = 73 \text{ km}$$

The distance obtained from either the single zone case (Section 3.4), or the multi-zone case (Section 3.5), whichever is applicable, is to be labelled d_a.

3.6 *Determination of the co-ordination distance for propagation mode (b)*

If the main beam of the earth station antenna is elevated less than 12° for long periods of time, as may be the case in operation with geostationary satellites, the co-ordination distance in the azimuthal direction of the main beam is determined in the same manner as above but the antenna elevation angle ε is used instead of the horizon elevation angle θ, and the antenna main beam gain is used instead of the gain towards the horizon. *In all such cases, the Zone A curves should be used irrespective of the actual zone involved.*

This procedure yields a distance for propagation mode (*b*), to be labelled d_b.

When considering non-geostationary satellites, interference via the main beam path should only be considered when the earth station antenna points in the same direction for appreciable periods of time (e.g., when working to deep space probes or to satellites which are almost geostationary).

3.7 *Evaluation of results from propagation modes (a) and (b)*

If propagation mode (*b*) is applicable, then the distance obtained for propagation mode (*b*) is compared with that of propagation mode (*a*) and where the co-ordination distance resulting from the main beam calculation exceeds that from the horizon path calculation, the procedure illustrated in Figure 15 should be used as follows to obtain the co-ordination contour for great circle propagation mechanisms:

i) draw two straight lines from the earth station at azimuthal angles of $\pm 5°$ relative to the azimuth of the main beam till they intersect the co-ordination contour obtained according to propagation mode (*a*);

ii) from the point corresponding to the co-ordination distance derived according to propagation mode (*b*) in the azimuthal direction of the main beam, draw two straight lines to join these two intersections;

iii) these two lines so drawn constitute the part of the co-ordination contour to be used in the sector $\pm 5°$ relative to the azimuthal direction of the main beam;

iv) outside the preceding sector $\pm 5°$ the co-ordination contour for the great circle propagation mechanisms is the one obtained for propagation mode (*a*).

For reference purposes, the distances obtained after application of procedures set forth in Sections 3.4 to 3.7 are to be labelled d_{ab}.

4. *Determination of co-ordination distance for propagation mode (c) (scattering from hydrometeors)*

The determination of co-ordination distance for scattering from hydrometeors (rain scatter) is predicated on a path geometry which is substantially different from that of the great circle propagation mechanisms.

4.1 *Normalized transmission loss $L_1(0{\cdot}01)$*

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

$$L_1(0{\cdot}01) = P_{t'} + \Delta G - P_r(p) - F_1(p,f) \qquad (4)$$

where:

ΔG = difference (in 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.

$F_1(p,f)$ = correction factor (in dB) to relate the effective percentage of the time p to 0·01%, in the frequency band under consideration (see Figure 16).

All other parameters have been defined in Section 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 Figure 17.

4.3 *Procedure for the determination of rain scatter co-ordination distance*

To obtain the rain scatter co-ordination distance for rain-climatic Zone 1, the normalized transmission loss (obtained by solving equation (4)), is used together with the appropriate frequency in Figure 18 to yield the rain scatter distance d_{cr}.

Figures 19 to 21 show corresponding curves for rain-climatic Zones 2 to 5. In all cases that rain climate is to be chosen which corresponds to the location of the earth station. Due to the peculiar geometry associated with rain scatter propagation, the centre of the rain scatter co-ordination contour does not coincide with the location of the earth station by a distance Δd.

The rain scatter distance d_{cr}, together with the elevation angle ε of the main beam of the earth station antenna are used in Figure 22 to obtain the distance denoted Δd. The distance Δd is measured from the earth station location along the azimuth of the main beam of the earth station antenna; a circle of radius d_{cr} is drawn around the point so reached. The circle is the rain scatter contour.

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

5. *Minimum value of co-ordination distance*

In the process of determining the co-ordination distance for propagation mode (*a*) or (*b*), if values result which would require the co-ordination distance curves to be extended to distances of less than 100 km, the co-ordination distance (d_a or d_b) for the propagation mode under consideration shall be 100 km.

In the process of determining the co-ordination distance for propagation mode (*c*), if values result which would require the rain scatter distance curves to be extended to distances of less than 100 km, the rain scatter distance (d_{cr}) shall be 100 km, used with the appropriate value of Δd.

6. *The co-ordination distance*

On any azimuth, the greatest of the co-ordination distances d_a, d_b or d_c, for any of the three propagation modes, represents the co-ordination

distance and is to be used for the co-ordination procedure.

An example of a co-ordination contour is shown in Figure 23.

7. *Parameters for calculation*

The values of parameters necessary for the determination of the co-ordination contour are given in Table I in the case of a transmitting earth station, and in Table II in the case of a receiving earth station.

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.

To aid in subsequent negotiations between administrations (as discussed in Annex B), it has been found useful to isolate from equation (2) two composite parameters associated only with terrestrial stations, an interference sensitivity factor $S = G_r - P_r(p)$ for the case of transmitting earth stations, and the e.i.r.p. $E = P_{t'} + G_{t'}$ for the case of receiving earth stations. The values to be used for S and E are given in Tables I and II, respectively.

If it becomes necessary to calculate the co-ordination distance in a band not shown in Table I or II, the values associated with the nearest allocated frequency band for the same service should be used.

TABLE I

Parameters required for the Determination of Co-ordination Distance for a Transmitting Earth Station

Space radiocommunication service designation		Space Operation (Telecommand)	Fixed-Satellite	Fixed-Satellite	Fixed-Satellite	Fixed-Satellite	Fixed-Satellite	Fixed-Satellite	Fixed-Satellite	Fixed-Satellite
Frequency bands (GHz)		1·427–1·429	2·655–2·690	4·400–4·700	5·850–6·425	7·900–7·975 8·025–8·400	10·95–11·20	12·50–12·75	14·4 – 14·5	27·5 – 29·5
Modulation of terrestrial station (1)		A	A	A	A	A	A	A	A	N
Interference parameters and criteria	p_o (%)	0·01	0·01	0·01	0·01	0·01	0·01	0·01	0·01	0·003
	n	2	1	1	2	2	2	2	2	1
	p (%)	0·005	0·01	0·01	0·005	0·005	0·005	0·005	0·005	0·003
	J (dB)	16	9	9	16	16	16	16	16	0
	$M_o(p_o)$ (dB)	17	17	17	17	17	17	17	17	30
	W (dB)	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
	G_r (dB) (2)	35	52 (3)	52 (3)	45	47	50	50	50	50
	ΔG (dB)	−7	10 (3)	10 (3)	3	5	8	8	8	8
	T_r (K)	750	500 (3)	500 (3)	750	750	1500	1500	1500	3200
Auxiliary parameters	S (dBW)	166	192	192	176	178	178	178	178	154
	$P_r(p)$ (dBW) in B	−131	−140	−140	−131	−131	−128	−128	−128	−104

(1) A = analogue modulation; N = digital modulation.

(2) Feeder losses are not included in the values for G_r.

(3) In these bands the parameters for the terrestrial station associated with transhorizon systems have been used.

Table II

Parameters required for the Determination of Co-ordination Distance for a Receiving Earth Station

Space Radiocommunication Service designation		Space Operation (Telemetering)[1]	Meteorological-Satellite[1]	Space Research: Near Earth	Space Research: Deep Space; Manned	Fixed-Satellite		Fixed-Satellite		Fixed-Satellite		Earth Exploration-Satellite[1]	Space Research: Near Earth	Space Research: Deep Space	Fixed-Satellite		Fixed-Satellite		Fixed-Satellite	Earth Exploration-Satellite[1]
Frequency band (GHz)		1·525–1·535	1·670–1·690	1·700–1·710 2·290–2·300		2·500–2·535		3·400–4·200		7·300–7·750		8·025–8·400	8·400–8·500		10·95–11·20 11·45–11·70		11·70–12·20 12·50–12·75		17·7–19·7	21·2–22·0
Modulation at earth station[2]				—	—	A	N	A	N	A	N		—	—	A	N	A	N	N	
Interference parameters and criteria	p_o (%)			0·1	0·001	0·03		0·03	0·003	0·03	0·003		0·1	0·001	0·03	0·003	0·03	0·003	0·003	
	n			2	1	3		3	3	3	3		2	1	2	1	2	1	1	
	p (%)			0·05	0·001	0·01		0·01	0·001	0·01	0·001		0·05	0·001	0·015	0·003	0·015	0·003	0·003	
	J (dB)			—	—	−8		−8	0	−8	0		—	—	−8	0	−8	0	0	
	$M_o(p_o)$ (dB)			—	—	17		17	5[3]	17	5[3]		—	—	17	5[3]	17	5[3]	5[3]	
	W (dB)			—	—	4		4	0	4	0		—	—	4	0	4	0	0	
Terrestrial station parameters	E (dBW) in B	55	55	62[4][6]	62[4][6]	92[6]		55	55	55	55		25[4]	25[4]	55	55	55	55	35[5]	
	P_t' (dBW) in B	13	13	10[4][6]	10[4][6]	40[6]		13	13	13	13		−17[4]	−17[4]	5	5	5	5	−15[5]	
	ΔG (dB)	0	0	10[6]	10[6]	10[6]		0	0	0	0		0	0	0	0	0	0	0	
Reference bandwidth	B (Hz)			1	1	10^6		10^6	10^6	10^6	10^6		1	1	10^6	10^6	10^6	10^6	10^6	
Permissible interference power	$P_r(p)$ (dBW) in B			−220	−220	—		—	—	—	—		−220	−220	—	—	—	—	—	

(1) Parameters associated with these services may vary over a rather wide range. Further study is required before representative values become available.
(2) A = analogue modulation; N = digital modulation.
(3) See note (2) in Section 2. $M_o(p_o)$ may assume values between 5 and 40 dB, depending on frequency, rain-climatic zone and system design.
(4) These values are estimated for 1 Hz bandwidth and are 30 dB below the total power assumed for emission.
(5) These values assume an r.f. bandwidth of no less than 100 MHz, and are 20 dB below total power assumed per emission.
(6) In these bands, the parameters for the terrestrial stations associated with transhorizon systems have been used.

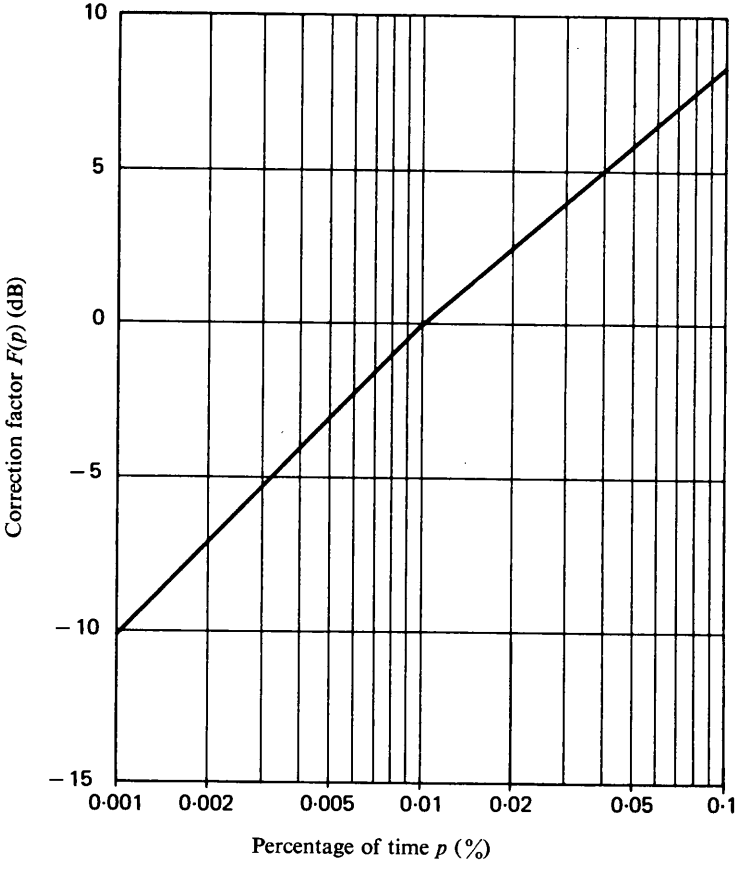


FIGURE 1

Correction factor F(p) for percentages of the time p other than 0·01%

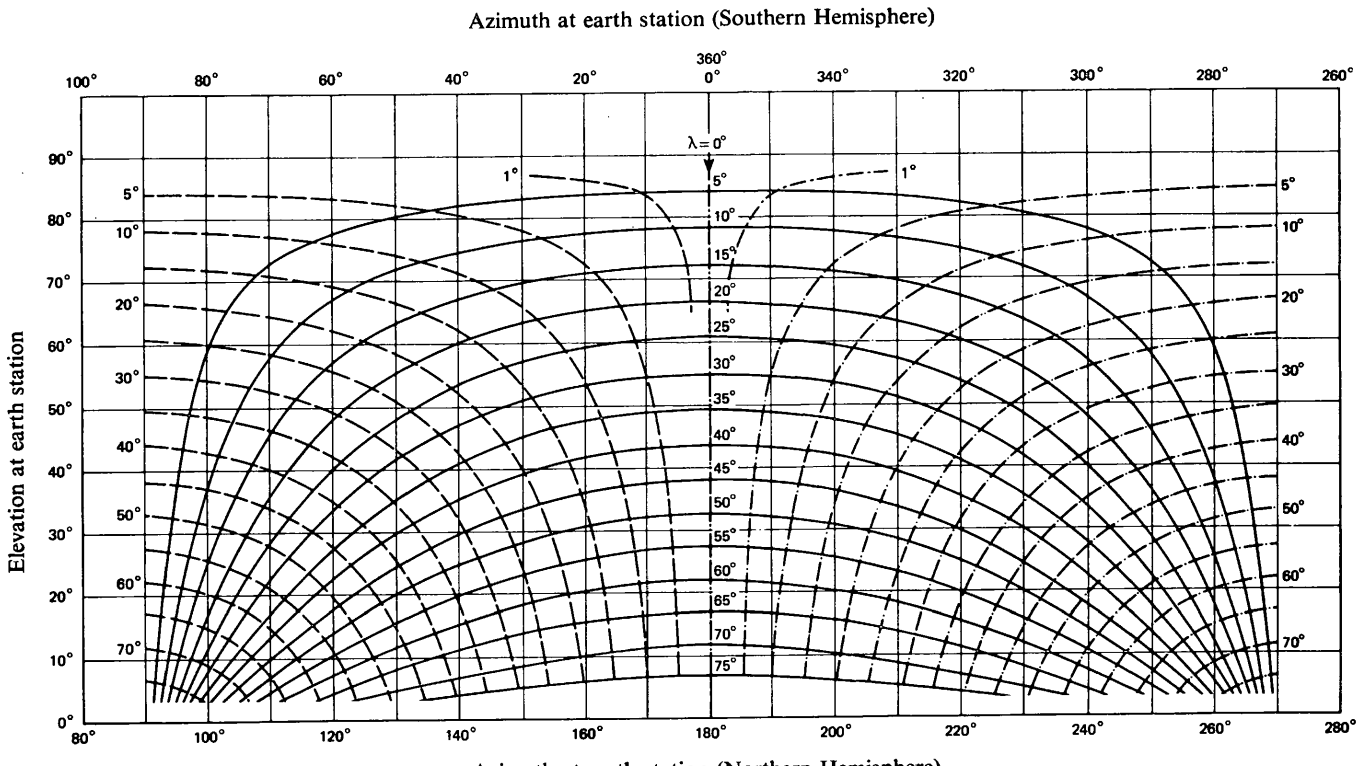


FIGURE 2 - *Position arcs of geostationary satellites*

——————— Arc of geostationary satellite orbit visible from earth station at terrestrial latitude λ

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

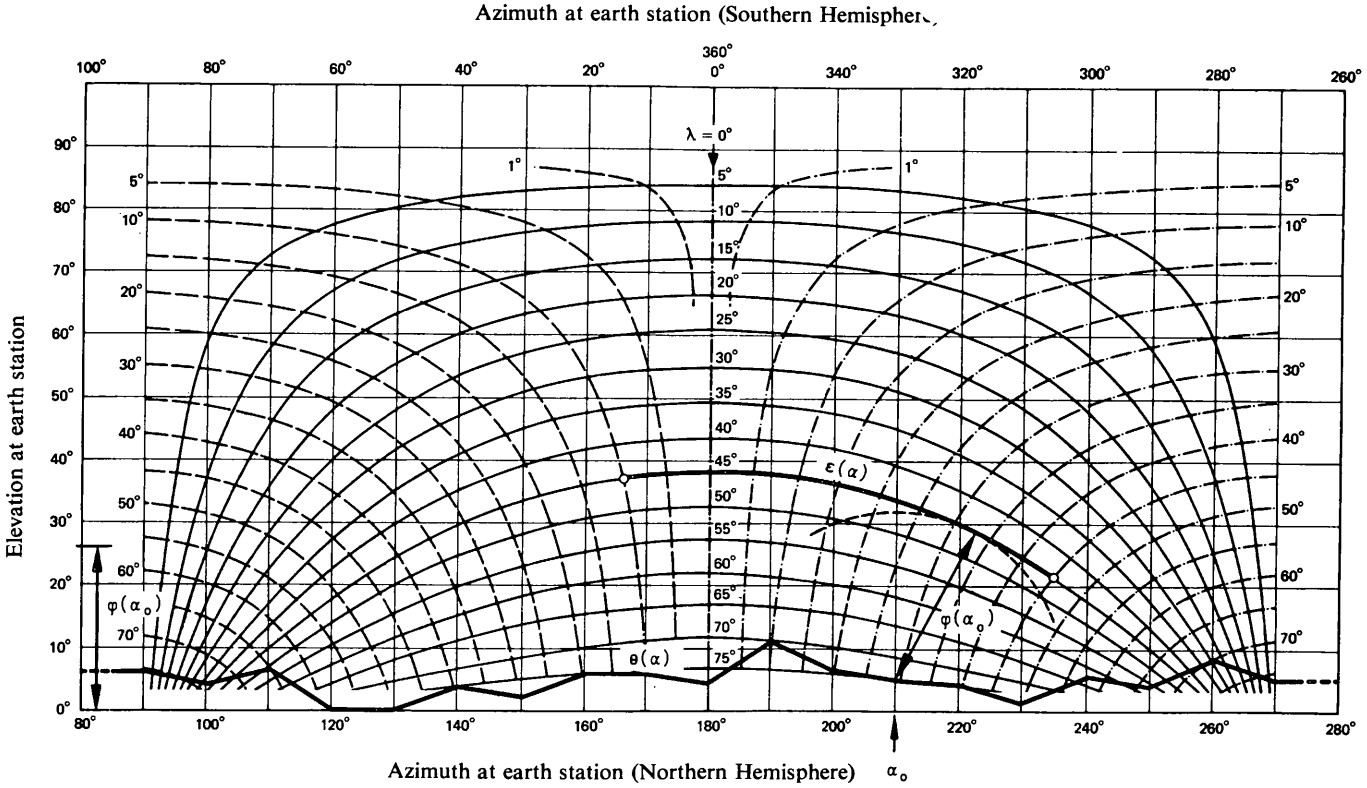


FIGURE 3 - *Example of derivation of* φ

Arc of geostationary satellite orbit visible from earth station at terrestrial latitude λ

Horizon profile θ(α)

Difference in longitude between earth station and the sub-satellite point:

Satellite longitude E of earth station longitude

Satellite longitude W of earth station longitude

Satellite longitude equal to the earth station longitude

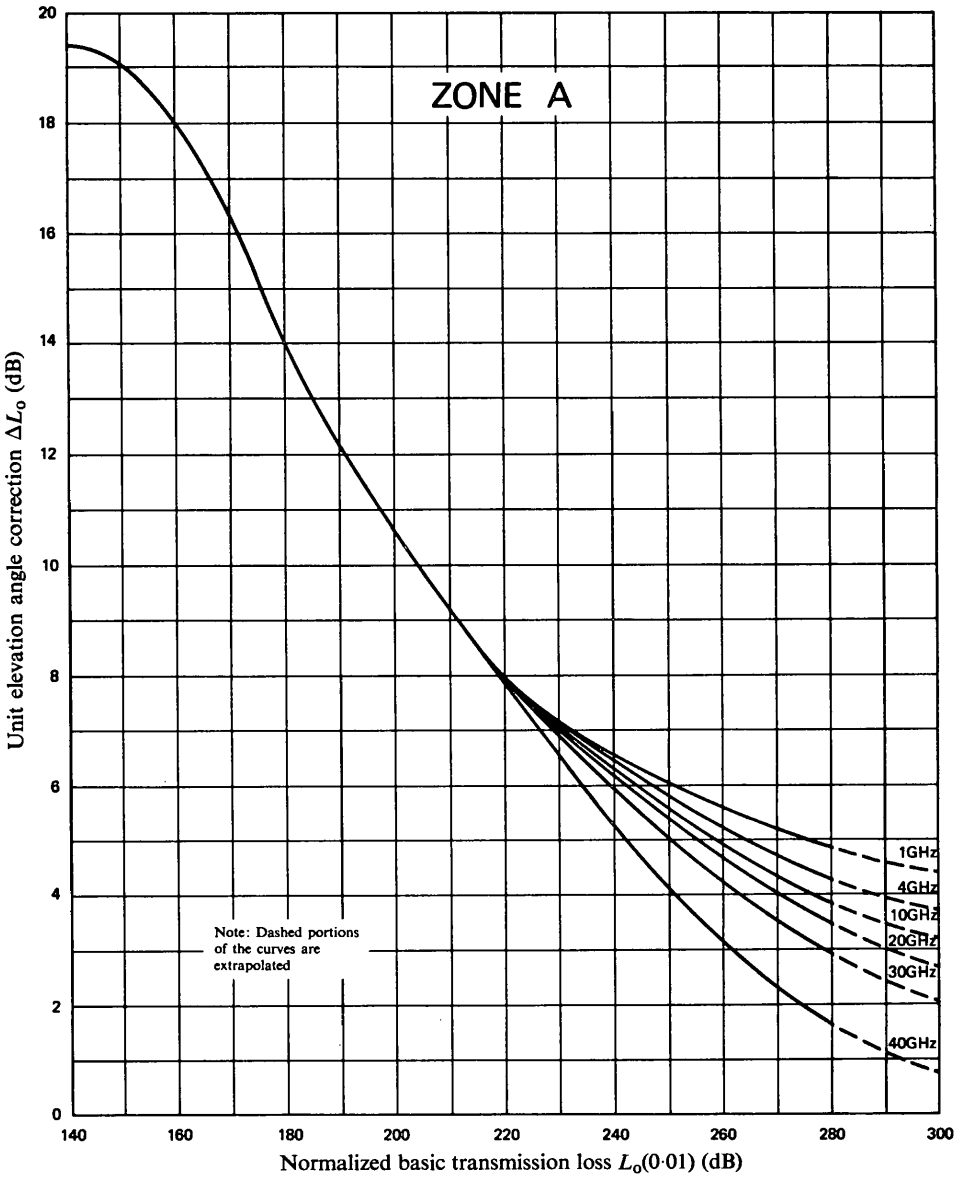


FIGURE 4

Unit elevation angle correction as a function of normalized basic transmission loss and frequency — Zone A

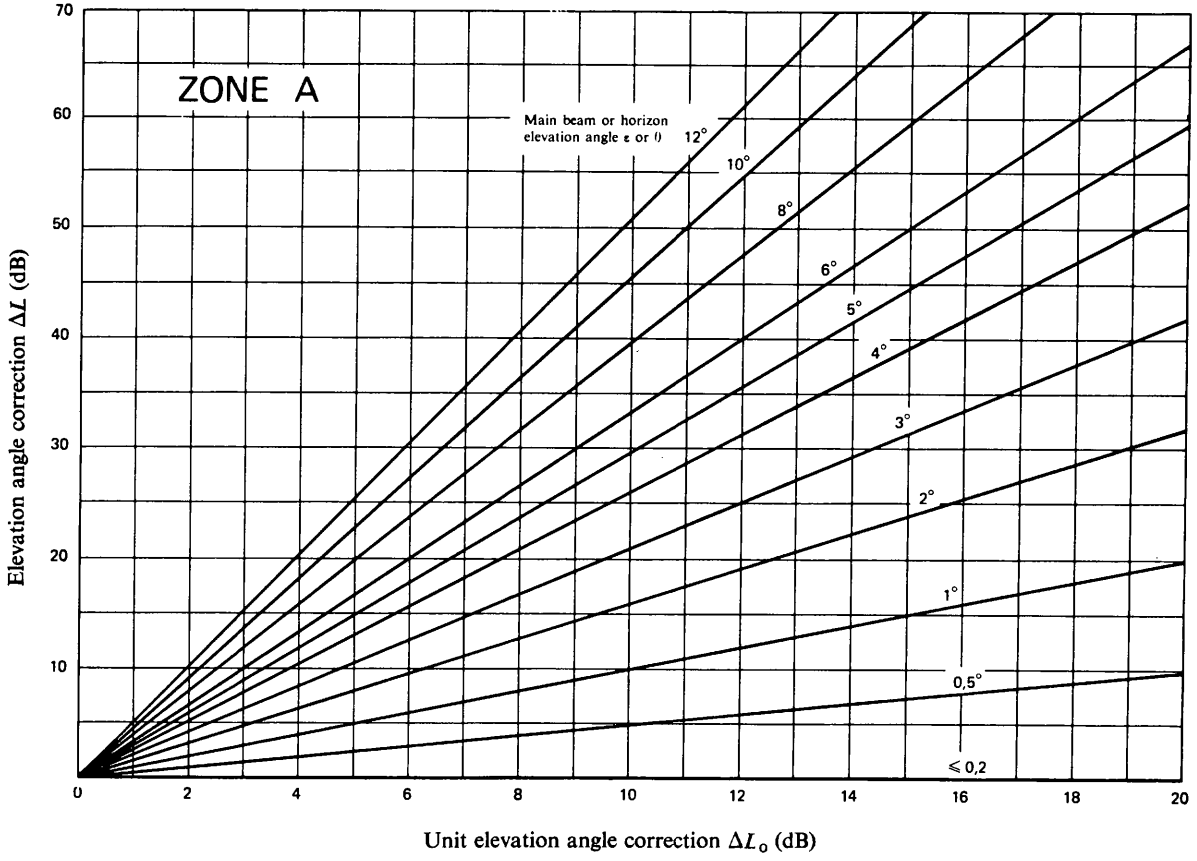


FIGURE 5

Elevation angle correction — Zone A

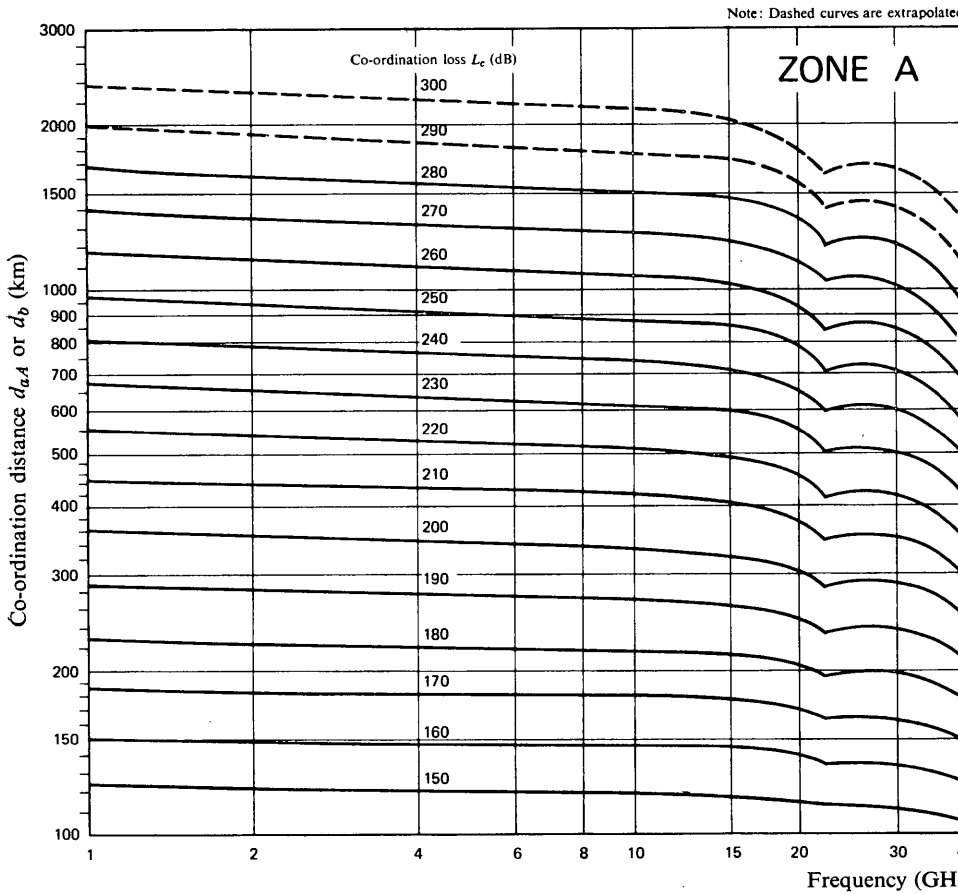


FIGURE 6

Co-ordination distance d_{aA} or d_b as a function of frequency and co-ordination loss — Zone A

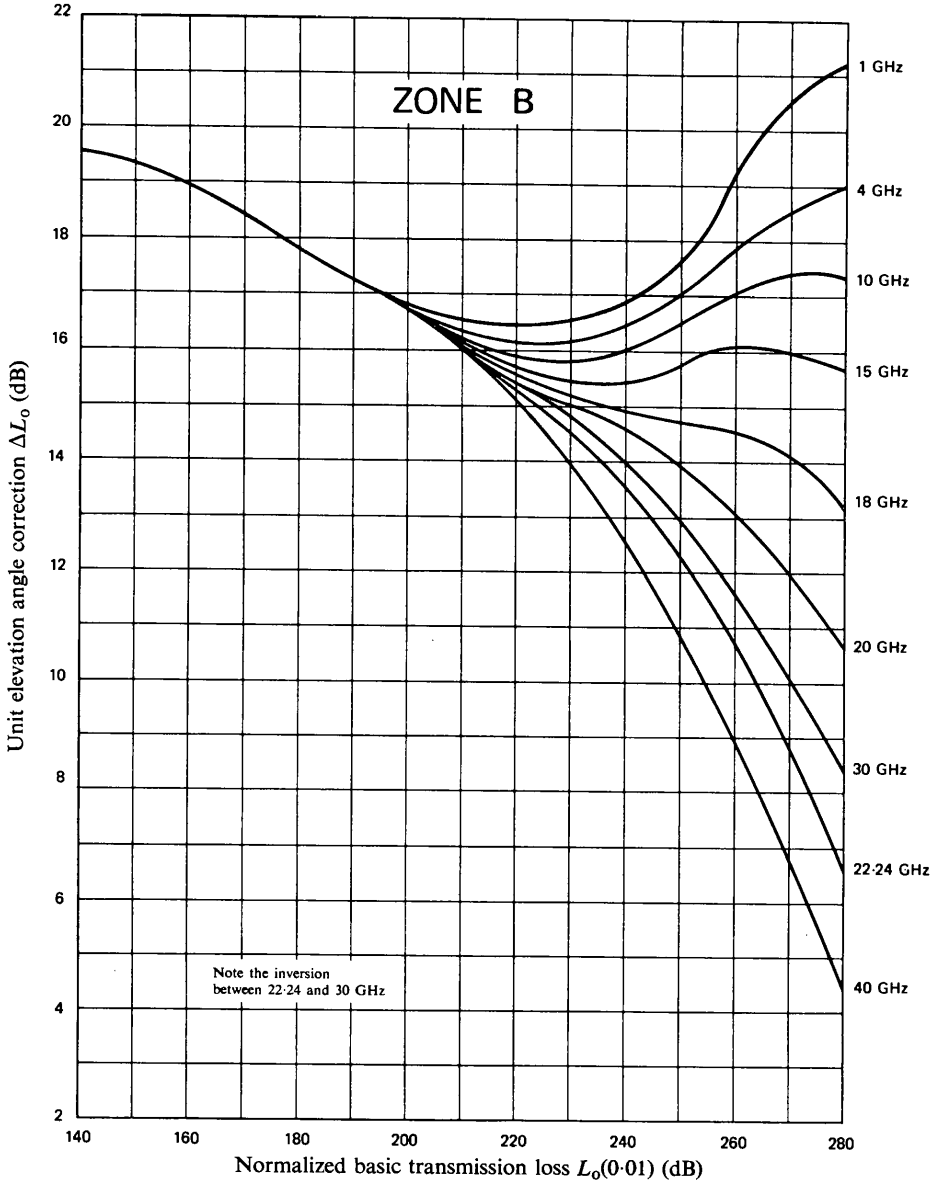


FIGURE 7

Unit elevation angle correction as a function of normalized basic transmission loss and frequency — Zone B

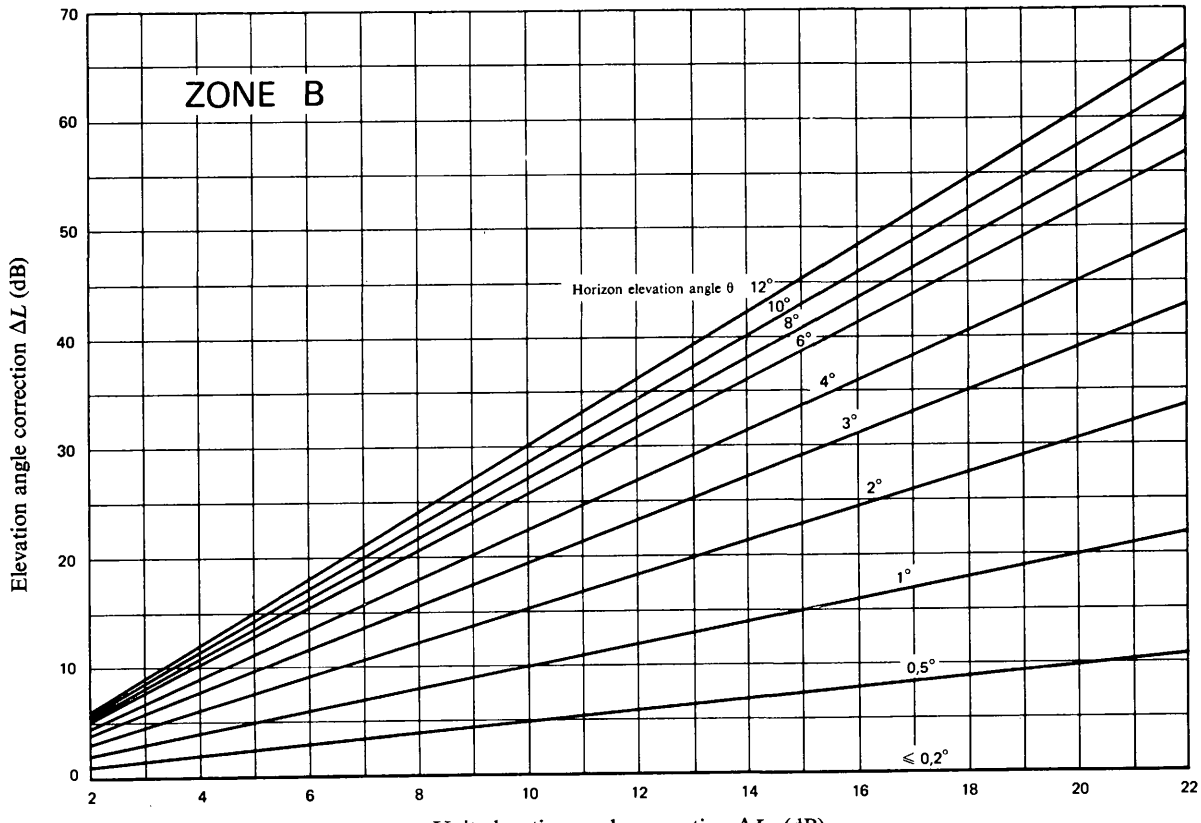


FIGURE 8

Elevation angle correction — Zone B

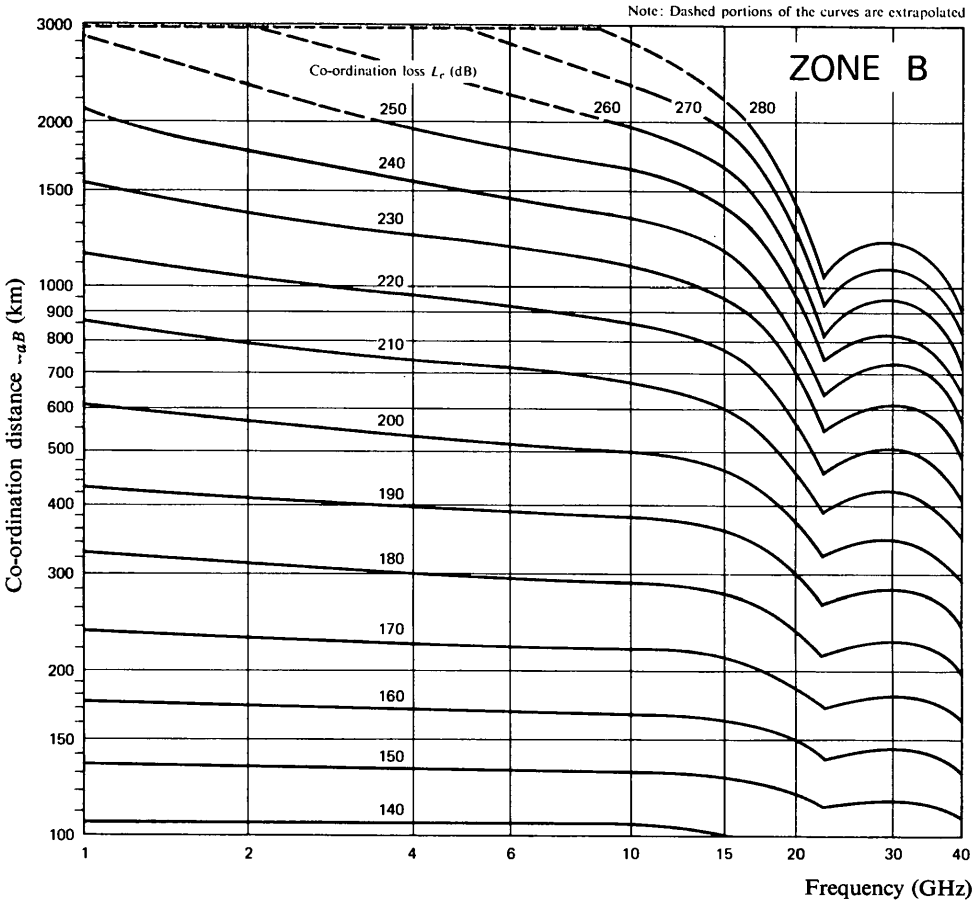


FIGURE 9

Co-ordination distance d_{aB} as a function of frequency and co-ordination loss — Zone B

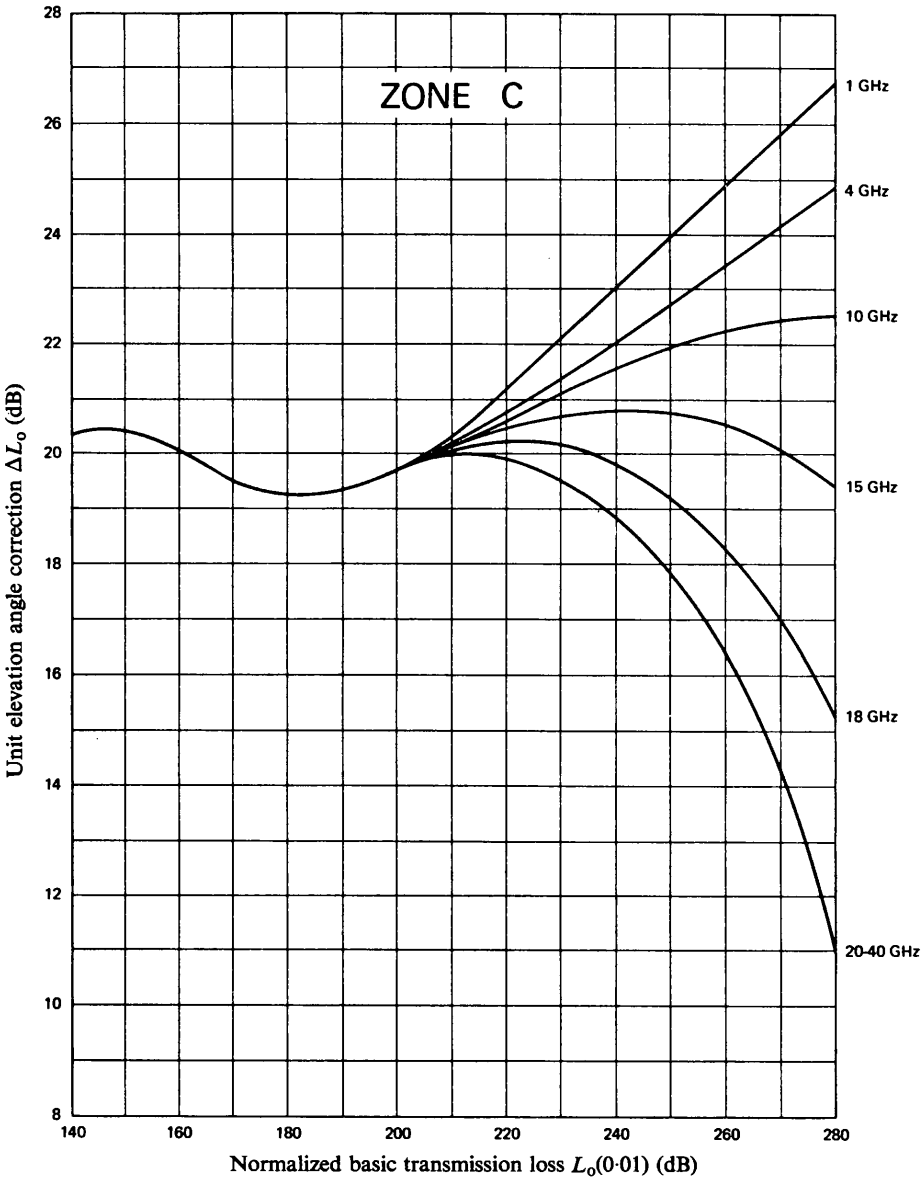


FIGURE 10

Unit elevation angle correction as a function of normalized basic transmission loss and frequency — Zone C

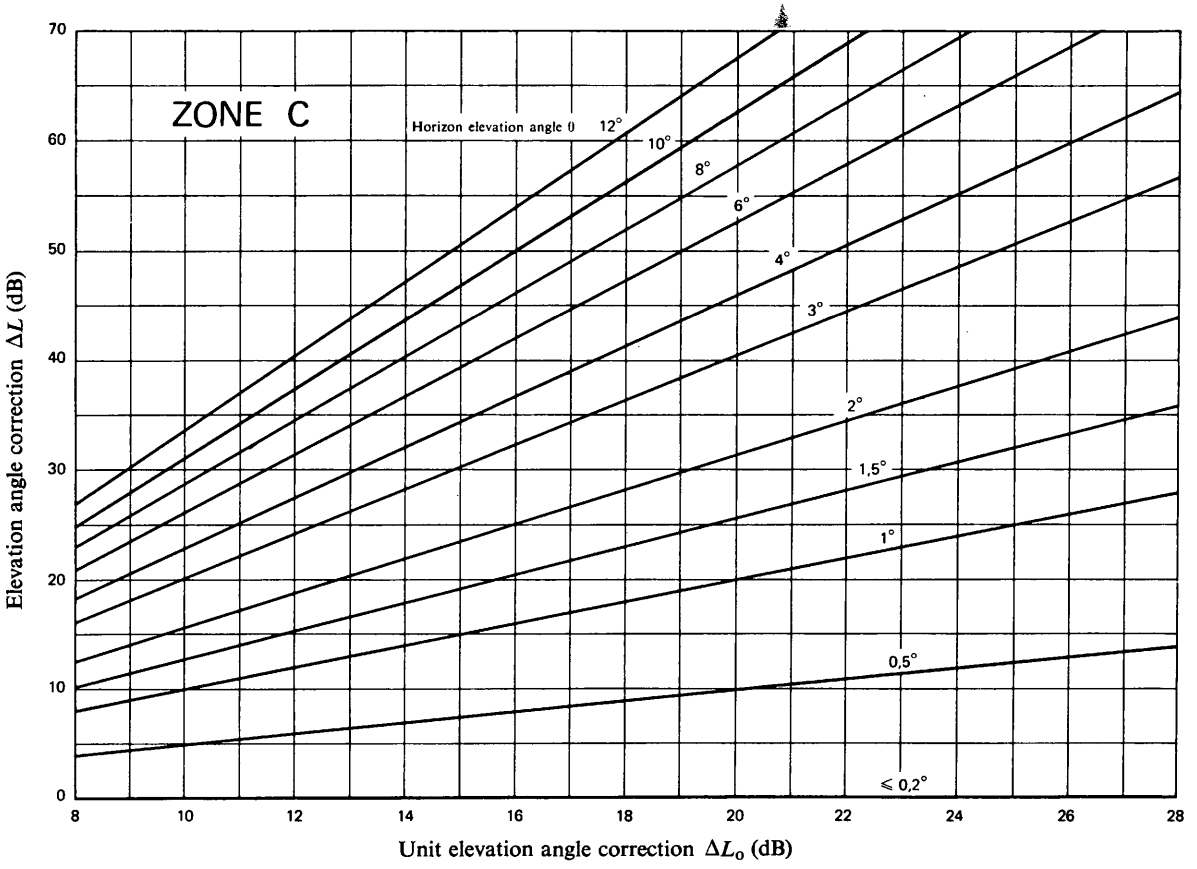


FIGURE 11

Elevation angle correction — Zone C

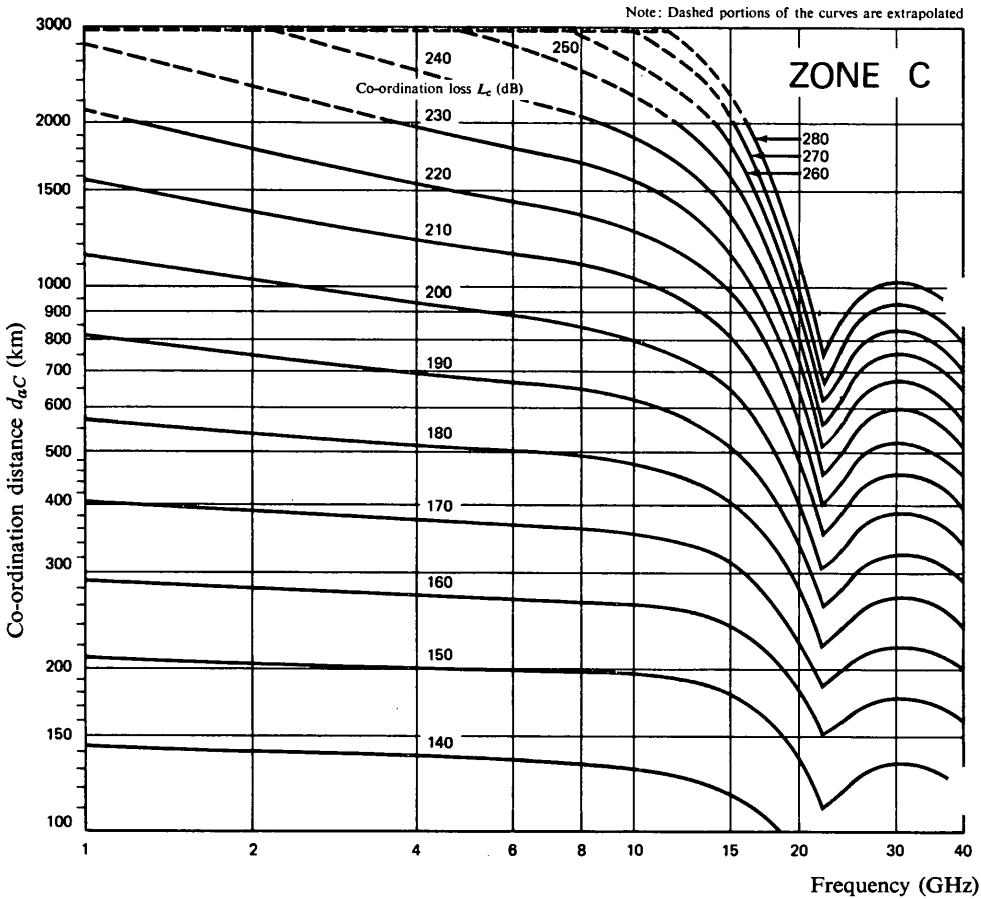


FIGURE 12

Co-ordination distance d_{aC} as a function of frequency and co-ordination loss — Zone C

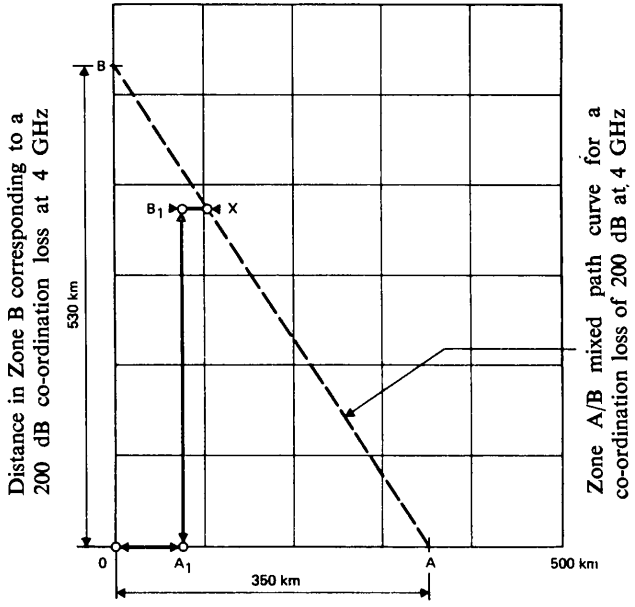


FIGURE 13a

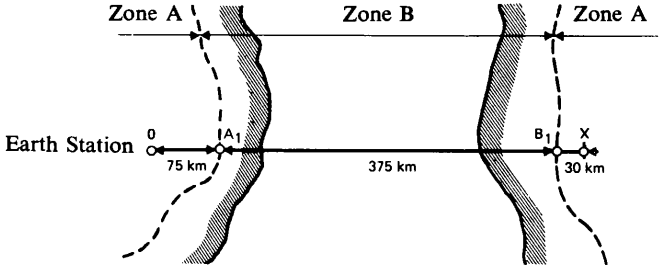


FIGURE 13b

FIGURE 13

Example of the determination of co-ordination distance for a mixed path involving two zones

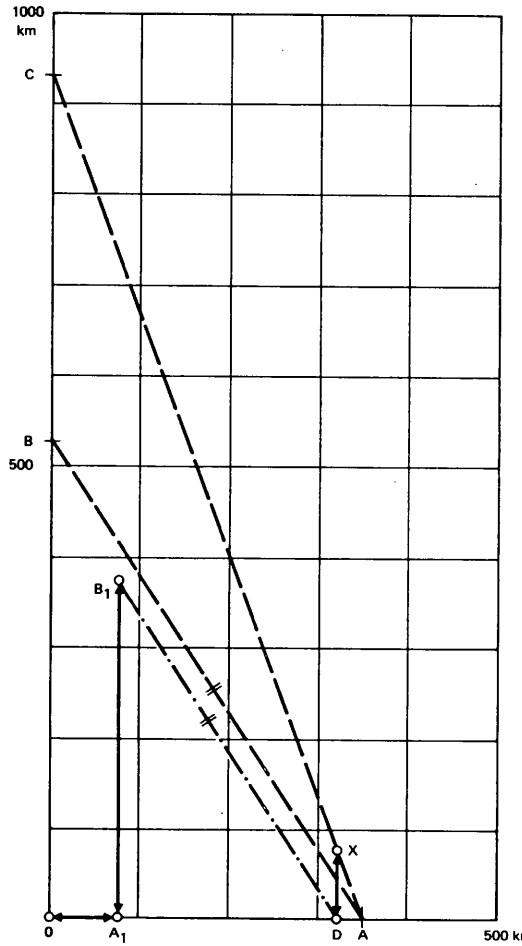


FIGURE 14b

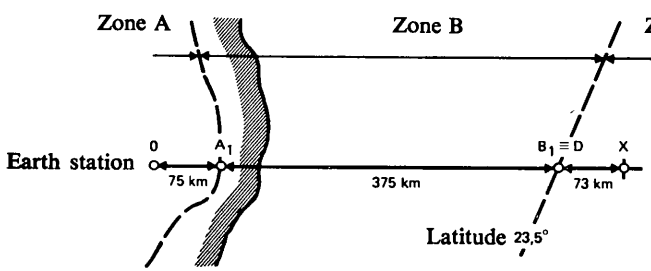


FIGURE 14a

FIGURE 14

Example of the determination of co-ordination distance for a mixed path in volving the three zones

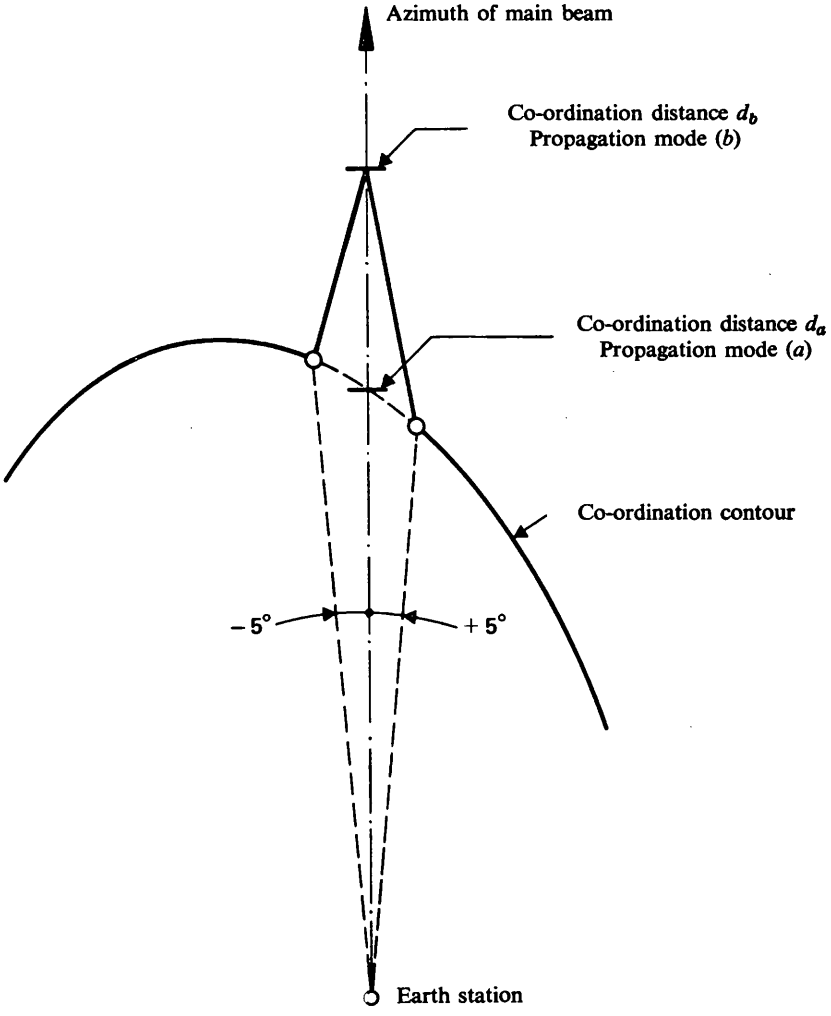
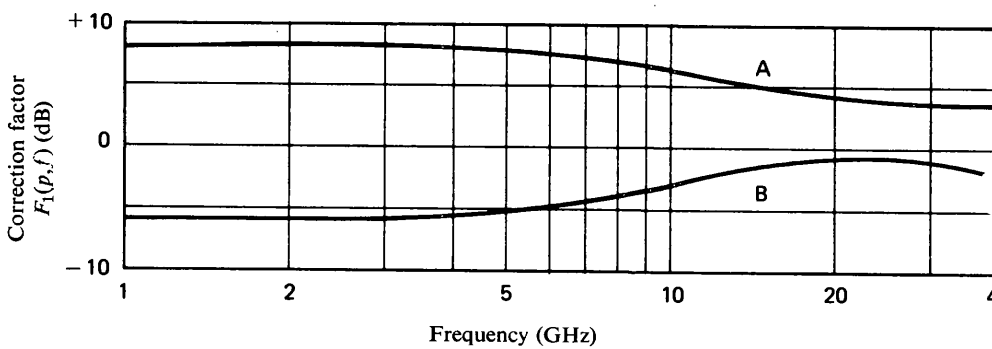


FIGURE 15

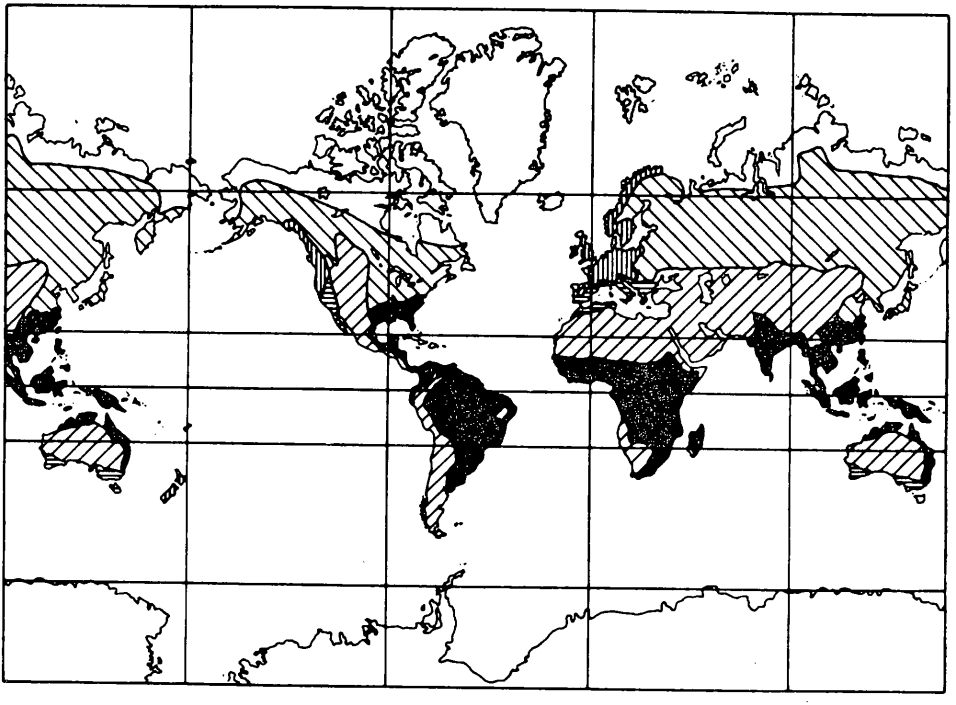
Example of the determination of the co-ordination distance in the case where the elevation of the earth station main beam is less than 12°



A: Correction for 0·1 % of the time } for all rain climatic zones
B: Correction for 0·001 % of the time }

FIGURE 16

Correction factor $F_1(p, f)$ to relate the effective percentage of time to 0·01 %, as a function of frequency for propagation mode (c)



Zone 1
Zone 2
Zone 3
Zone 4
Zone 5

FIGURE 17

Rain-climatic zones of the world

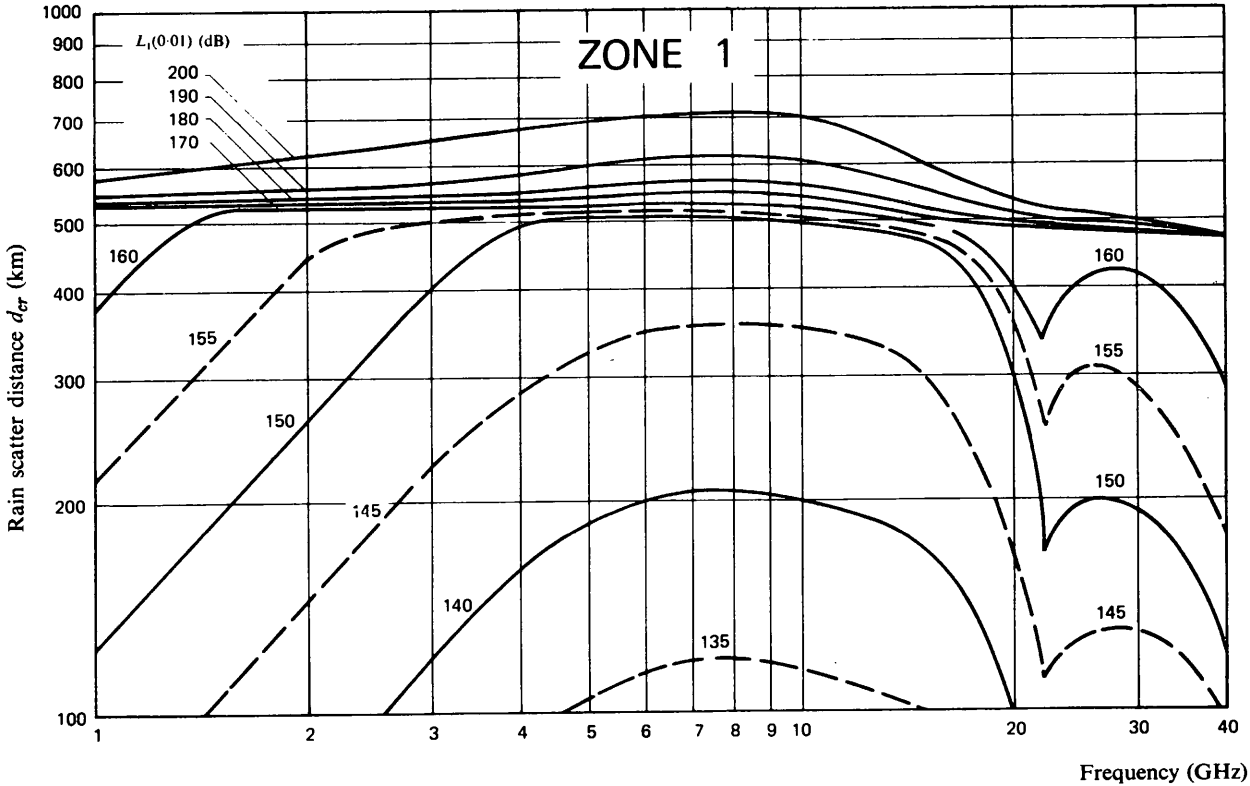


FIGURE 18

Rain scatter distance as a function of frequency and normalized transmission loss — Rain climatic Zone 1 (see figure 17)

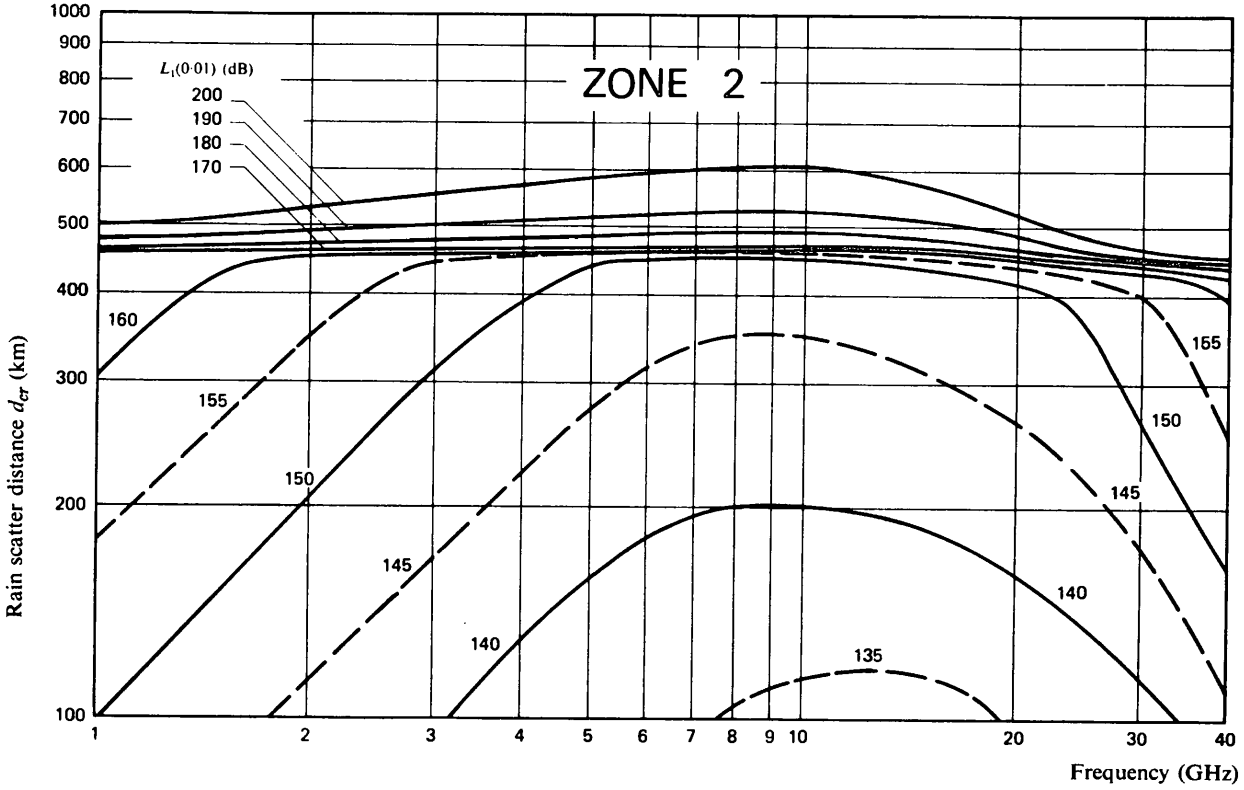


FIGURE 19

Rain scatter distance as a function of frequency and normalized transmission loss — Rain climatic Zone 2 (see figure 17)

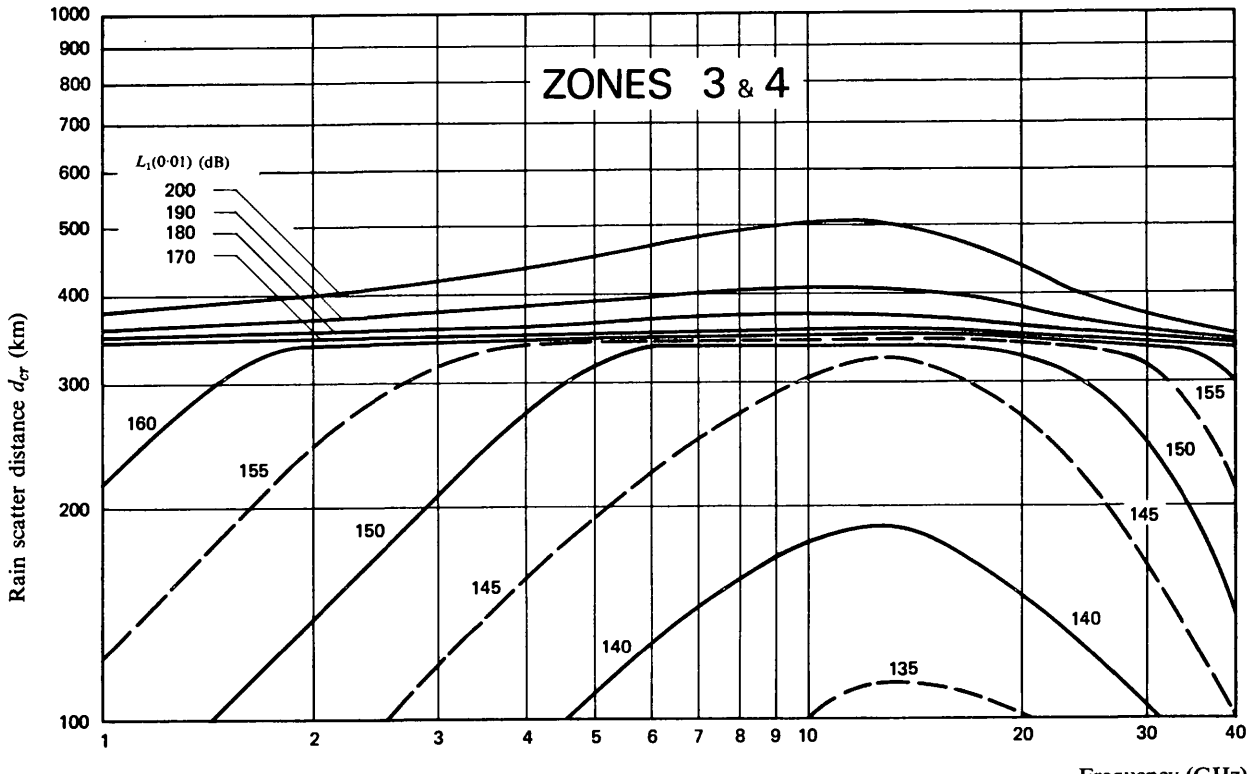


FIGURE 20

Rain scatter distance as a function of frequency and normalized transmission loss — Rain climatic Zones 3 and 4 (see figure 17)

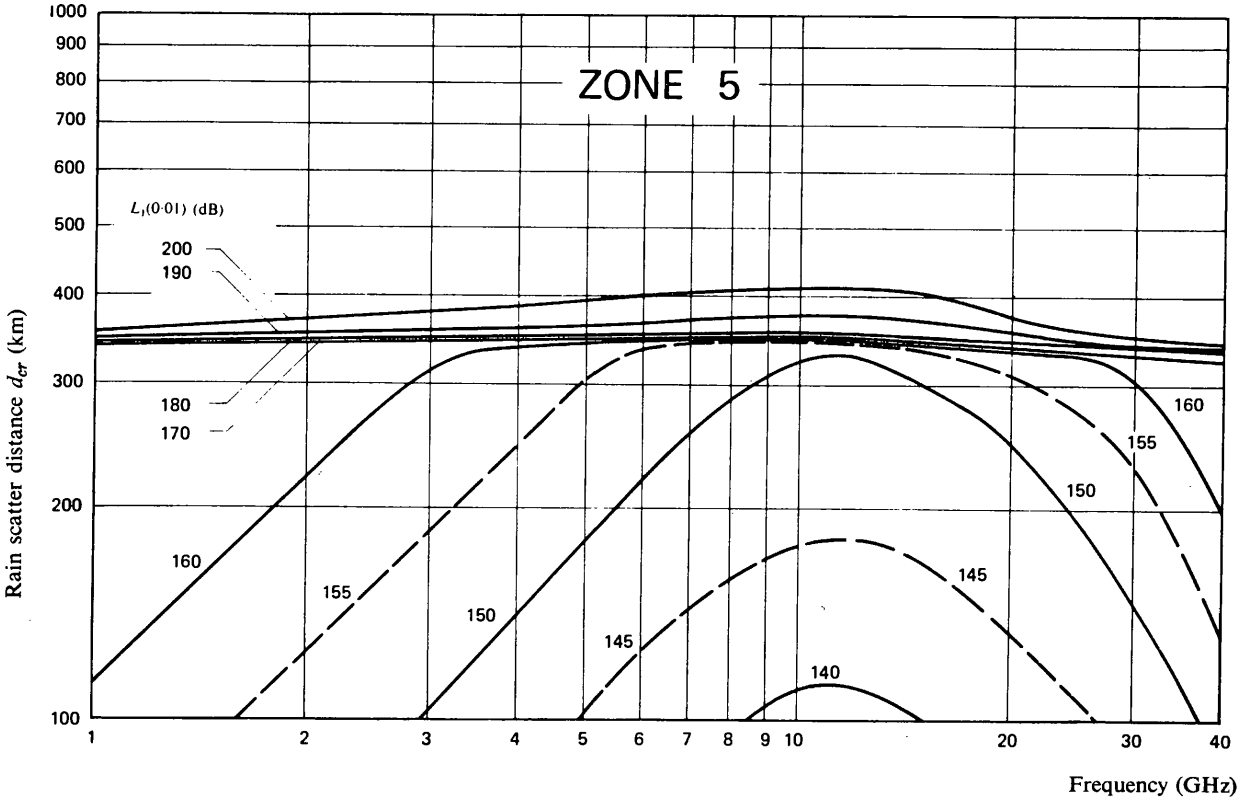


FIGURE 21

Rain scatter distance as a function of frequency and normalized transmission loss — Rain climatic Zone 5 (see figure 17)

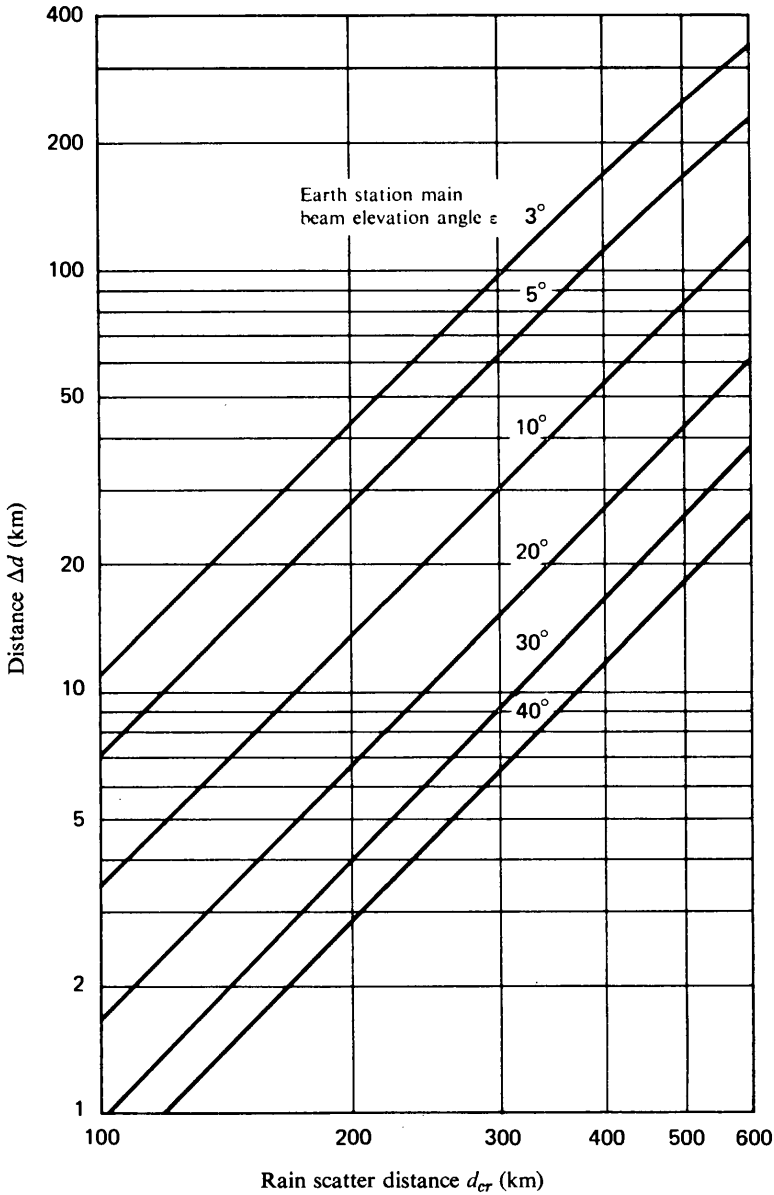
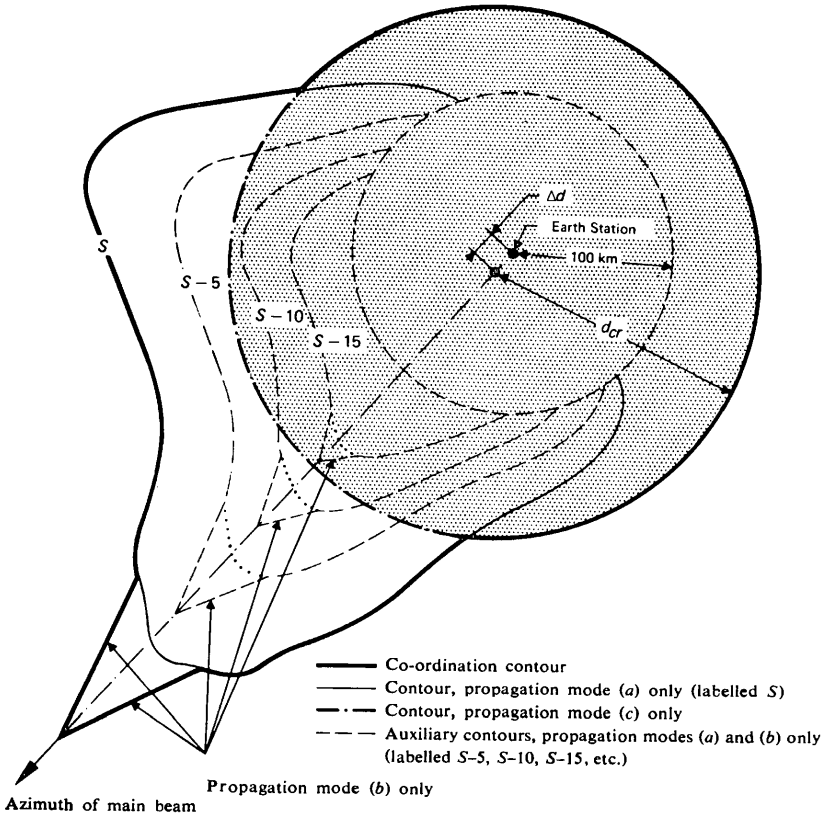


FIGURE 22

Distance Δd as a function of rain scatter distance d_{cr} and earth station main beam elevation angle ε



If by using the auxiliary contours it is seen that a terrestrial station can be eliminated with respect to the great circle propagation mechanism then:

i) if that terrestrial station is outside of the shaded area (rain-scatter mode), it may be eliminated from any further consideration;

ii) if that terrestrial station is within the shaded area (rain-scatter mode), it must still be considered, but simply for the rain-scatter propagation mode only.

FIGURE 23

Example of contours for a transmitting earth station

ANNEX A TO APPENDIX 28

Determination of Co-ordination Distance in allocated Frequency Bands

1. Article 9A of the Radio Regulations requires co-ordination distances to be determined only in the particular frequency bands given in Article 5 of these Regulations and listed in Tables III and IV of this Annex. For each of these frequency bands it is convenient to combine those parameters which depend only upon the frequency and types of system using the band. The resulting value of the combined parameters is then a given constant for a particular allocated frequency band and type of earth station.

Earth station transmission

2. In the bands allocated for earth station transmission (Table III), use is made of constants C_1 and C_2 derived in the following manner:

For propagation by modes (*a*) and (*b*):

$$\begin{aligned} C_1 &= G_r - P_r(p) - 20 \log_{10}(f/4) - F(p) \\ &= S - 20 \log_{10}(f/4) - F(p) \end{aligned}$$

For propagation by mode (*c*):

$$C_2 = -P_r(p) - F_1(p,f) + \Delta G$$

The normalized basic transmission loss $L_0(0{\cdot}01)$ and the normalized transmission loss $L_1(0{\cdot}01)$ are given by:

$$\begin{aligned} L_0(0{\cdot}01) &= P_{t'} + G_{t'} + C_1 \\ L_1(0{\cdot}01) &= P_{t'} + C_2 \end{aligned}$$

The values of C_1 and C_2 for bands allocated for earth station transmission are given in Table III, together with the reference bandwidth (B) which is used in calculating $P_{t'}$.

Earth station reception

3. In the bands allocated for earth station reception (see Table IV) use is made of constants C_3 and C_4 which are derived in the following manner:

For propagation by modes (*a*) and (*b*):

$$C_3 = E - (10 \log_{10} kB + J - W) - F(p) - 20 \log_{10}(f/4)$$

For propagation by mode (*c*):

$$C_4 = P_{t'} - (10 \log_{10} kB + J - W) - F_1(p,f) + \Delta G$$

The normalized basic transmission loss $L_0(0{\cdot}01)$ and the normalized transmission loss $L_1(0{\cdot}01)$ are given by:

$$L_0(0{\cdot}01) = G_r + C_3 - 10 \log_{10} T_r - M(p)$$
$$L_1(0{\cdot}01) = C_4 - 10 \log_{10} T_r - M(p)$$

The values of C_3 and C_4 for bands allocated for earth station reception are given in Table IV.

Flow Diagrams

4. The procedure for determining co-ordination distance is illustrated by Flow Diagrams 1 and 2 in this Annex. The steps required to determine co-ordination distances for a transmitting earth station are shown in Flow Diagram 1, and those for a receiving earth station are shown in Flow Diagram 2. The symbols used in these diagrams are defined in the main text of Appendix 28.

TABLE III

Earth station Transmission (See Flow Diagram 1)

Allocated Frequency Bands (GHz)	C_1 (dBW)	C_2 (dBW)	Reference Bandwidth B (Hz)
1·427 - 1·429	178	127	4×10^3
2·655 - 2·690	196	150	4×10^3
4·400 - 4·700	191	150	4×10^3
5·850 - 6·425	175	136	4×10^3
7·900 - 7·975 8·025 - 8·400	175	138	4×10^3
10·95 - 11·20	172	137	4×10^3
12·50 - 12·75	171	137	4×10^3
14·40 - 14·50	170	137	4×10^3
27·5 - 29·5	142	112	1×10^6

TABLE IV

Earth Station Reception (see Flow Diagram 2)

Allocated frequency Bands (GHz)	Designation of space radiocommunication service		Type of modulating signal (1)	C_3 (dBW)	C_4 (dBW)
1·525 - 1·535	Space operation (Telemetering)				
1·670 - 1·690	Meteorological-satellite				
1·700 - 1·710 / 2·290 - 2·300	Space research	Near Earth			
		Deep space, manned			
2·500 - 2·535	Fixed-satellite		A	277	231
3·400 - 4·200	Fixed-satellite		A	236	194
			N	234	188
7·300 - 7·750	Fixed-satellite		A	230	194
			N	228	186
8·025 - 8·400	Earth exploration-satellite				
8·400 - 8·500	Space research	Near Earth			
		Deep space			
10·95 - 11·20 / 11·45 - 11·70	Fixed-satellite		A	225	184
			N	220	176
11·70 - 12·20 / 12·50 - 12·75	Fixed-satellite		A	224	184
			N	219	176
17·7 - 19·7	Fixed-satellite		N	196	154
21·2 - 22·0	Earth exploration-satellite				

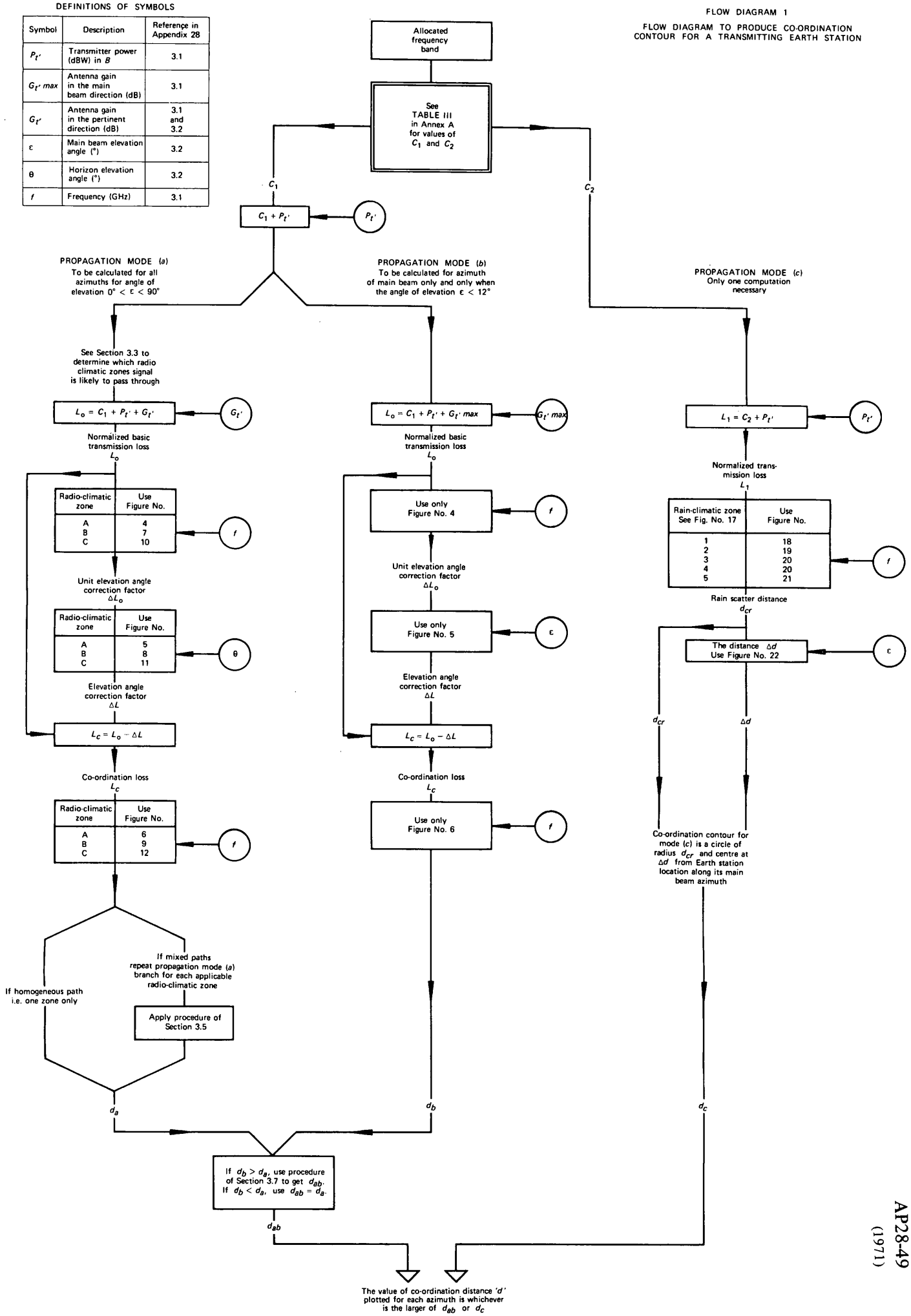
(1) A = Analogue Modulation; N = Digital Modulation.

DEFINITIONS OF SYMBOLS

Symbol	Description	Reference in Appendix 28
$P_{t'}$	Transmitter power (dBW) in B	3.1
$G_{t'}\,max$	Antenna gain in the main beam direction (dB)	3.1
$G_{t'}$	Antenna gain in the pertinent direction (dB)	3.1 and 3.2
ε	Main beam elevation angle (°)	3.2
θ	Horizon elevation angle (°)	3.2
f	Frequency (GHz)	3.1

FLOW DIAGRAM 1

FLOW DIAGRAM TO PRODUCE CO-ORDINATION CONTOUR FOR A TRANSMITTING EARTH STATION

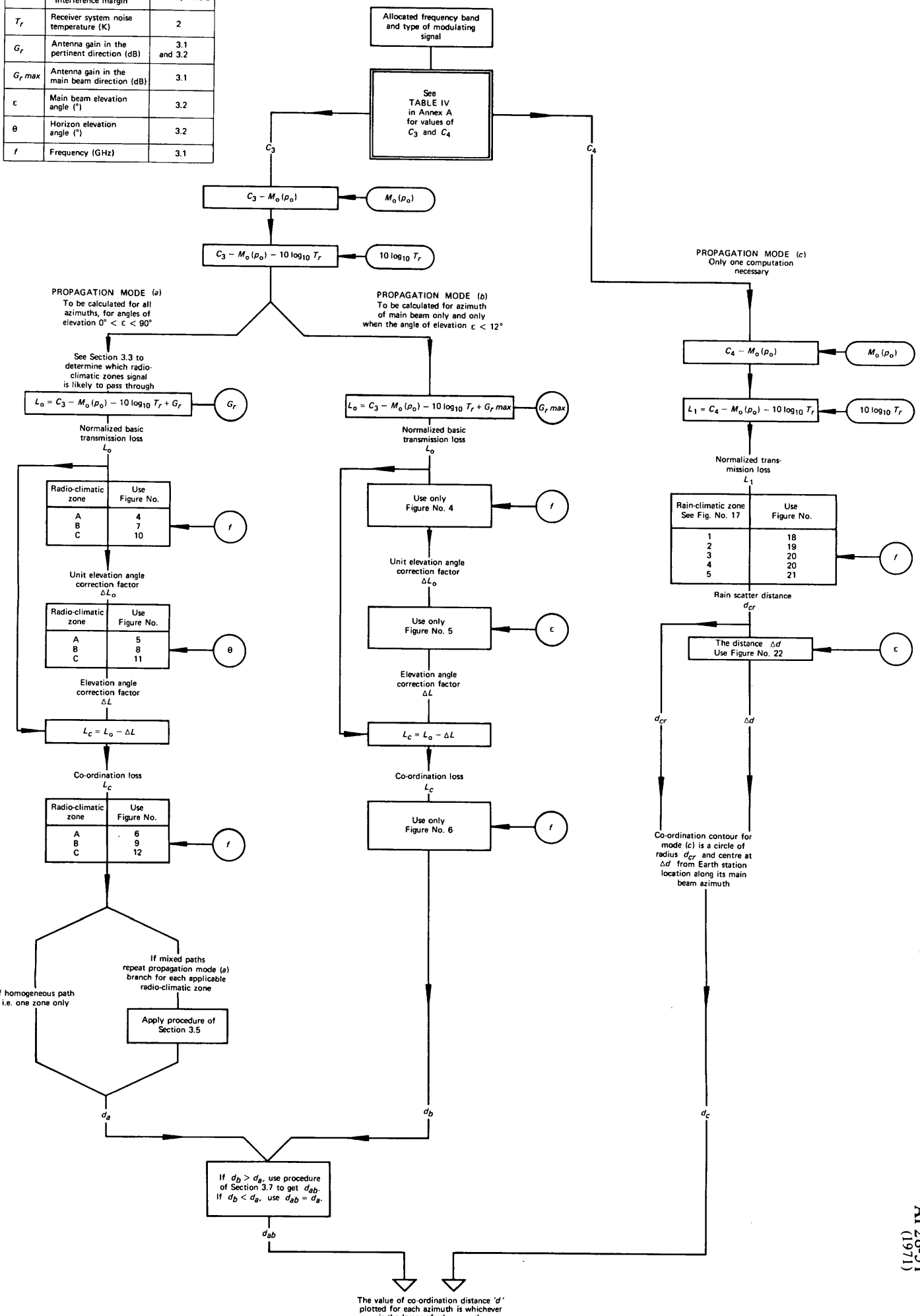


DEFINITIONS OF SYMBOLS

Symbol	Description	Reference in Appendix 28
$M_o(p_o)$	Long term/short term "interference margin"	2, Note 2
T_r	Receiver system noise temperature (K)	2
G_r	Antenna gain in the pertinent direction (dB)	3.1 and 3.2
$G_r max$	Antenna gain in the main beam direction (dB)	3.1
ε	Main beam elevation angle (°)	3.2
θ	Horizon elevation angle (°)	3.2
f	Frequency (GHz)	3.1

FLOW DIAGRAM 2

FLOW DIAGRAM TO PRODUCE CO-ORDINATION CONTOUR FOR A RECEIVING EARTH STATION



ANNEX B TO APPENDIX 28

Determination and Use of auxiliary Contours

1. *Introduction*

For great circle propagation mechanisms, modes (*a*) and (*b*), auxiliary contours are of great value in eliminating certain existing or planned terrestrial stations falling within the co-ordination 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 can be determined, depending on whether the earth station is used for transmission or reception.

2.1 *Transmitting earth station*

The contours are determined in the same way as the corresponding co-ordination contour for propagation modes (*a*) and (*b*), but using terrestrial station interference sensitivity factor S values (in dBW) which are 5, 10, 15, 20 dB, etc. lower than the value (given in Table I of Appendix 28) corresponding to the co-ordination contour.

2.2 *Receiving earth station*

The contours are determined in the same way as the corresponding co-ordination contour, for propagation modes (*a*) and (*b*), but using terrestrial station e.i.r.p. values E (in dBW) which are 5, 10, 15, 20 dB, etc. lower than the value (given in Table II of Appendix 28) corresponding to the co-ordination contour.

3. *Use of auxiliary contours*

The auxiliary contours, the co-ordination contour for great circle propagation (modes (*a*) and (*b*)) and the co-ordination contour for

rain scatter (mode (*c*)) are all plotted on the same diagram for a given shared band. An illustrated example is given in Figure 23 of Appendix 28 for a transmitting earth station.

For each terrestrial station situated within the co-ordination area, a two-stage procedure may be applied, one for the great circle propagation mechanism and the other for rain scatter.

3.1 *Great circle propagation mechanism (modes (a) and (b))*

If a transmitting terrestrial station is outside the co-ordination area corresponding to modes (*a*) and (*b*), it need not be considered further with respect to modes (*a*) and (*b*).

For each transmitting terrestrial station situated within the co-ordination area corresponding to modes (*a*) and (*b*), 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 considerations with respect to modes (*a*) and (*b*).

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 mechanism (mode (c))*

Terrestrial stations eliminated by the above procedure from further consideration with regard to propagation modes (*a*) and (*b*) need, nevertheless, be further considered with regard to propagation mode (*c*) when they lie within the rain scatter co-ordination area.

APPENDIX 29

Method of Calculation to evaluate the Degree of Interference between geostationary Satellite Networks Sharing the same Frequency Bands

1. *Introduction*

The method of calculating interference is based on the concept that the noise temperature of the system receiving interference increases as the level of the interference 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 (1) resulting from interference caused by a given system is calculated and this value is compared with a predetermined increase in the noise temperature (see section 3 below).

2. *Calculation of the increase in noise temperature of the satellite link receiving interference*

Let A and A′ be the satellite links (2) of the two satellite networks considered. Primes indicate the parameters of satellite link A′; the notation without primes is used for the parameters of satellite link A.

The parameters are defined as follows (for satellite link A):

ΔT_s = increase in the receiver noise temperature of the satellite S caused by interference in the receiver of this satellite (K);

---

(1) See No. **103A.**

(2) See No. **84AFC.**

ΔT_e = increase in the receiver noise temperature of the earth station e_R caused by interference in the receiver 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);

$g_3(\eta_{e'})$ = transmitting antenna gain of satellite S in the direction of the receiving earth station e'_R of satellite link A′ (numerical power ratio);

Note: the product $p_s\, g_3(\eta_{e'})$ is the maximum equivalent isotropically radiated power per Hz of satellite S in the direction of the receiving earth station e'_R of satellite link A′;

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);

$g_2(\delta_{e'})$ = receiving antenna gain of satellite S in the direction of the transmitting earth station e'_T (numerical power ratio);

$g_1(\theta)$ = transmitting antenna gain of the earth station e_T in the direction of satellite S′ (numerical power ratio);

$g_4(\theta)$ = receiving antenna gain of the earth station e_R in the direction of satellite S′ (numerical power ratio);

k = Boltzmann's constant (J/K);

l_d = free-space transmission loss on the down-path (numerical power ratio) (*);

l_u = free-space transmission loss on the up-path (numerical power ratio) (*);

(*) To simplify the calculation it was assumed that:

— basic transmission loss on the down-path is the same regardless of the satellite and earth station considered;

— basic transmission loss on the up-path is the same regardless of the earth station and satellite considered.

γ = transmission gain of the satellite link evaluated from the output of the receiving antenna of the space station S to the output of the receiving antenna of the earth station e_R (numerical power ratio, usually less than 1);

θ = geocentric angular separation between two satellites (degrees) (*).

The parameters ΔT_s and ΔT_e are given by the following equations:

$$\Delta T_s = \frac{p'_e \, g'_1(\theta) \, g_2(\delta_{e'})}{kl_u} \tag{1}$$

$$\Delta T_e = \frac{p'_s \, g'_3(\eta_e) \, g_4(\theta)}{kl_d} \tag{2}$$

The symbol ΔT will be used to denote the apparent increase in the equivalent noise temperature for the entire satellite link at the receiver input of the receiving station e_R due to interference from link A′.

This increase is the result of interference entering at both the satellite and earth station receiver of link A and can accordingly be expressed as:

$$\Delta T = \gamma \Delta T_s + \Delta T_e \tag{3}$$

Hence,

$$\Delta T = \gamma \frac{p'_e \, g'_1(\theta) \, g_2(\delta_{e'})}{kl_u} + \frac{p'_s \, g'_3(\eta_e) \, g_4(\theta)}{kl_d} \tag{4}$$

Equation (4) combines both the up-path and the down-path interference. If there is a change of modulation in the satellite or if the translation frequencies of the wanted and interfering satellites are different then it may be necessary to treat up and down paths separately using equations (1) and (2).

(*) To simplify the calculation it was assumed that the topocentric angular separation between the two satellites as seen from any earth station is identical to the geocentric angular separation between the two satellites.

In the foregoing equations, the gains $g_1'(\theta)$ and $g_4(\theta)$ are those of the earth stations concerned. Unless more precise actual data are available, an appropriate reference radiation pattern may be used to express the gain $g_1'(\theta)$ and $g_4(\theta)$ in a direction forming an angle θ with the direction of maximum radiation. In the event that precise numerical data are not available, the reference radiation pattern $32 - 25 \log_{10}\theta$ shall be used for earth station antennae for which the ratio *diameter/wavelength* exceeds 100.

In the same way, the increase $\Delta T'$ in the equivalent noise temperature for the entire satellite link at the receiver input of the receiving earth station e_R' under the effect of the interference caused by satellite link A is given by the following equations:

$$\Delta T'_{s'} = \frac{p_e\, g_1(\theta)\, g_2'(\delta_e)}{kl_u} \tag{5}$$

$$\Delta T'_{e'} = \frac{p_s\, g_3(\eta_{e'})\, g_4'(\theta)}{kl_d} \tag{6}$$

$$\Delta T' = \gamma' \frac{p_e\, g_1(\theta)\, g_2'(\delta_e)}{kl_u} + \frac{p_s\, g_3(\eta_{e'})\, g_4'(\theta)}{kl_d} \tag{7}$$

For two multiple-access satellites this calculation must be made for each of the satellite links established via one satellite in relation to each of the satellite links established via the other satellite.

3. *Comparison between calculated and predetermined percentage increase in equivalent satellite link noise temperature*

The calculated values of ΔT and $\Delta T'$ shall be compared with the corresponding predetermined values. These predetermined values are taken as 2% of the appropriate equivalent satellite link noise temperatures:

— if the calculated value of ΔT is less than the predetermined one, the interference level from satellite link A′ to satellite link A is permissible irrespective of the modulation characteristics of the two satellite links and of the precise frequencies used;

— if the calculated value of ΔT is more than the predetermined one, a detailed calculation shall be carried out following the methods and techniques set out in the relevant C.C.I.R. Reports and Recommendations.

The comparison of $\Delta T'$ with the predetermined value shall be carried out in a similar manner.

As an example, it can be seen that in the case of a satellite link operating in accordance with current C.C.I.R. Recommendations, using FM telephony and having a total noise in a telephone channel of 10 000 pW0p including 1 000 pW0p interference noise from terrestrial radio-relay systems and 1 000 pW0p interference noise from other satellite links, a 2% increase in equivalent noise temperature would correspond to 160 pW0p of interference noise.

The list of basic characteristics to be furnished for each network is given in Appendix 1B to the Radio Regulations. A detailed illustration of the interference calculation in the case of two geostationary satellite links is given in the Annex to this Appendix.

4. *Determination of the satellite links to be considered in calculating the increase in equivalent satellite link noise temperature from the data furnished for the advance publication of a satellite network*

The greatest increase in equivalent satellite link noise temperature caused to any link of another satellite network, existing or planned, by interference produced by 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 suffering 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 interfered with is the greatest.

The most unfavourably sited receiving earth station of the network suffering 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.

When the satellite of the network suffering interference is equipped with simple frequency-translating transponders the above determinations are made in pairs, one for the receiving antenna of a particular transponder and one for the "space-to-Earth" service area associated with the transmitting antenna of that transponder.

The calculation procedure described above may be used to determine the greatest increase in equivalent noise temperature caused to any satellite link in a proposed satellite network by interference produced by any other satellite network.

ANNEX TO APPENDIX 29

Example of an Interference Calculation between two geostationary Satellite Links Sharing the same Frequency Band

A. General

In this example, for simplicity, two identical satellite networks are assumed with $\theta = 6°$ geocentric angular spacing between the satellites. For this angular separation the reference radiation pattern of the earth station antenna ($32 - 25 \log_{10}\theta$) gives a gain of 12·5 dB in the direction of the satellite of the other network.

The calculations have been performed in dB, which means that numerical multiplications thus become dB additions and numerical divisions become dB subtractions. In each step, the contributing factors have been introduced in a sequence corresponding to the propagation direction. The first three steps define the system parameters for each link. Steps 4, 5 and 6 perform the actual interference calculations.

To determine the equivalent link noise temperature it is necessary to know the ratio between the total internal link noise and the thermal noise of the down-path. The noise budget for this example is assumed as follows:

Noise budget

Internal noise 8 000 pW0p	Thermal noise (down-path)	5 000 pW0p
	Thermal noise (up-path)	1 000 pW0p
	Intermodulation noise	2 000 pW0p
External noise 2 000 pW0p	Interference noise from links using other satellites	1 000 pW0p
	Interference noise from terrestrial systems	1 000 pW0p
	Total noise	10 000 pW0p

It may be noted that since both satellites use global beams, essentially no antenna discrimination between wanted and unwanted signals is obtained at the satellite and that this constitutes a worst case.

B. System parameters

	Symbol	Link A or A′	Unit
Step 1) *Up-path at 6 175 MHz*			
Maximum power density per Hz delivered to the antenna of the transmitting earth station in the worst 4 kHz band	p_e	−37	dBW/Hz
Earth station antenna gain	g_1	62·5	dB
Free space loss 38 500 km at 6 175 MHz	l_u	200	dB
Satellite antenna gain (using global beam)	g_2	15·5	dB
Receiver input at satellite $p_e + g_1 - l_u + g_2$		−159	dBW/Hz
Step 2) *Down-path at 3 950 MHz*			
Maximum power density per Hz delivered to the satellite antenna in the worst 4 kHz band	p_s	−57	dBW/Hz
Satellite transmitting antenna gain	g_3	15·5	dB
Free space loss for 38 500 km at 3 950 MHz	l_d	196	dB
Earth station receiv. antenna gain	g_4	58·5	dB
Receiver input at earth station $p_s + g_3 - l_d + g_4$		−179	dBW/Hz
Step 3) *Link calculations*			
Transmission gain from satellite receiver input to earth station receiver input 159 dB − 179 dB	γ	−20	dB

	Symbol	Link A or A′	Unit
Earth station noise temperature (giving G/T = 40·7 dB)		60	K
Thermal noise down-path (see noise budget)		5 000	pW0p
Total internal link noise (see noise budget)		8 000	pW0p
Equivalent link noise temperature $\frac{8\,000}{5\,000} \times 60$	T	96	K

C. *Interference calculation*

Step 4)	*Up-path interference*			
	Interfering earth station power density (as in Step 1)	p_e'	−37	dBW/Hz
	Interfering earth station antenna gain towards interfered satellite (6° off beam)	$g_1'(\theta)$	12·5	dB
	Free space loss for 38 500 km at 6 175 MHz (see Step 1)	l_u	200	dB
	Satellite antenna gain in the direction of the interfering earth station	$g_2(\delta_e')$	15·5	dB
	Boltzmann's constant $1{\cdot}38 \times 10^{-23}$ J/K	k	−228·6	dBW/K
	Increase in receiver noise temperature of the satellite $p_e' + g_1'(\theta) - l_u + g_2(\delta_e') - k$ (in logarithmic units)		19·6	
	Increase in receiver noise temperature of the satellite	ΔT_s	91	K
Step 5)	*Down-path interference*			
	Interfering satellite transmitter power density (as in Step 2)	p_s'	−57	dBW/Hz

	Symbol	Link A or A′	Unit
Interfering satellite antenna gain towards interfered earth station	$g'_3(\eta_e)$	15·5	dB
Free space loss for 38 500 km at 3 950 MHz (see Step 2)	l_d	196	dB
Earth station antenna gain in the direction of the interfering satellite (6° off beam)	$g_4(\theta)$	12·5	dB
Boltzmann's constant $1{\cdot}38 \times 10^{-23}$ J/K	k	−228·6	dBW/K
Increase in receiver noise temperature of the earth station $p'_s + g'_3(\eta_e) - l_d + g_4(\theta) - k$ (in logarithmic units)		3·6	
Increase in receiver noise rempera-ture of the earth station	ΔT_e	2·29	K
Step 6) *Total link interference*			
Increase in satellite noise temperature (from Step 4)	ΔT_s	91	K
Numerical value for γ (from Step 3)	γ	0·01	numerical
Increase in receiver noise temperature of the earth station (from Step 5)	ΔT_e	2·29	K
Increase in equivalent link noise temperature $\gamma\Delta T_s + \Delta T_e = 0{\cdot}01 \times 91 + 2{\cdot}29$	ΔT	3·2	K
Percentage increase $\frac{3{\cdot}2}{96} \times 100\%$	$(\Delta T/T) \times 100\%$	3·33	%
Increase in link noise due to interference (3·33/100) × 8 000 pW0p		266	pW0p

D. *Conclusions*

In the example shown, the increase in equivalent satellite link noise temperature is 3.33%. Since it exceeds the predetermined value of 2%, the amount of noise introduced can no longer be considered permissible and therefore co-ordination between the two networks is required. More precise calculations should now be made using, in particular, the actual

antenna patterns of the earth stations, the topocentric angular separation of the satellites, and the precise basic transmission losses. There may be additional factors such as polarization discrimination, frequency interleaving, spectral distribution of the interference which all reduce the calculated interference.

It can be shown that for this example a larger satellite spacing of 7·4° would have caused only 2% increase in equivalent link noise temperature and thus obviated the need for any co-ordination.

RESOLUTION No.Spa 1

Relating to the Provision and Use of Information Regarding International Satellite Systems

(Abrogated by Resolution No. **Spa2**-*8)*

RESOLUTION No.Spa 2

Relating to Space Vehicles in Distress and Emergency

(Abrogated by Resolution No. **Spa2**-*8)*

RESOLUTION No.Spa 3

Relating to the Category of the Fixed and Mobile Services in the Band 1 525-1 540 Mc/s

(Abrogated by Resolution No. **Spa2**-*8)*

RESOLUTION No. Spa2 – 1

Relating to the Use by all Countries, with equal Rights, of Frequency Bands for Space Radiocommunication Services

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

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 requirements and readiness of technical facilities of countries;

resolves

1. that the registration with the I.T.U. 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 I.T.U. 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. **Spa2** – 2

Relating to the Establishment of Agreements and Associated Plans for the Broadcasting-Satellite Service

The World Administrative Radio Conference for Space Telecommunication (Geneva, 1971),

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, from the date of their bringing 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;

2. that the Administrative Council be requested to examine as soon as possible the question of a World Administrative Conference, and/or Regional Administrative Conferences as required, with a view to fixing suitable dates, places and agenda;

3. that during the period before the entry into force of such agreements and associated plans the administrations and the I.F.R.B. shall apply the procedure contained in Resolution No. **Spa2**–3.

RESOLUTION No. **Spa2** – 3

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

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

a) that while Resolution No. **Spa2**–2 has been adopted by this Conference, envisaging 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 procedure specified in Article 9A of the Radio Regulations contains no provisions for co-ordination between space stations in the broadcasting-satellite service and terrestrial stations and between space stations in that service and space systems of other administrations;

resolves

1. that the following procedure shall be applied until agreements and associated plans pursuant to Resolution No. **Spa2**–2 enter into force:

Section A: Co-ordination Procedure between Space Stations in the Broadcasting-Satellite Service and Terrestrial Stations

2.1 Before an administration notifies to the I.F.R.B. 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 co-ordinate 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 1A to the Radio Regulations, which are necessary to assess the risk of interference to a terrestrial radiocommunication service[1].

2.2 The Board shall publish this information in a special section of

[1] The technical data to be used in effecting co-ordination should be based on the most recent C.C.I.R. Recommendations as accepted by the administrations concerned under the terms of Resolution No. **Spa2**-6. In the absence of relevant C.C.I.R. Recommendations, the technical data to be used in effecting co-ordination shall be determined by agreement among the administrations concerned.

its weekly circular and shall also, when the weekly circular contains such information, so advise all administrations by circular telegram.

2.3 Any administration which considers that its terrestrial radiocommunication services may be affected shall forward its comments to the administration seeking co-ordination and, in any case, to the Board. These comments must be forwarded within one hundred and twenty days from the date of the relevant I.F.R.B. 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 or, if this is not possible, send to the administration seeking co-ordination all the data on which its comments are based as well as any such suggestions as 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 co-ordination procedure.

2.6 If the assistance of the Board has been sought and there is a continuing disagreement between the administration seeking co-ordination and the administration which has forwarded its comments, the administration seeking co-ordination may, after a total period of one hundred and eighty days, from the date of the relevant I.F.R B. weekly circular, send to the Board its notice concerning the frequency assignment in question.

Section B: Co-ordination 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 co-ordination

with space systems of other administrations, apply the following provisions of Article 9A of the Radio Regulations:

3.1 Nos. **639AA** to **639AI** inclusive.

3.2.1 No. **639AJ** [1].

3.2.2 No co-ordination 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. **639AL**, **639AM**, **639AO**, **639AS** *a*), *c*), *e*), *f*), **639AT**, **639AU**, **639AV**, **639AW**, **639AX**, **639AY**, **639AZ**.

Section C: Notification, Examination and Recording in the Master Register of Assignments to Space Stations in the Broadcasting-Satellite Service dealt with under this Resolution

4.1 Any frequency assignment [2] 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. **639BE**, **639BF** and **639BG** of the Radio Regulations.

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[1] The technical data to be used in effecting co-ordination should be based on the most recent C.C.I.R. Recommendations as accepted by the administrations concerned under the terms of Resolutions No. **Spa2**-6. In the absence of relevant C.C.I.R. Recommendations, the technical data to be used in effecting co-ordination shall be determined by agreement among the administrations concerned.

[2] 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 *Master Register*).

4.2 Notices made under paragraph 4.1 shall initially be treated in accordance with No. **639BH** of the Radio Regulations.

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 co-ordination procedures and to the probability of harmful interference);

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

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. **501** or **639BM** 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. **501** or **639BM** 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 and with such suggestions as the Board may be 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 co-ordination 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 prejudge in any way the decisions to be included in the agreements and associated plans referred to in Resolution No. **Spa2**–2.

6.5 Where the Board finds that the co-ordination 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 and with such suggestions as the Board may be able to offer with a view to a satisfactory solution of the problem.

6.6 Where the notifying administration resubmits the notice and the Board finds that the co-ordination procedures have been successfully completed with all administrations whose services may be affected, the assignment shall be treated as indicated in paragraph 6.4.

6.7 Where the notifying administration resubmits the notice and states that it has been unsuccessful in endeavouring to effect the co-ordination, the notice shall be examined by the Board with respect to paragraph 5.5.

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 co-ordination 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 and with such suggestions as the Board may be 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 one hundred and twenty days 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 paragraphs 5.2, 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. **639CP**

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. **639BM**, **639BN**, **639BO**, **639BP**, **639BQ** and **639BR** of the Radio Regulations, 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. **501** of the Radio Regulations, 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 paragraph 5.2 of this Resolution, or with No. **501**, **570AB** or **639BM** of the Radio Regulations, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

RESOLUTION No. Spa2-4

Relating to the experimental Use of Radio Waves by Ionospheric Research Satellites

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

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 and ISIS 1 and 2 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;

resolves

that administrations may continue to permit the transmission 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 the transmission from these satellites as required by No. **470V** of the Radio Regulations to prevent harmful interference to other services.

RESOLUTION No. Spa2 – 5

Relating to the Use of the Band 156 – 174 MHz by the Maritime Mobile-Satellite Service

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

a) that there is a need to develop the use of space radiocommunication techniques to meet the future requirements of the maritime mobile service;

b) that, of the bands used at present by the maritime mobile service, there may be advantages in using for the maritime mobile-satellite service narrow channels between 156 and 174 MHz for safety and distress;

recognizing

a) that the maritime mobile bands between 156 and 174 MHz are also used for other services;

b) that the power flux densities laid down by maritime satellites in this band may cause harmful interference to terrestrial receivers and that the satellite receiver may suffer harmful interference from terrestrial radiocommunication transmissions;

c) that the terrestrial maritime mobile service makes extensive use of the channels given in Appendix 18 to the Radio Regulations;

is of the opinion

that it is important for the maritime mobile satellite service to be able to use some narrow channels, on an exclusive basis, for safety and distress as soon as practicable;

having provided for

the possible use of narrow channels for safety and distress by the maritime mobile-satellite service in bands 157·3125 - 157·4125 MHz and 161·9125 - 162·0125 MHz not earlier than 1 January 1976 (see No. **287A** of the Radio Regulations);

resolves

that the World Administrative Radio Conference for Maritime Mobile Telecommunications to be held in 1974 be invited to consider this matter further and to decide if and to what extent the maritime mobile-satellite service should be introduced in the above bands on an exclusive basis and to make any consequential changes in the Radio Regulations and in the provisions governing the use of the channels in Appendix 18 to the Radio Regulations;

requests the Secretary-General

to transmit this Resolution to Members and Associate Members and to the Administrative Council for inclusion in the draft agenda for the 1974 Maritime Conference.

RESOLUTION No. **Spa2** – 6

Relating to the Technical Criteria recommended by the C.C.I.R. for Sharing Frequency Bands between Space Radiocommunication and Terrestrial Radiocommunication Services or between Space Radiocommunication Services

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

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 co-ordination procedures on each of the sharing services in the interest of controlling mutual interference;

b) that, in frequency bands shared by space stations located on geostationary satellites, it is necessary to impose co-ordination procedures in the interest of controlling mutual interference;

c) that the technical criteria and co-ordination procedures referred to in *a)* and *b)* above, and as set out in the Radio Regulations, are mainly based upon Recommendations of the C.C.I.R.;

d) that, in recognition of the successful sharing of frequency bands by space radiocommunication and terrestrial radiocommunication services, and the continuing improvements in space technology, each Plenary Assembly of the C.C.I.R. subsequent to the Xth Plenary Assembly, Geneva, 1963, has improved upon some of the technical criteria recommended by the preceding Plenary Assembly;

e) that Plenary Assemblies of the C.C.I.R. are held triennially whereas Administrative Radio Conferences, which are empowered to modify the Radio Regulations making substantial use of the Recommendations of the C.C.I.R., are in practice held less frequently and with much less regularity;

f) that the International Telecommunication Convention (Montreux, 1965) recognizes the right of Members and Associate 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, so far as concerns the harmful interference to the radio services of other countries;

is of the opinion

a) that subsequent Plenary Assemblies of the C.C.I.R. are likely to make further changes in the recommended technical criteria; and

b) that administrations should be afforded the opportunity to take advantage of the current C.C.I.R. Recommendations on sharing criteria when planning systems for use in frequency bands shared with equal rights by space radiocommunication and terrestrial radiocommunication services, or between radiocommunication services;

therefore resolves that

1. each Plenary Assembly of the C.C.I.R. should arrange for the Secretary-General of the I.T.U. to be informed of those Recommendations of the C.C.I.R. affecting the technical criteria relating to sharing between space radiocommunication and terrestrial radiocommunication services or between space radiocommunication services;

2. following the distribution to administrations of the relevant C.C.I.R. texts, the Secretary-General shall write to administrations asking them to indicate within one hundred and twenty days, to which of the C.C.I.R. Recommendations or to which specific technical criteria defined in the Recommendations referred to in 1 above they agree for use in the application of the pertinent provisions of the Radio Regulations;

3. the administrations which do not respond to the Secretary-General's consultation within one hundred and twenty days shall be deemed to wish the specific technical criteria referred to in the current Radio Regulations to be applied for the time being;

4. in those cases where an administration, in its reply to the Secretary-General's consultation, indicates that a specific C.C.I.R. Recommendation or a specific technical criterion defined in those Recommendations is not

acceptable to it, or where an administration has not replied to the Secretary-General's consultation as in paragraph 3 above, the relevant technical 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 consolidated list prepared by the I.F.R.B. on the basis of the replies to the enquiry, of the C.C.I.R. Recommendations or of the specific relevant technical criteria defined in those Recommendations, and to which administrations each of those Recommendations or specific relevant technical criteria are acceptable or are not acceptable. This list shall also include those administrations mentioned in paragraph 3 above;

6. the I.F.R.B. be directed to take into account:

a) the applicability of the C.C.I.R. technical criteria in accordance with the list referred to in 5 above, when making technical examinations with respect to cases involving only administrations to which such criteria are acceptable;

b) the applicability of the technical criteria defined in the Radio Regulations in accordance with the list referred to in 5 above, when making technical examinations with respect to cases involving an administration which does not accept the relevant C.C.I.R. technical criteria;

7. if, at a later date, questions arise concerning the application of the relevant technical criterion or criteria to a case involving administrations described in paragraph 3 above, the I.F.R.B. shall enquire of the administrations concerned whether or not they would agree to the application of the technical criterion or criteria defined in the relevant C.C.I.R. Recommendations referred to in paragraph 1 above. The list published pursuant to paragraph 5 above shall be updated on the basis of the reply of the administration or of the absence of reply.

RESOLUTION No. Spa2 – 7

Relating to the Inclusion of additional Sections in List VIIIA (Article 20, Appendix 9)

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

a) that it has modified the definitions which appeared in the Radio Regulations and has adopted a series of new definitions for the services;

b) that, within the framework of these modifications, it has changed, in Appendix 9 to Radio Regulations, the headings and the contents of the existing nine Sections of List VIIIA (List of Space Radiocommunication Stations and Radio Astronomy Stations);

c) that however, in List VIIIA so modified, it is not possible to include all the categories of earth and space stations notified to the I.F.R.B. for inclusion in the Master International Frequency Register;

d) that the Conference has not had the time to make the required modifications;

decides

to invite the Secretary-General, in collaboration with the I.F.R.B., to take the necessary steps, on the basis of the existing Sections of List VIIIA, to have additional Sections added to this List, so that the particulars of all the earth and space stations notified to the I.F.R.B. under Article 9A of the Radio Regulations, for recording in the Master International Frequency Register, be included.

RESOLUTION No. Spa2 – 8

Relating to the Abrogation of obsolete Resolutions and Recommendations of the Extraordinary Administrative Radio Conference to allocate Frequency Bands for Space Radiocommunication Purposes, Geneva, 1963 and a Recommendation of the Administrative Radio Conference, Geneva, 1959

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

a) that all necessary action has been taken on the following Resolutions and Recommendations of the Extraordinary Administrative Radio Conference (Geneva, 1963):

Resolution No. Spa 1 Relating to the Provision and Use of Information regarding International Satellite Systems;

Resolution No. Spa 2 Relating to Space Vehicles in Distress and Emergency;

Resolution No. Spa 3 Relating to the Category of the Fixed and Mobile Services in the Band 1 525 - 1 540 Mc/s;

Recommendation No. Spa 1 Relating to the Calculation of Co-ordination Distance for Earth Stations;

Recommendation No. Spa 2 to the C.C.I.R. and to Administrations Relating to the Calculation of the Probability of Interference between Stations within Co-ordination Distance;

b) that Recommendation No. Spa 6 of the Extraordinary Administrative Radio Conference (Geneva, 1963) Relating to the Frequency Requirements in the HF Bands Exclusively Allocated to the Aeronautical Mobile (R) Service, is now obsolete;

c) that paragraphs 3 and 4 of Recommendation No. Spa 9 of the Extraordinary Administrative Radio Conference (Geneva, 1963) Relating to the Review of Progress in the Field of Space Radiocommunications, are now obsolete;

d) that Recommendation No. Spa 3 of the Extraordinary Administrative Radio Conference (Geneva, 1963) to the C.C.I.R. and to Administrations Relating to Frequency Bands shared between Space and Terrestrial Services has been replaced by Recommendation No. **Spa2**–15 of the present Conference;

e) that Recommendation No. 36 of the Administrative Radio Conference (Geneva, 1959) Relating to the Convening of an Extraordinary Administrative Radio Conference to allocate Frequency Bands for Space Radiocommunication Purposes, is no longer necessary;

resolves

that the said Resolutions and Recommendations or parts of Recommendation are abrogated.

RECOMMENDATION No. 36

Relating to the Convening of an Extraordinary Administrative Radio Conference to allocate Frequency Bands for Space Radiocommunication Purposes

(Abrogated by Resolution No. **Spa2**-*8)*

RECOMMENDATION No. Spa 1

Relating to the Calculation of Co-ordination Distance for Earth Stations

(Abrogated by Resolution No. **Spa2**-*8)*

RECOMMENDATION No. Spa 2

to the C.C.I.R. and to Administrations
Relating to Frequency Bands shared between Space and Terrestrial Services

(Abrogated by Resolution No. **Spa2**-*8)*

RECOMMENDATION No. Spa 3

to the C.C.I.R. and to Administrations Relating to the Calculation of the Probability of Interference between Stations within Co-ordination Distance

(Abrogated by Resolution No. **Spa2**-*8)*

RECOMMENDATION No. Spa 6

Relating to the Frequency Requirements in the HF Bands Exclusively Allocated to the Aeronautical Mobile (R) Service

(Abrogated by Resolution No. **Spa2**-*8)*

RECOMMENDATION No. Spa 9

Relating to the Review of Progress in the Field of Space Radiocommunications

The Extraordinary Administrative Radio Conference, Geneva, 1963,

considering

a) that man is progressing rapidly in the conquest of outer space, that all nations will benefit, and that this progress depends upon efficient and orderly space communications;

b) that this Conference has taken the first steps in the field of development of space radiocommunications in having allocated frequency bands for space radiocommunications and having established technical criteria and frequency registration and notification procedures designed to facilitate the further development of space radiocommunications;

recognizing

a) that the development of space services will go on in parallel with the development of terrestrial communication systems;

b) that all Members of the Union have an interest in the rational use of frequency bands allocated for space communication services, in the avoidance of harmful interference to space and other services, and in the international regulation of the use of these frequency bands;

c) that the decisions of the Conference may be subject to increasing refinement and improvement by future Conferences of the Union;

d) that there will be available additional data relating to space radiocommunications resulting from further experimental and operational experience;

believing

that such refinement and improvement is in the best interests of all Members and Associate Members of the Union if the full benefits of new technology are to be realized;

recommends

1. that Members and Associate Members of the Union make available, to the appropriate permanent organs of the Union, pertinent

data resulting from experimental and operational experience relating to space radiocommunications, as well as their proposals concerning space radiocommunications;

2. that the Administrative Council of the Union should review annually the progress in space radiocommunications made by Administrations, and the available reports and recommendations of the permanent organs of the Union with respect thereto;

and further recommends

3. *(Abrogated by Resolution No.* **Spa2**-*8)*

4. *(Abrogated by Resolution No.* **Spa2**-*8)*

RECOMMENDATION No. Spa2 – 1

Relating to the Examination by World Administrative Radio Conferences of the Situation with Regard to Occupation of the Frequency Spectrum in Space Radiocommunications

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

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;

g) that despite the provisions of Article 9A of the Radio Regulations and the principles adopted by this Conference, which provide for full consultation and co-ordination 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 a situation 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. Spa2 – 2

Relating to the preferred Frequency Bands for Tropospheric Scatter Systems

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

the technical and operational difficulties pointed out by the C.C.I.R., particularly in the Report of the Special Joint Meeting (Geneva, 1971) in bands shared by tropospheric scatter systems and space systems;

recognizing, however,

that administrations will wish to continue to use tropospheric scatter systems in order to satisfy certain telecommunication requirements;

noting

that the proliferation of such systems in all frequency bands, particularly those shared with space systems, will only serve to aggravate an already difficult situation;

requests

that the C.C.I.R. urgently study the radio-frequency requirements for tropospheric scatter systems and recommend the preferred radio frequencies for such systems;

invites the Administrative Council

to arrange that a future World Administrative Radio Conference consider which frequency bands of the fixed service shall be preferably used by new tropospheric scatter systems, taking into account the allocations to the space radiocommunication services.

RECOMMENDATION No. **Spa2** – 3

Relating to the future Use of Bands allocated to the Inter-Satellite Service

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

a) that the bands 54·25 - 58·2 GHz, 59 - 64 GHz, 105 - 130 GHz, 170 - 182 GHz and 185 - 190 GHz have been allocated to the inter-satellite service;

b) that all the foregoing bands are located in parts of the radio-frequency spectrum close to peaks of atmospheric absorption;

and recognizing

that the inter-satellite and terrestrial radiocommunication services are protected from mutual interference by the attenuation due to atmospheric absorption;

recommends

that a future World Administrative Radio Conference should consider allocating these bands also to terrestrial radiocommunication (except the aeronautical mobile) services.

RECOMMENDATION No. Spa2 – 4

Relating to the future Use of certain Frequency Bands between 40 and 275 GHz

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

that the 43 - 48 GHz, 66 - 71 GHz, 95 - 101 GHz, 142 - 150 GHz, 190 - 200 GHz and 250 - 265 GHz bands have been allocated to the following services:

— aeronautical mobile-satellite

— maritime mobile-satellite

— aeronautical radionavigation-satellite

— maritime radionavigation-satellite;

recognizing

that it is not desirable for compatibility considerations that at a later date these bands should be shared with terrestrial radiocommunica-

tion services other than the aeronautical and maritime mobile services and/or the aeronautical and maritime radionavigation services;

recommends

that a future competent World Administrative Radio Conference should consider allocating, in addition, the 43 - 48 GHz, 66 - 71 GHz, 95 - 101 GHz, 142 - 150 GHz, 190 - 200 GHz and 250 - 265 GHz bands to the following services:

— aeronautical mobile

— maritime mobile

— aeronautical radionavigation

— maritime radionavigation

in an appropriate manner.

RECOMMENDATION No. Spa2 – 5

Relating to the future Use of the 41 - 43 GHz Band by the Fixed and Mobile Services

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

that the 41 - 43 GHz band has been allocated to the broadcasting-satellite service;

recognizing

that it is possible, by appropriate co-ordination, for a frequency band to be shared by the broadcasting-satellite service, on the one hand, and the fixed and mobile services, on the other;

recommends

that a future competent World Administrative Radio Conference should consider allocating, in addition, the 41 - 43 GHz band to the fixed and mobile services.

RECOMMENDATION No. Spa2 – 6

Relating to future Frequency Allocation Requirements for the Maritime Mobile-Satellite Service

The World Administrative Radio Conference for Space Telecommunications, (Geneva, 1971),

having noted

that the Inter-Governmental Maritime Consultative Organization (I.M.C.O.) has stated a requirement for frequencies of the order of 400 MHz, believing that small vessels in particular may be unable to use satellite radiocommunications if such frequencies are not made available;

further noting

that the C.C.I.R. Special Joint Meeting (Geneva, 1971) concluded that the present Conference should be invited to examine the possibility of providing exclusive channels for the maritime mobile-satellite service at about 400 MHz and that provision of such channels is desirable;

considering

a) that ship stations and survival craft stations are completely dependent upon the use of radio for communication;

b) that the use of space techniques will provide the maritime mobile service with a reliable and more efficient method of communication;

c) that reliable maritime mobile-satellite service communications will greatly assist in the saving of lives and property;

d) that although the Conference has made certain provisions for the maritime mobile-satellite service, there is some uncertainty with respect to the adequacy and usefulness of these provisions, particularly insofar as small ships and survival craft are concerned;

e) that general participation of small ships in a service using space techniques would not only benefit the efficient and safe operation of these ships but would also improve the safety service for larger ships and survival craft;

f) that future conferences might find it necessary to make additional allocations for such uses nearer to the optimum portions of the spectrum;

g) that for some communications functions, such as certain broadcasting and fixed applications, other means than radio could be used, thereby making portions of the spectrum available for services which are dependent on radio;

recommends

1. that administrations and appropriate international organizations continue to review the requirements for the maritime mobile-satellite service and the suitability of current frequency allocations in meeting those requirements;

2. that the C.C.I.R. continue its studies to determine the optimum portions of the frequency spectrum and related sharing conditions to accommodate maritime mobile-satellite service requirements, taking into consideration advances in space radiocommunication technology;

3. that a competent World Administrative Radio Conference review the requirements of the maritime mobile-satellite and safety services, and if necessary, provide the frequency allocations to satisfy these requirements.

RECOMMENDATION No. Spa2 – 7

Relating to the future Provision of a Band near 10 MHz for the Radio Astronomy Service

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

a) the requirements of the radio astronomy service, as expressed by the Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science (I.U.C.A.F.), for a frequency allocation near 10 MHz;

b) that the use of the standard frequency guard bands has not satisfied the needs of the radio astronomy service at a frequency near 10 MHz;

c) that propagation conditions at a frequency near 10 MHz are such that a transmitter operating anywhere on the Earth might cause interference to the radio astronomy service and as a consequence an exclusive world-wide allocation is necessary for long term observations;

d) that successful radio astronomy measurements have, at times, been made at frequencies near 10 MHz;

e) that I.U.C.A.F. is co-ordinating the needs of radio astronomers for frequency allocations;

recommends

1. that administrations keep under review the possibility of releasing a band of frequencies 50 kHz wide for the use of the radio astronomy service between 10 MHz and 15 MHz;

2. that administrations give close attention to any future recommendation of the I.U.C.A.F. concerning the specific frequency band between 10 MHz and 15 MHz required by the radio astronomy service;

3. that a future World Administrative Radio Conference consider granting to the radio astronomy service an exclusive allocation in this region of the spectrum.

RECOMMENDATION No. Spa2 – 8

Relating to the Protection of Radio Astronomy Observations on the Shielded Area of the Moon

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

a) that radio astronomy observations at frequencies below the ionospheric critical frequencies and above 100 GHz are hampered or prevented by absorption in the Earth's atmosphere;

b) that successful radio astronomy observations require complete freedom from harmful interference;

c) that the shielded area of the Moon offers unique opportunities for observations which are not affected by such absorption;

d) that the shielded area of the Moon appears to be the potentially most useful area accessible to man which is completely free from interference from terrestrial transmissions;

e) that the shielded area of the Moon refers to the area of the Moon which is more than 23·2° beyond the mean limb of the Moon as seen from the centre of the Earth;

f) that the transmissions by radio of data from observation stations to collection points will be in the frequency bands allocated for this purpose;

noting

the desirability of maintaining the shielded area of the Moon as an area of maximum value for observations by the radio astronomy service and by passive space research and consequently as free as possible from transmissions;

recommends

1. that the C.C.I.R. study the frequency bands most suitable for radio astronomy observations on the shielded area of the Moon and work out recommendations concerning these bands as well as criteria for their application and protection;

2. that in the meantime, administrations, in accordance with the intent of this Recommendation, take all practicable steps to ensure that there will be no interference to radio astronomy observations on the shielded area of the Moon; and

3. that administrations apply such Recommendations as may be provided on this matter by the C.C.I.R. pending the convening of the next World Administrative Radio Conference.

RECOMMENDATION No. **Spa2** – 9

Relating to the Co-Ordination of Earth Stations

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

a) that under the terms of Article 9A 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 co-ordinated 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 - 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 C.C.I.R.

to continue as a matter of urgency its study:

— 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;

— of the formulation of calculation methods for determining the co-ordination 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:

— any C.C.I.R. Recommendation, if applicable, for the values missing from Tables I and II of Appendix 28 to the Radio Regulations;

— the methods of determining the co-ordination area for frequencies below 1 GHz and above 40 GHz, which may be the subject of a C.C.I.R. Recommendation.

RECOMMENDATION No. Spa2 - 10

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

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

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 C.C.I.R. (Geneva, 1971), indicated that the following power flux density limits are necessary to protect the terrestrial broadcasting service:

-121 dBW/m^2	$\delta \leqslant 20°$
$-121 + 0{\cdot}4\,(\delta - 20)$ dBW/m^2	$20° < \delta \leqslant 60°$
-105 dBW/m^2	$60° < \delta \leqslant 90°$

where δ is the angle of arrival above the horizontal plane (in degrees);

b) that additional tests carried out by one administration after the Special Joint Meeting of the C.C.I.R., indicated that the following more conservative power flux density limits may be necessary:

-130 dBW/m^2	$\delta \leqslant 20°$
$-130 + 0{\cdot}4\,(\delta - 20)$ dBW/m^2	$20° < \delta \leqslant 60°$
-114 dBW/m^2	$60° < \delta \leqslant 90°$

where δ is the angle of arrival above the horizontal plane (in degrees);

c) 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;

d) 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 C.C.I.R. Recommendation 417-2;

e) that account may have to be taken of ground reflections;

f) 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 C.C.I.R. Recommendation 417-2), by a space station in the broadcasting-satellite service in the band 620 - 790 MHz should not exceed:

-129 dBW/m^2	$\delta \leqslant 20°$
$-129 + 0{\cdot}4\,(\delta - 20)$ dBW/m^2	$20° < \delta \leqslant 60°$
-113 dBW/m^2	$60° < \delta \leqslant 90°$

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 C.C.I.R. urgently study the sharing criteria to be applied to frequency sharing between the broadcasting-satellite service and the terrestrial broadcasting service in the band 620 - 790 MHz and prepare a Recommendation on power flux densities to be used in lieu of the above provisional limits;

5. that in its studies the C.C.I.R. consider in particular the following aspects:

5.1 the required protection ratio for both 525- and 625-line systems for interference from an FM television signal into a VSB television signal;

5.2 the minimum field strength to be protected for the terrestrial television service taking into account the current state of the art;

5.3 the effect of ground reflections;

5.4 the number of broadcasting satellites that may be visible from a terrestrial broadcasting receiver;

5.5 the effect of polarization discrimination;

5.6 the effect of antenna directivity;

6. that in its studies the C.C.I.R. should consider the advantages of energy dispersal techniques in the broadcasting-satellite service (television).

RECOMMENDATION No. Spa2 – 11

Relating to Carrier Energy Dispersal in Systems in the Fixed-Satellite Service

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

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;

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.

RECOMMENDATION No. **Spa2** – 12

Relating to Technical Standards for the Assessment of harmful Interference in the Frequency Bands above 28 MHz

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

considering

a) that the definition of harmful interference (No. **93** 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 I.F.R.B. 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;

and noting

a) that the I.F.R.B. has been considering the maximum allowable values of interference given in the pertinent C.C.I.R. Recommendations to be values which ensure a satisfactory service;

b) that, however, the I.F.R.B. 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 C.C.I.R.

to study this subject and to recommend the technical criteria for the frequency bands above 28 MHz, allocated to space radiocommunication, radio astronomy, and the terrestrial radiocommunication services concerned, in order to enable the I.F.R.B. and administrations to apply such criteria for these bands;

and invites the I.F.R.B.

to publish, for the information of administrations, its technical standards based upon the relevant provisions of the Radio Regulations and Appendices thereto, the decisions of Administrative Conferences of the Union as appropriate, the Recommendations of the C.C.I.R., the state of the radio art, and the development of transmission techniques.

RECOMMENDATION No. Spa2 – 13

Relating to the Use of Space Radiocommunication Systems in the Event of natural Disasters, Epidemics, Famines and similar Emergencies

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

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;

b) that in the absence of such planning it is not feasible to proceed with specifications for rapidly transportable, universally operable earth stations;

recommends

1. that administrations, individually or in collaboration, provide for the needs of eventual 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 C.C.I.R. to study standard specifications and preferred frequencies for transportable earth stations and for compatible mobile and transportable fixed radiocommunications equipment for relief operations;

requests

the Secretary-General to bring this Recommendation to the attention of the United Nations, the Specialized Agencies, and other International Organizations concerned, in order to ensure full cooperation in the implementation of this Recommendation.

RECOMMENDATION No. Spa2 – 14

Relating to a revised Presentation of the Sections of Article 1 of the Radio Regulations

The World Administrative Radio Conference for Space Telecommunications, (Geneva, 1971),

considering

a) that, as a result of the amendments made to Article 1 of the Radio Regulations, the terms specified in that Article are no longer arranged in logical order;

b) that it would therefore be desirable to rearrange Article 1 of the Radio Regulations in a more appropriate form;

recognizing

that this Conference was unable to perform this task;

recommends

that the next World Administrative Radio Conference which is competent to revise Article 1 of the Radio Regulations should consider the rearrangement of Article 1 in a more logical manner, for example, on the lines of the Annex to this Recommendation, and further amendments to this Article, as necessary.

* * *

ANNEX TO RECOMMENDATION No. Spa2 – 14

ARTICLE 1

Section I. General Terms

Section II. Radio Systems

Section III. Radio Services and Stations

Sub-Section IIIA. Terrestrial Radiocommunication

Sub-Section IIIB. Space Radiocommunication

Sub-Section IIIC. Radio Astronomy

Section IV. Technical Characteristics

RECOMMENDATION No. Spa2 – 15

To the C.C.I.R. and to Administrations relating to Frequency Bands shared between Space Radiocommunication Services and between Space and Terrestrial Radiocommunication Services

The World Administrative Radio Conference for Space Telecommunications (Geneva, 1971),

recognizing

a) the value to the Conference of the material contained in Document No. 64 (results of C.C.I.R. studies relating to space telecommunications concluded at its Special Joint Meeting, Geneva, 1971);

b) that further studies on a wide range of problems dealing with space radiocommunications form the subject of C.C.I.R. Questions and Study Programmes approved by the XIIth Plenary Assembly;

considering however

a) that certain C.C.I.R. Recommendations, listed below, call for further work and study:

Recommendation 355-1 "FREQUENCY SHARING BETWEEN ACTIVE COMMUNICATION-SATELLITE SYSTEMS AND TERRESTRIAL RADIO SERVICES IN THE SAME FREQUENCY BANDS"

Recommendation 465 "GENERALIZED EARTH-STATION ANTENNA RADIATION PATTERN FOR USE IN INTERFERENCE CALCULATIONS, INCLUDING COORDINATION PROCEDURES, IN THE FREQUENCY RANGE 2-10 GHz"

Recommendation 466 "COMMUNICATION-SATELLITE SYSTEMS FOR TELEPHONY USING FREQUENCY-DIVISION MULTIPLEX. MAXIMUM ALLOWABLE VALUES OF INTERFERENCE IN A TELEPHONE CHANNEL OF A GEOSTATIONARY COMMUNICATION-SATELLITE SYSTEM EMPLOYING FREQUENCY MODULATION, CAUSED BY OTHER GEOSTATIONARY COMMUNICATION-SATELLITE SYSTEMS"

b) that as a result of the deliberations of this Conference, particularly in relation to the provisions of Article 7, Sections VII, VIII and IX, and to other relevant Articles of the Radio Regulations, further information is required to reply to the following current Questions and Study Programmes of the C.C.I.R.:

Question 1-1/4 "ANTENNAE FOR SPACE SYSTEMS"

under Decides 2: the state of development in antenna design and fabrication;

under Decides 3: the state of development of antennae with improved side- and back-lobe characteristics;

under Decides 4: the polarization characteristics of antennae, particularly in the side-lobe regions and in planes other than the principal planes.

Question 2-1/4 "TECHNICAL CHARACTERISTICS OF COMMUNICATION-SATELLITE SYSTEMS FOR FIXED AND MOBILE, EXCLUDING AERONAUTICAL AND MARITIME MOBILE, SERVICES"

under Decides 3: under what conditions and to what extent would it be feasible for communication-satellites, operating in the same system or operating in different systems, to share preferred frequency bands;

under Decides 4: under what conditions and to what extent would it be feasible for communication-satellite systems to share preferred frequency bands with terrestrial services.

Study Programme 2-1A-1/4 "FEASIBILITY OF FREQUENCY SHARING BETWEEN COMMUNICATION-SATELLITE SYSTEMS AND TERRESTRIAL SERVICES"

under Decides 2: the determination of the preferred technical characteristics of transmitting and receiving antennae for earth stations at fixed locations, from the standpoint of spectrum sharing with other radio services.

Study Programme 2-1C/4 "COMMUNICATION-SATELLITE SYSTEMS. FEASIBILITY OF FREQUENCY SHARING AMONG COMMUNICATION-SATELLITE SYSTEMS"

under Decides 1: the criteria which affect interference among communication-satellites in a given system and between communication-satellite systems, taking into account the two directions of transmission;

under Decides 2: the preferred technical characteristics of transmitting and receiving antennae for earth stations, from the standpoint of frequency sharing

within the same system and with other communication-satellite systems.

Study Programme 2-1J/4 "COMMUNICATION-SATELLITE SYSTEMS. TECHNICAL FACTORS INFLUENCING THE EFFICIENCY OF USE OF THE GEOSTATIONARY SATELLITE ORBIT BY COMMUNICATION-SATELLITES SHARING THE SAME FREQUENCY BANDS"

under Decides 1: the technical characteristics of communication-satellite systems which affect the utilization of the geostationary satellite orbit, and the interrelationships between them;

under Decides 3: the extent to which it may be feasible and desirable to adopt preferred technical characteristics for different geostationary communication-satellites and earth stations;

under Note 1: Some of the factors which should be taken into account in carrying out these studies:

— the tolerable levels of interference noise in different communication-satellite systems;

— the radiation patterns of the earth station and satellite antennae;

— factors affecting the multiple use of the same frequencies within a single communication satellite;

— polarization discrimination;

c) that it would be useful to have a clear definition of the term "system noise temperature";

d) that it would be useful to have clear definitions of the terms "acceptable (or unacceptable) interference" and "harmful interference" for the space radiocommunication, radio astronomy, and terrestrial radiocommunication services;

e) 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;

f) that frequency sharing between the radionavigation service and the fixed-satellite service (Earth-to-space) has been adopted in the frequency band 14·0 to 14·3 GHz, and between the radionavigation-satellite service and the fixed-satellite service (Earth-to-space) in the frequency band 14·3 to 14·4 GHz;

recommends

1. that administrations, recognized private operating agencies, and other participants in the work of the C.C.I.R., 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 C.C.I.R.;

2. that the C.C.I.R. 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 the present Conference, in order to permit the determination of:

2.5.1 the co-ordination 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 co-ordination 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 the present Conference with a view to issuing appropriate Recommendations as soon as possible so that administrations and the International Frequency Registration Board shall have the necessary technical data required to carry out examination procedures, in particular regarding Articles 9 and 9A of the Radio Regulations and those in Resolution No. **Spa2** – 3;

2.11 the term "system noise temperature" with a view to formulating a clear definition of this term applicable to space radiocommunication systems;

2.12 the terms "acceptable (or unacceptable) interference" and "harmful interference" with a view to formulating clear definitions appropriate to the radio astronomy service and to the various space radiocommunication and terrestrial radiocommunication services;

2.13 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;

2.14 the criteria for frequency sharing between the radionavigation service and the fixed-satellite service (Earth-to-space) in the frequency band 14·0 to 14·3 GHz and between the radionavigation-satellite service and the fixed-satellite service (Earth-to-space) in the frequency band 14·3 to 14·4 GHz.

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(1968 edition revised after the Space Conference of 1971)

General Secretariat
of the International Telecommunication Union
GENEVA

ANALYTICAL TABLE

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p.	— page
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RES	— Resolution
Aer	— Aeronautical Conference (Geneva, 1966)
Mar	— Maritime Conference (Geneva, 1967)
Spa	— Space Conference (Geneva, 1963)
Spa2	— Space Conference (Geneva, 1971)

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