Radiocommunication

I.T.U.

Regolamento

delle

Radiocomunicazioni

(stralcio di Gaetano Caprara - IØHJN)

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ARTICLE 2

Nomenclature

Section I - Frequency and Wavelenght Bands

2.1 The radio spectrum shall be subdivided into nine frequency bands, which shall be designated by progressive whole numbers in accordance with the following table. As the unit of frequency is the hertz (Hz), frequencies shall be expressed:

- in kilohertz (kHz), up to and including 3 000 kHz;

- in megahertz (MHz), above 3 MHz, up to and including 3 000 MHz;

- in gigahertz (GHz), above 3 GHz, up to and including 3 000 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	Symbols	Frequency Range (lower limit exclusive, upper limit inclusive)	Corresponding Metric Subdivision	Metric Abbreviations for the Bands
4	VLF	3 to 30 kHz	Myriametric waves	B.Mam
5	LF	30 to 300 kHz	Kilometric waves	B.km
6	MF	300 to 3 000 kHz	Hectometric waves	B.hm
7	HF	3 to 30 MHz	Decametric waves	B.dam
8	VHF	30 to 300 MHz	Metric waves	B.m
9	UHF	300 to 3 000 MHz	Decimetric waves	B.dm
10	SHF	3 to 30 GHz	Centimetric waves	B.cm
11	EHF	30 to 300 GHz	Millimetric waves	B.mm
12		300 to 3 000 GHz	Decimillimetric waves	

Note 1: "Band N" (N = band number) extends from 0.3 × 10N Hz to 3 × 10N Hz.

Note 2: Prefix: k = kilo (103), M = mega (106), G = giga (109).

2.2 In communications between administrations and the ITU, no names, symbols or abbreviations should be used for the various frequency bands other than those specified in No. **S2.1**.

Section II – Dates and times

2.3 Any date used in relation to radiocommunication shall be according to the Gregorian Calendar.

2.4 If in a date the month is not indicated either in full or in an abbreviated form, it shall be expressed in an all-numeric form with the fixed sequence of figures, two of each representing the day, month and year.

2.5 Whenever a date is used in connection with Coordinated Universal Time (UTC), this date shall be that of the prime meridian at the appropriate time, the prime meridian corresponding to zero degrees geographical longitude.

2.6 Whenever a specified time is used in international radiocommunication activities, UTC shall be applied, unless otherwise indicated, and it shall be presented as a four-digit group (0000-2359). The abbreviation UTC shall be used in all languages.

Section III – Designation of emissions

2.7 Emissions shall be designated according to their necessary bandwidth and their classification in accordance with the method described in Appendix **1**.

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ARTICLE 3

Technical Characteristics of Stations

3.1 The choice and performance of equipment to be used in a station and any emissions there from shall satisfy the provisions of these Regulations.

3.2 Also, as far as is compatible with practical considerations, the choice of transmitting, receiving and measuring equipment shall be based on the most recent advances in the technique as indicated, *inter alia*, in ITU-R Recommendations.

3.3 Transmitting and receiving equipment intended to be used in a given part of the frequency spectrum should be designed to take into account the technical characteristics of transmitting and receiving equipment likely to be employed in neighbouring and other parts of the spectrum, provided that all technically and economically justifiable measures have been taken to reduce the level of unwanted emissions from the latter transmitting equipment and to reduce the susceptibility to interference of the latter receiving equipment.

3.4 To the maximum extent possible, equipment to be used in a station should apply signal processing methods which enable the most efficient use of the frequency spectrum in accordance with the relevant ITU-R Recommendations. These methods include, *inter alia*, certain bandwidth expansion techniques, and in particular, in amplitude-modulation systems, the use of the single-sideband technique.

3.5 Transmitting stations shall conform to the frequency tolerances specified in Appendix **2**.

3.6 Transmitting stations shall conform to the maximum permitted power levels for spurious emission or unwanted emissions in the spurious domain specified in Appendix **3**. (WRC-03)

3.7 Transmitting stations shall conform to the maximum permitted power levels for out-of-band emissions, or unwanted emissions in the out-of-band domain, specified for certain services and classes of emission in the present Regulations. In the absence of such specified maximum permitted power levels transmitting stations should, to the maximum extent possible, satisfy the requirements relating to the limitation of the out-of-band emissions, or unwanted emissions in the out-of-band domain, specified in the most recent ITU-R Recommendations (see **Resolution 27** (Rev.WRC-03))

3.8 Moreover, every effort should be made to keep frequency tolerances and levels of unwanted emissions at the lowest values which the state of the technique and the nature of the service permit.

3.9 The bandwidths of emissions also shall be such as to ensure the most efficient utilization of the spectrum; in general this requires that bandwidths be kept at the lowest values which the state of the technique and the nature of the service permit. Appendix **1** is provided as a guide for the determination of the necessary bandwidth.

3.10 Where bandwidth-expansion techniques are used, the minimum spectral power density consistent with efficient spectrum utilization shall be employed.

3.11 Wherever necessary for efficient spectrum use, the receivers used by any service should comply as far as possible with the frequency tolerances of the transmitters of that service, due regard being paid to the Doppler effect where appropriate.

3.12 Receiving stations should use equipment with technical characteristics appropriate for the class of emission concerned; in particular, selectivity should be appropriate having regard to No. **3.9** on the bandwidths of emissions.

3.13 The performance characteristics of receivers should be adequate to ensure that they do not suffer from interference due to transmitters situated at a reasonable distance and which operate in accordance with these Regulations.

3.14 To ensure compliance with these Regulations, administrations shall arrange for frequent checks to be made of the emissions of stations under their jurisdiction. For this purpose, they shall use the means indicated in Article **16**, if required. The technique of measurements and the intervals of measurements to be employed shall be, as far as is practicable, in accordance with the most recent ITU-R Recommendations.

3.15 The use of damped wave emissions is forbidden in all stations.

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ARTICLE 4

Assignment and use of frequencies

4.1 Members shall endeavour to limit the number of frequencies and the spectrum space used to the minimum essential to provide in a satisfactory manner the necessary services. To that end they shall endeavour to apply the latest technical advances as soon as possible **(CS 195)**.

4.2 Members undertake that in assigning frequencies to stations which are capable of causing harmful interference to the services rendered by the stations of another country, such assignments are to be made in accordance with the Table of Frequency Allocations and other provisions of these Regulations.

4.3 Any new assignment or any change of frequency or other basic characteristic of an existing assignment (see Appendix **4**) shall be made in such a way as to avoid causing harmful interference to services rendered by stations using frequencies assigned in accordance with the Table of Frequency Allocations in this Chapter and the other provisions of these Regulations, the characteristics of which assignments are recorded in the Master International Frequency Register (**MIFR**).

4.4 Administrations of the Members shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations given in this Chapter or the other provisions of these Regulations, except on the express condition that harmful interference shall not be caused to services carried on by stations operating in accordance with the provisions of the Constitution, of the Convention and of these Regulations.

4.5 The frequency assigned to a station of a given service shall be separated from the limits of the band allocated to this service in such a way that, taking account of the frequency band assigned to a station, no harmful interference is caused to services to which frequency bands immediately adjoining are allocated.

4.6 For the purpose of resolving cases of harmful interference, the radio astronomy service shall be treated as a radiocommunication service. However, protection from services in other bands shall be afforded the radio astronomy service only to the extent that such services are afforded protection from each other.

4.7 For the purpose of resolving cases of harmful interference, the space research (passive) service and the earth exploration-satellite (passive) service shall be afforded protection from different services in other bands only to the extent that these different services are protected from each other.

4.8 Where, in adjacent Regions or sub-Regions, a band of frequencies is allocated to different services of the same category (see Sections I and II of Article **5**), the basic principle is the equality of right to operate. Accordingly, the stations of each service in one Region or sub-Region must operate so as not to cause harmful interference to any service of the same or higher category in the other Regions or sub-Regions. (WRC-03)

4.9 No provision of these Regulations prevents the use by a station in distress, or by a station providing assistance to it, of any means of radiocommunication at its disposal to attract attention,

make known the condition and location of the station in distress, and obtain or provide assistance.

4.10 Members recognize that the safety aspects of radionavigation and other safety services require special measures to ensure their freedom from harmful interference; it is necessary therefore to take this factor into account in the assignment and use of frequencies.

4.11 Members recognize that among frequencies which have longdistance propagation characteristics, those in the bands between 5 MHz and 30 MHz 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.

4.12 To reduce requirements for frequencies in the bands between 5 MHz and 30 MHz and thus to prevent harmful interference to longdistance radiocommunications, administrations are encouraged to use, whenever practicable, any other possible means of communication.

4.13 When special circumstances make it indispensable to do so, 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:

4.14 *a)* a station in the fixed service or an earth station in the fixed-satellite service may, under the conditions defined in Nos. **5.28** to **5.31**, transmit to mobile stations on its normal frequencies;

4.15 *b)* a land station may communicate, under the conditions defined in Nos. **5.28** to **5.31**, with fixed stations in the fixed service or earth stations in the fixed-satellite service or other land stations of the same category.

4.16 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.

4.17 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.

4.18 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.

4.19 In certain cases provided for in Articles **31**, **51** and Appendix **13**, 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. **51.73**).

4.20 Aircraft earth stations 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.

4.21 In exceptional cases, land mobile earth stations in the land mobile-satellite service may communicate with stations in the maritime mobile-satellite and aeronautical mobile-satellite services. Such operations shall comply with the relevant provisions of the Radio Regulations relating to those services and shall be subject to agreement among administrations concerned, taking due account of No. **4.10**.

4.22 Any emission capable of causing harmful interference to distress, alarm, urgency or safety communications on the international distress and emergency frequencies established for these purposes by these Regulations is prohibited. Supplementary distress frequencies available on less than a worldwide basis should be afforded adequate protection.

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Frequency Allocations

Frequency bands (slices of the spectrum) are allocated to the different services either worldwide *(worldwide allocation)* or regionally *(regional allocation)* - (Nos. **5.23-5.33**). Band allocations are set out in the *Table of Frequency Allocations* - **Frequency Allocations** of the **Amateur and Amateur Satellite Service** **Article 5** of the RR. To this end, the world is divided into three *Regions* for purposes of frequency allocation.

Each band may be allocated to one or more services, with equal or different rights. There are two categories of service, namely *primary* and *secondary* . Exceptions (additional or alternative allocations, different categories of service, etc.) or restrictions on allocations in the Table, usually geographical in a smaller area than the region (country, group of countries), are covered in "*footnotes*" (French: "renvoi") to the Table.

ARTICLE 5

Frequency Allocations

Introduction

5.1 In all documents of the Union where the terms *allocation*, *allotment* and *assignment* are to be used, they shall have the meaning given them in Nos. **1.16** to **1.18**, the terms used in the three working languages being as follows:

Frequency distribution to:	*French*	*English*	*Spanish*
Services	Attribution (attribuer)	Allocation (to allocate)	Atribución (atribuir)
Areas or Countries	Allotissement (allotir)	Allotment (to allot)	Adjudicación (adjudicar)
Stations	Assignation (assigner)	Assignment (to assign)	Asignación (asignar)

Section I. Regions

5.2 For the allocation of frequencies the world has been divided into three Regions as shown on the following map and described in Nos. **5.3** to **5.9**:

REM See also ITU member countries list by Regions.

5.3 *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 the Islamic Republic of Iran which lies between these limits. It also includes the whole of the territory of Armenia,

Azerbaijan, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of Russia which lies between lines A and C.

5.4 *Region 2:* Region 2 includes the area limited on the east by line B and on the west by line C.

5.5 *Region 3:* Region 3 includes the area limited on the east by line C and on the west by line A, except any of the territory of Armenia, Azerbaijan, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of Russia. It also includes that part of the territory of the Islamic Republic of Iran lying outside of those limits.

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

5.7 *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.

5.8 *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.

5.9 *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 Bering 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.

Section II. Categories of Services and Allocations

5.23 *Primary and Secondary Services*

5.24 1) 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 worldwide or Regional basis, such services are listed in the following order:

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

5.26 *b)* services the names of which are printed in "normal characters" (example: Mobile); these are called "secondary" services (see Nos. **5.28** to **5.31**).

5.27 2) Additional remarks shall be printed in normal characters (example: MOBILE except aeronautical mobile).

5.28 3) Stations of secondary service:

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

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

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

5.32 4) Where a band is indicated in a footnote of 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 Nos. **5.28** to **5.31**).

5.33 5) Where a band is indicated in a footnote of the Table as allocated to a service "on a primary basis", in an area smaller than a Region, or in a particular country, this is a primary service only in that area or country.

5.34 *Additional Allocations*

5.35 1) Where a band is indicated in a footnote of the Table as "also allocated" to a service in an area smaller than a Region, or in a particular country, this is an "additional" allocation, i.e. an allocation which is added in this area or in this country to the service or services which are indicated in the Table (see No. **5.36**).

5.36 2) If the footnote does not include any restriction on the service or services concerned apart from the restriction to operate only in a particular area or country, stations of this service or these services shall have equality of right to operate with stations of the other primary service or services indicated in the Table.

5.37 3) If restrictions are imposed on an additional allocation in addition to the restriction to operate only in a particular area or country, this is indicated in the footnote of the Table.

5.38 *Alternative Allocations*

5.39 1) Where a band is indicated in a footnote of 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. **5.40**).

5.40 2) 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 of such a service or services shall have an equality of right to operate with stations of the primary service or services, indicated in the Table, to which the band is allocated in other areas or countries.

5.41 3) 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.

5.42 *Miscellaneous Provisions*

5.43 1) 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 **SII** of these Regulations.

5.44 2) 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.

5.45 Not used.

Section III. Description of the Table of Frequency Allocations

5.46 1) 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. **5.2**). Where an allocation occupies the whole of the width of the Table or only one or two of the three columns, this is a worldwide allocation or a Regional allocation, respectively.

5.47 2) The frequency band referred to in each allocation is indicated in the left-hand top corner of the part of the Table concerned.

5.48 3) Within each of the categories specified in Nos. **5.25** and **5.26**, services are listed in alphabetical order according to the French language. The order of listing does not indicate relative priority within each category.

5.49 4) In the case where there is a parenthetical addition to an allocation in the Table, that service allocation is restricted to the type of operation so indicated.

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

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

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

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ARTICLE 15

Interference

Section I – Interference from Radio Stations

15.1 § 1 All stations are forbidden to carry out unnecessary transmissions, or the transmission of superfluous signals, or the transmission of false or misleading signals, or the transmission of signals without identification (except as provided for in Article **19**).

15.2 § 2 Transmitting stations shall radiate only as much power as is necessary to ensure a satisfactory service.

15.3 § 3 In order to avoid interference (see also Article **3** and No. **22.1**):

15.4 *a)* locations of transmitting stations and, where the nature of the service permits, locations of receiving stations shall be selected with particular care;

15.5 *b)* radiation in and reception from unnecessary directions shall be minimized by taking the maximum practical advantage of the properties of directional antennae whenever the nature of the service permits;

15.6 *c)* the choice and use of transmitters and receivers shall be in accordance with the provisions of Article **3**;

15.7 *d)* the conditions specified under No. **22.1** shall be fulfilled.

15.8 § 4 Special consideration shall be given to avoiding interference on distress and safety frequencies and those related to distress and safety identified in Appendix **13**.

15.9 § 5 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 general this requires that in selecting the class of emission to meet these objectives every effort shall be made to minimize the bandwidth occupied, taking into account the operational and technical considerations of the service to be performed.

15.10 § 6 The out-of-band emissions of transmitting stations should not cause harmful interference to services which operate in adjacent bands in accordance with these Regulations and which use receivers in conformity with Nos. **3.3, 3.11, 3.12, 3.13** and relevant ITU-R Recommendations.

15.11 § 7 If, while complying with the provisions of Article **3**, a station causes harmful interference through its spurious emissions, special measures shall be taken to eliminate such interference.

Section II – Interference from electrical apparatus and installations of any kind except equipment used for industrial, scientific and medical applications

15.12 § 8 Administrations shall take all practicable and necessary steps to ensure that the operation of electrical apparatus or installations of any kind, including power and telecommunication distribution networks, but excluding equipment used for industrial, scientific and medical applications, does not cause harmful interference to a radiocommunication service and, in particular, to a radionavigation or any other safety service operating in accordance with the provisions of these Regulations[1].

Section III – Interference from equipment used for industrial, scientific and medical applications

15.13 § 9 Administrations shall take all practicable and necessary steps to ensure that radiation from equipment used for industrial, scientific and medical applications is minimal and that, outside the bands designated for use by this equipment, radiation from such equipment is at a level that does not cause harmful interference to a radiocommunication service and, in particular, to a radionavigation or any other safety service operating in accordance with the provisions of these Regulations[1].

Section IV – Tests

15.14 § 10 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.

15.15 2) For the identification of transmissions made during tests, adjustments or experiments, see Article **19**.

15.16 3) In the aeronautical radionavigation service, it is undesirable, for safety reasons, to transmit the normal identification during emissions conducted to check or adjust equipment already in service. Unidentified emissions should however be restricted to a minimum.

15.17 4) Signals for testing and adjustment shall be chosen in such a manner that no confusion will arise with a signal, abbreviation, etc., having a special meaning defined by these Regulations or by

the International Code of Signals.

15.18 5) For testing stations in the mobile service see No. **57.9**.

Section V – Reports of Infringements

15.19 § 11 Infringements of the Constitution, Convention or Radio Regulations shall be reported to their respective administrations by the control organization, stations or inspectors detecting them. For this purpose they shall use forms similar to the specimen given in Appendix **9**.

15.20 § 12 Representations relating to any serious infringement committed by a station shall be made to the administration of the country having jurisdiction over the station, by the administrations which detect it.

15.21 § 13 If an administration has information of an infringement of the Convention or Radio Regulations, committed by a station over which it may exercise authority, it shall ascertain the facts, fix the responsibility and take the necessary action.

Section VI – Procedure in a case of harmful interference

15.22 § 14 It is essential that Member States‡ exercise the utmost goodwill and mutual assistance in the application of the provisions of Article 45 of the Constitution and of this Section to the settlement of problems of harmful interference.

15.23 § 15 In the settlement of these problems, due consideration shall be given to all factors involved, including the relevant technical and operating factors, such as: adjustment of frequencies, characteristics of transmitting and receiving antennae, time sharing, change of channels within multichannel transmissions.

15.24 § 16 For the purpose of this Section, the term "administration" may include the centralizing office designated by the administration, in accordance with No. **16.3**.

15.25 § 17 Administrations shall cooperate in the detection and elimination of harmful interference, employing where appropriate the facilities described in Article **16** and the procedures detailed in this Section.

15.26 § 18 Where practicable, and subject to agreement by administrations concerned, the case of harmful interference may be dealt with directly by their specially designated monitoring stations or by direct coordination between their operating organizations.

15.27 § 19 Full particulars relating to harmful interference shall, whenever possible, be given in the form indicated in Appendix **10**.

15.28 § 20 Recognizing that transmissions on the distress and safety frequencies (see Article **31** and Appendix **13**) require absolute international protection and that the elimination of harmful interference to such transmissions is imperative, administrations undertake to act immediately when their attention is drawn to any such harmful interference.

15.29 § 21 In cases of harmful interference where rapid action is required, communications between administrations shall be transmitted by the quickest means available and, subject to prior authorization by the administrations concerned in such cases, information may be exchanged directly between specially designated stations of the international monitoring system.

15.30 § 22 When a case of such harmful interference is reported by a receiving station, it shall give to the transmitting station whose service is being interfered with all possible information which will assist in determining the source and characteristics of the interference.

15.31 § 23 If a case of harmful interference so justifies, the administration having jurisdiction over the receiving station experiencing the interference shall inform the administration having jurisdiction over the transmitting station whose service is being interfered with, giving all possible information.

15.32 § 24 If further observations and measurements are necessary to determine the source and characteristics of and to establish the responsibility for the harmful interference, the administration having jurisdiction over the transmitting station whose service is being interfered with may seek the cooperation of other administrations, particularly of the administration having jurisdiction over the receiving station experiencing the interference, or of other organizations.

15.33 § 25 When cases of harmful interference occur as a result of emissions from space stations, the administrations having jurisdiction over these interfering stations shall, upon request from the administration having jurisdiction over the station experiencing the interference, furnish current ephemeral data necessary to allow determination of the positions of the space stations when not otherwise known.

15.34 § 26 Having determined the source and characteristics of the harmful interference, the administration having jurisdiction over the transmitting station whose service is being interfered with shall inform the administration having jurisdiction over the interfering station, giving all useful information in order that this administration may take such steps as may be necessary to eliminate the interference.

15.35 § 27 On being informed that a station over which it has jurisdiction is believed to have been the cause of harmful interference, an administration shall, as soon as possible, acknowledge receipt of that information by telegram. Such acknowledgement shall not constitute an acceptance of responsibility.

15.36 § 28 When a safety service suffers harmful interference the administration having jurisdiction over the receiving station experiencing the interference may also approach directly the administration having jurisdiction over the interfering station. The same procedure may also be followed in other cases with the prior approval of the administration having jurisdiction over the transmitting station whose service is being interfered with.

15.37 § 29 An administration receiving a communication to the effect that one of its stations is causing harmful interference to a safety service shall promptly investigate the matter and take any necessary remedial action.

15.38 § 30 When the service rendered by an earth station suffers harmful interference, the administration having jurisdiction over the receiving station experiencing such interference may also approach directly the administration having jurisdiction over the interfering station.

15.39 § 31 If the harmful interference persists in spite of the action taken in accordance with the procedures outlined above, the administration having jurisdiction over the transmitting station whose service is being interfered with may address to the administration having jurisdiction over the interfering station a report of irregularity or infraction in accordance with the provisions of Section V.

15.40 § 32 If there is a specialized international organization for a particular service, reports of irregularities and of infractions relating to harmful interference caused or suffered by stations in this service may be addressed to such organization at the same time as to the administration concerned.

15.41 § 33 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 Bureau for its information.

15.42 2) In such a case, the administration concerned may also request the Bureau to act in accordance with the provisions of Section I of Article **13**; but it shall then supply the Bureau with the full facts of the case, including all the technical and operational details and copies of the correspondence.

15.43 § 34 1) In the case where an administration has difficulty in identifying a source of harmful interference in the HF bands and urgently wishes to seek the assistance of the Bureau, it shall promptly inform the Bureau.

15.44 2) On receipt of this information, the Bureau shall immediately request the cooperation of appropriate administrations or specially designated stations of the international monitoring system that may be able to help in identifying the source of harmful interference.

15.45 3) The Bureau shall consolidate all reports received in response to requests under No. **15.44** and, using such other information as it has available, shall promptly attempt to identify the source of harmful interference.

15.46 4) The Bureau shall thereafter forward its conclusions and recommendations to the administration reporting the case of harmful interference. These shall also be forwarded to the administration believed to be responsible for the source of harmful interference, together with a request for prompt action.

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ARTICLE 16

International Monitoring

16.1 To assist to the extent practicable in the implementation of these Regulations, in particular to help ensure efficient and economical use of the radio-frequency spectrum and to help in the prompt elimination of harmful interference, administrations agree to continue the development of monitoring facilities and, to the extent practicable, to cooperate in the continued development of the international monitoring system, taking into account the relevant ITU-R Recommendations.[1]

16.2 The international monitoring system comprises only those monitoring stations which have been so nominated by administrations in the information sent to the Secretary-General in accordance with Recommendation ITU-R SM.1139. These stations may be operated by an administration or, in accordance with an authorization granted by the appropriate administration, by a public or private enterprise, by a common monitoring service established by two or more countries, or by an international organization.

16.3 Each administration or common monitoring service established by two or more countries, or international organizations participating in the international monitoring system, shall designate a centralizing office to which all requests for monitoring information shall be addressed and through which monitoring information will be forwarded to the Bureau or to centralizing offices of other administrations.

16.4 However, these provisions shall not affect private monitoring arrangements made for special purposes by administrations, international organizations, or public or private enterprises.

16.5 Administrations shall, as far as they consider practicable, conduct such monitoring as may be requested of them by other administrations or by the Bureau.

16.6 Administrative and procedural requirements for use and operation of the international monitoring system should be in accordance with the provisions of Recommendation ITU-R SM.1139.

16.7 The Bureau shall record the results supplied by the monitoring stations participating in the

international monitoring system, and shall prepare periodically, for publication by the Secretary-General, summaries of the useful monitoring data received by it including a list of the stations contributing the data.

16.8 When an administration, in supplying monitoring observations from one of its monitoring stations taking part in the international monitoring system, states to the Bureau that a clearly identified emission is not in conformity with these Regulations, the Bureau shall draw the attention of the administration concerned to those observations.

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ARTICLE 19

Identification of Stations

Section I. General Provisions

19.1 §1 All transmissions shall be capable of being identified either by identification signals or by other means.

19.2 §2 1) All transmissions with false or misleading identification are prohibited.

19.3 2) Where practicable and in appropriate services, identification signals should be automatically transmitted in accordance with relevant ITU-R Recommendations.

19.4 3) All transmissions in the following services should, except as provided in Nos. **19.13** to **19.15**, carry identification signals:

19.5 *a)* amateur service;

19.6 *b)* broadcasting service;

19.7 *c)* fixed service in the bands below 28 000 kHz;

19.8 *d)* mobile service;

19.9 *e)* standard frequency and time signal service.

19.10 4) All operational transmissions by radiobeacons shall carry identification signals. However, it is recognized that, for radiobeacons and for certain other radionavigation services that normally carry identification signals, during periods of malfunction or other non-operational service the deliberate removal of identification signals is an agreed means of warning users that the transmissions cannot safely be used for navigational purposes.

19.11 5) All transmissions by satellite emergency position-indicating radiobeacons (EPIRBs) operating in the band 406-406.1 MHz or the band 1 645.5-1 646.5 MHz, or by EPIRBs using digital selective calling techniques, shall carry identification signals.

19.12 6) When identification signals are transmitted they shall comply with the provisions of this Article.

19.13 7) However, the requirements for certain transmissions to carry identification signals need not apply to:

19.14 *a)* survival craft stations when transmitting distress signals automatically;

19.15 *b)* emergency position-indicating radiobeacons (except for those in No. **19.11**).

19.16 §3 In transmissions carrying identification signals a station shall be identified by a call sign, by a maritime mobile service identity or by other recognized means of identification which may be one or more of the following: name of station, location of station, operating agency, official registration mark, flight identification number, selective call number or signal, selective call identification number or signal, characteristic signal, characteristic of emission or other clearly distinguishing features readily recognized internationally.

19.17 §4 For transmissions carrying identification signals, in order that stations may be readily identified, each station shall transmit its identification as frequently as practicable during the course of transmissions, including those made for tests, adjustments or experiments. During such transmissions, however, identification signals shall be transmitted at least hourly, preferably within the period from five minutes before to five minutes after the hour (UTC) unless to do so would cause unreasonable interruption of traffic, in which case identification shall be given at the beginning and end of transmissions.

19.18 §5 Identification signals shall wherever practicable be in one of the following forms:

19.19 *a)* speech, using simple amplitude or frequency modulation;

19.20 *b)* international Morse code transmitted at manual speed;

19.21 *c)* a telegraph code compatible with conventional printing equipment;

19.22 *d)* any other form recommended by the Radiocommunication Sector.

19.23 § 6 To the extent possible the identification signal should be transmitted in accordance with relevant ITU-R Recommendations.

19.24 § 7 Administrations should ensure that wherever practicable superimposed identification methods be employed in accordance with ITU-R Recommendations.

19.25 § 8 When a number of stations work simultaneously in a common circuit, either as relay stations, or in parallel on different frequencies, each station shall, as far as practicable, transmit its own identification or those of all the stations concerned.

19.26 § 9 Administrations shall ensure, except in the cases mentioned in Nos. **19.13** to **19.15**, that all transmissions not carrying identification signals can be identified by other means when they are capable of causing harmful interference to the services of another administration operating in accordance with these Regulations.

19.27 § 10 Administrations shall, having regard to the provisions of these Regulations relating to the notification of assignments for recording in the Master Register, adopt their own measures to ensure compliance with the provisions of No. **19.26**.

19.28 § 11 Each Member State reserves the right to establish its own measures for identifying its stations used for national defence. However, it shall use, as far as possible, call signs recognizable as such, and containing the distinctive characters of its nationality.

Section II – Allocation of international series and assignment of call signs

19.28A § 11A 1) For the purpose of the supply of identification signals, a *territory* or *geographical area* shall be understood to mean the territory within the limits of which the station is located. For mobile stations, it shall be understood to mean the territory within the limits of which the responsible administration is located. A territory which does not have full responsibility for its international relations shall also be considered as a geographical area for this purpose.

19.28B 2) In all documents of the Union where the terms *allocation of call sign series* and *assignment of call signs* are to be used, they shall be used with the following meaning:

Identification means	**Terms used in these Regulations**
International series of call signs (including maritime identification digits (MIDs) and selective call numbers)	Allocation to the administration of a Member State (see definition in No. 1002 of the Constitution)
Call signs (including maritime identification digits (MIDs) and selective call numbers)	Assignment by any administration to stations operating in a territory or geographical area (see No. **19.28A**)

19.29 § 12 1) All stations open to international public correspondence, all amateur stations, and other stations which are capable of causing harmful interference beyond the boundaries of the territory or geographical area in which they are located, shall have call signs from the international series allocated to its administration as given in the Table of Allocation of International Call Sign Series in Appendix **42**.

19.30 2) As the need arises, ship stations and ship earth stations to which the provisions of Chapter **IX** apply, and coast stations or coast earth stations capable of communicating with such ship stations, shall have assigned to them maritime mobile service identities in accordance with Section VI of this Article.

19.31 3) It is not compulsory to assign call signs from the international series to stations identified by maritime mobile service identities or which are easily identified by other means (see No. **19.16**) and whose signals of identification or characteristics of emission are published in international documents.

19.31A 4)Means shall be provided for uniquely identifying mobile stations operating in automated terrestrial or satellite communication systems for the purposes of answering distress calls, for avoiding interference and for billing. Identification of the mobile station by accessing a registration database is satisfactory, provided that the system can associate the mobile station calling number with the particular mobile station user. (WRC-03)

19.32 § 13 Should the available call sign series in Appendix **42** be exhausted, new call sign series may be allocated according to the principles set out in Resolution **13 (Rev.WRC-97)** relating to the formation of call signs and the allocation of new international series.

19.33 § 14 Between radiocommunication conferences, the Secretary-General is authorized to deal with questions relating to changes in the allocation of series of call signs, on a provisional basis, and subject to confirmation by the following conference (see also No. **19.32**).

19.34 § 15 The Secretary-General shall be responsible for allocating maritime identification digits (MIDs) to administrations and shall regularly publish information regarding allocated MIDs.

19.35 § 16 The Secretary-General shall be responsible for allocating additional maritime identification digits (MIDs) to administrations within the limits specified, provided that it is ascertained that the possibilities offered by the MIDs allocated to an administration will soon be exhausted despite judicious ship station identity assignment as outlined in Section VI. (WRC-03)

19.36 § 17 Each administration has been allocated one or more maritime identification digit (MID) for its use. A second or subsequent MID should not be requested2 unless the previously allocated MID is more than 80% exhausted in the basic category of three trailing zeros and the rate of assignments is such that 90% exhaustion is foreseen. (WRC-03)

19.36.1 In no circumstances may an administration claim more MIDs than the total number of its ship stations notified to ITU divided by 1 000, plus one. Administrations shall make every attempt to reuse the Maritime Mobile Service Identities (MMSI) assigned from earlier MID resources, which become redundant after ships leave their national ship registry. Such numbers should be considered for reassignment after being absent from at least two successive editions of List VIIA of the ITU service publications. Administrations seeking additional MID resources must meet the criteria of having notified all previous assignments, in accordance with No. **20.16**. This criteria applies only to MMSIs in the basic category and to all MIDs assigned to the administration.

19.37 § 18 The Secretary-General shall be responsible for supplying series of selective call numbers or signals (see Nos. **19.92** to **19.95**) at the request of the administrations concerned.

19.38 § 19 1) Each administration shall choose the call signs and, if the selective calling system used is in accordance with Recommendation ITU-R M.257-3, the ship station selective call numbers and the coast station identification numbers of its stations from the international series allocated or supplied to it; and shall notify this information to the Secretary-General together with the information which is to appear in Lists I, IV, V, VI and VIIIA. These notifications do not include call signs assigned to amateur and experimental stations.

19.39 2) Each administration shall choose the maritime mobile service identities of its stations from the maritime identification digits allocated to it and notify this information to the Secretary-General for inclusion in the relevant lists, as provided for in Article **20**.

19.40 3) The Secretary-General shall ensure that the same call sign, the same maritime mobile service identity, the same selective call number or the same identification number is not assigned more than once and that call signs which might be confused with distress signals, or with other signals of the same nature, are not assigned.

19.41 § 20 1) When a fixed station uses more than one frequency in the international service, each frequency may be identified by a separate call sign used solely for this frequency.

19.42 2) When a broadcasting station uses more than one frequency in the international service, each frequency may be identified by a separate call sign used solely for this frequency or by some other appropriate means, such as announcing the name of the place and frequency used.

19.43 3) When a land station uses more than one frequency, each frequency may, if desired, be identified by a separate call sign.

19.44 4) Where practicable, coast stations should use a common call sign for each frequency series3.

Section III – Formation of call signs

19.45 § 21 1) The twenty-six letters of the alphabet, as well as digits in the cases specified below, may be used to form call signs. Accented letters are excluded.

19.46 2) However, the following combinations shall not be used as call signs:

19.47 *a)* combinations which might be confused with distress signals or with other signals of a similar nature;

19.48 *b)* combinations in Recommendation ITU-R M.1172 that are reserved for the abbreviations to be used in the radiocommunication services.

19.49 *SUP*

19.50 § 22 Call signs in the international series are formed as indicated in Nos. **19.51** to **19.71**. The first two characters shall be two letters or a letter followed by a digit or a digit followed by a letter. The first two characters or in certain cases the first character of a call sign constitute the nationality identification.

19.50.1 For call sign series beginning with B, F, G, I, K, M, N, R, W and 2, only the first character is required for nationality identification. In the cases of half series (i.e. when the first two characters are allocated to more than one Member State), the first three characters are required for nationality identification. (WRC-03)

19.51 *Land and fixed stations*

19.52 § 23 1)

– two characters and one letter, *or*

– two characters and one letter followed by not more than three digits (other than the digits 0 and 1 in cases where they immediately follow a letter).

19.53 2) However, it is recommended that, as far as possible, the call signs of fixed stations consist of:

– two characters and one letter followed by two digits (other than the digits 0 and 1 in cases where they immediately follow a letter).

19.54 *Ship stations*

19.55 § 24 1)

– two characters and two letters, *or*

– two characters, two letters and one digit (other than the digits 0 or 1).

19.56 2) However, ship stations employing only radiotelephony may also use a call sign

consisting of:

– two characters (provided that the second is a letter) followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter), *or*

– two characters and one letter followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter).

19.57 *Aircraft stations*

19.58 § 25

– two characters and three letters.

19.59 *Ship's survival craft stations*

19.60 *§ 26*

– the call sign of the parent ship followed by two digits (other than the digits 0 or 1 in cases where they immediately follow a letter).

19.61 *Emergency position-indicating radiobeacon stations*

19.62 *§ 27*

– the Morse letter B and/or the call sign of the parent ship to which the radiobeacon belongs.

19.63 *Aircraft survival craft stations*

19.64 *§ 28*

– the complete call sign of the parent aircraft (see No. **19.58**), followed by a single digit other than 0 or 1.

19.65 *Land mobile stations*

19.66 *§ 29*

– two characters (provided that the second is a letter) followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter), *or*

– two characters and one or two letters followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter).

19.67 *Amateur and experimental stations*

19.68 *§ 30 1)*

– one character (provided that it is the letter B, F, G, I, K, M, N, R or W) and a single digit (other than 0 or 1), followed by a group of not more than four characters, the last of which shall be a letter, *or*

– two characters and a single digit (other than 0 or 1), followed by a group of not more than four characters, the last of which shall be a letter. (WRC-03)

19.68A 1A) On special occasions, for temporary use, administrations may authorize use of call signs with more than the four characters referred to in No. **19.68**. (WRC-03

19.69 2) However, the prohibition of the use of the digits 0 and 1 does not apply to amateur stations.

19.70 *Stations in the space service*

19.71 § 31 When call signs for stations in the space service are employed, it is recommended that they consist of:

– two characters followed by two or three digits (other than the digits 0 and 1 in cases where they immediately follow a letter).

Section IV - Identification of stations using radiotelephony

19.82A § 35A Amateur stations and experimental stations
– a call sign (see No. **19.68**).

Last update: 08 September, 2005

ARTICLE 25

Amateur services

(Updated by the decisions of the WRC-03)

Section I. Amateur Service

25.1 § 1. Radiocommunication between amateur stations of different countries shall be permitted unless the administration of one of the countries concerned has notified that it objects to such radiocommunications. (WRC-03)

25.2 § 2. 1) Transmissions between amateur stations of different countries shall be limited to communications incidental to the purposes of the amateur service, as defined in No. **1.56** and to remarks of a personal character. (WRC-03)

25.2A § 2. 1*bis*) Transmissions between amateur stations of different countries shall not be encoded for the purpose of obscuring their meaning, except for control signals exchanged between earth command stations and space stations in the amateur-satellite service. (WRC-03)

25.3 2) Amateur stations may be used for transmitting international communications on behalf of third parties only in case of emergencies or disaster relief. An administration may determine the applicability of this provision to amateur stations under its jurisdiction. (WRC-03)

25.4 not used

25.5 § 3. 1) Administrations shall determine whether or not a person seeking a licence to operate an amateur station shall demonstrate the ability to send and receive texts in Morse code signals. (WRC-03)

25.6 2) Administrations shall verify the operational and technical qualifications of any person wishing to operate an amateur station. Guidance for standards of competence may be found in the most recent version of Recommendation **ITU-R M.1544**. (WRC-03)

25.7 § 4. The maximum power of amateur stations shall be fixed by the administrations concerned. (WRC-03)

25.8 § 5. 1) All pertinent Articles and provisions of the Constitution, the Convention and of these Regulations shall apply to amateur stations. (WRC-03)

25.9 2) During the course of their transmissions, amateur stations shall transmit their call sign at short intervals.

25.9A § 5A Administrations are encouraged to take the necessary steps to allow amateur stations to prepare for and meet communication needs in support of disaster relief. (WRC-03)

25.9B § 5B An administration may determine whether or not to permit a person who has been granted a licence to operate an amateur station by another administration to operate an amateur station while that person is temporarily in its territory, subject to such conditions or restrictions it may impose. (WRC-03)

Section II. Amateur-Satellite Service

25.10 § 6. The provisions of Section I of this Article shall apply equally, as appropriate, to the amateur-satellite service.

25.11 § 7. Administrations authorizing space stations in the amateur-satellite service shall ensure that sufficient earth command stations are established before launch to ensure that any harmful interference caused by emissions from a station in the amateur-satellite service can be terminated immediately (see No. **22.1**).

Updated: 01 September, 2005

APPENDIX 1

Classification of emissions and necessary bandwidths

(See ARTICLE 2)

§ 1. (1) Emissions shall be designated according to their necessary bandwidth and their classification as explained in this Appendix..

(2) Formulae and examples of emissions designated in accordance with this Appendix are given in Recommendation ITU-R SM.1138. Further examples may be provided in other ITU-R Recommendations. These examples may also be published in the Preface to the International Frequency List.

Section I - Necessary Bandwidth

§ 2. 1) The *necessary bandwidth*, as defined in No. **1.152** and determined in accordance with formulae and examples, shall be expressed by three numerals and one letter. The letter occupies the position of the decimal point and represents the unit of bandwidth. The first character shall be neither zero nor K, M or G.

2) Necessary bandwidths 1:

between 0.001 and 999 Hz shall be expressed in Hz (letter H);

between 1.00 and 999 kHz shall be expressed in kHz (letter K);

between 1.00 and 999 MHz shall be expressed in MHz (letter M);

between 1.00 and 999 GHz shall be expressed in GHz (letter G).

1 Examples:

0.002 Hz = H002	6 kHz = 6K00	1.25 MHz = 1M25
0.1 Hz = H100	12.5 kHz = 12K5	2 MHz = 2M00
25.3 Hz = 25H3	180.4 kHz = 180K	10 MHz = 10M0
400 Hz = 400H	180.5 kHz = 181K	202 MHz = 202M

2.4 kHz = 2K40 180.7 kHz = 181K 5.65 GHz = 5G65

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

3.1) use of the formulae and examples of necessary bandwidths and designation of corresponding emissions given in Recommendation ITU-R SM.1138;

3.2) computation, in accordance with other ITU-R Recommendations;

3.3) measurement, in cases not covered by § 3.1) or 3.2) above.

Section II - Classification

§ 3. The class of emission is a set of characteristics conforming to § 4 below.

§ 4 Emissions shall be classified and symbolized according to their basic characteristics as given in Sub-Section IIA and any optional additional characteristics as provided for in Sub-Section IIB.

§ 5 The basic characteristics (see Sub-Section IIA) are:

1) first symbol - type of modulation of the main carrier;

2) second symbol - nature of signal(s) modulating the main carrier;

3) third symbol - type of information to be transmitted.

Modulation used only for short periods and for incidental purposes (such as, in many cases, for identification or calling) may be ignored provided that the necessary bandwidth as indicated is not thereby increased.

Sub-Section IIA – Basic characteristics

§ 6. 1) First symbol - type of modulation of the main carrier

1.1	Emission of an unmodulated carrier N	**N**
1.2	Emission in which the main carrier is amplitude-modulated (including cases where sub-carriers are angle-modulated)	
1.2.1	Double-sideband	**A**
1.2.2	Single-sideband, full carrier	**H**

1.2.3	Single-sideband, reduced or variable level carrier	**R**
1.2.4	Single-sideband, suppressed carrier	**J**
1.2.5	Independent sidebands	**B**
1.2.6	Vestigial sideband	**C**
1.3	Emission in which the main carrier is anglemodulated	
1.3.1	Frequency modulation	**F**
1.3.2	Phase modulation	**G**
1.4	Emission in which the main carrier is amplitude- and angle-modulated either simultaneously or in a pre-established sequence	**D**
1.5	Emission of pulses **2**	
1.5.1	Sequence of unmodulated pulses	**P**
1.5.2	A sequence of pulses	
1.5.2.1	modulated in amplitude	**K**
1.5.2.2	modulated in width/duration	**L**
1.5.2.3	modulated in position/phase	**M**
1.5.2.4	in which the carrier is angle-modulated during the period of the pulse	**Q**
1.5.2.5	which is a combination of the foregoing or is produced by other means	**V**
1.6	Cases not covered above, in which an emission consists of the main carrier modulated, either simultaneously or in a pre-established sequence, in a combination of two or more of the following modes: amplitude, angle, pulse	**W**
1.7	Cases not otherwise covered	**X**

2 Emissions where the main carrier is directly modulated by a signal which has been coded into quantized form (e.g. pulse code modulation) should be designated under § 1.2) or 1.3).

2) Second symbol - nature of signal(s) modulating the main carrier

2.1	No modulating signal	**0**
2.2	A single channel containing quantized or digital information without the use of a modulating sub-carrier**3**	**1**
2.3	A single channel containing quantized or digital information with the use of a modulating sub-carrier**3**	**2**
2.4	A single channel containing analogue information	**3**
2.5	Two or more channels containing quantized or digital information	**7**
2.6	Two or more channels containing analogue information	**8**
2.7	Composite system with one or more channels containing quantized or digital information, together with one or more channels containing analogue information	**8**
2.8	Cases not otherwise covered	**X**

3 This excludes time-division multiplex.

3) Third symbol - type of information to be transmitted [4]

3.1	No information transmitted	**N**
3.2	Telegraphy - for aural reception	**A**
3.3	Telegraphy - for automatic reception	**B**
3.4	Facsimile	**C**
3.5	Data transmission, telemetry, telecommand	**D**
3.6	Telephony (including sound broadcasting)	**E**
3.7	Television (video)	**F**
3.8	Combination of the above	**W**
3.9	Cases not otherwise covered	**X**

4 In this context the word "information" does not include information of a constant, unvarying nature such as is provided by standard frequency emissions, continuous wave and pulse radars, etc.

Sub-Section IIB – Optional characteristics for the classification of emissions

§ 7 Two optional characteristics should be added for a more complete description of an emission. These are:

Fourth symbol - Details of signal(s)

Fifth symbol - Nature of multiplexing

Where the fourth or fifth symbol is used it shall be as indicated below.

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

1) Fourth symbol - Details of signal(s)

1.1	Two-condition code with elements of differing numbers and/or durations	**A**
1.2	Two-condition code with elements of the same number and duration without error-correction	**B**
1.3	Two-condition code with elements of the same number and duration with error-correction	**C**
1.4	Four-condition code in which each condition represents a signal element (or one or more bits)	**D**
1.5	Multi-condition code in which each condition represents a signal element (of one or more bits)	**E**

1.6	Multi-condition code in which each condition or combination of conditions represents a character	**F**
1.7	Sound of broadcasting quality (monophonic)	**G**
1.8	Sound of broadcasting quality (stereophonic or quadraphonic)	**H**
1.9	Sound of commercial quality (excluding categories given in sub-paragraphs 1.10 and 1.11)	**J**
1.10	Sound of commercial quality with the use of frequency inversion or band-splitting	**K**
1.11	Sound of commercial quality with separate frequency-modulated signals to control the level of demodulated signal	**L**
1.12	Monochrome	**M**
1.13	Colour	**N**
1.14	Combination of the above	**W**
1.15	Cases not otherwise covered	**X**

2. Fifth symbol - Nature of multiplexing

2.1	None	**N**
2.2	Code-division multiplex **5**	**C**
2.3	Frequency-division multiplex	**F**
2.4	Time-division multiplex	**T**
2.5	Combination of frequency-division multiplex and time-division multiplex	**W**
2.6	Other types of multiplexing	**X**

5 This includes bandwith expansion techniques.

PART B

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

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

1) use of the formulae included in the following table which also gives examples of necessary bandwidths and designation of corresponding emissions;

2) computation in accordance with ITU-R Recommendations1 ;

3) measurement, in cases not covered by 1) or 2) above.

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

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

Bn = Necessary bandwidth in hertz

B = Modulation rate in bauds

N = Maximum possible number of black plus white elements to be transmitted per second, in facsimile

M = Maximum modulation frequency in hertz

C = Sub-carrier frequency in hertz

D = Peak deviation, i.e., half the difference between the maximum and minimum values of the instantaneous frequency. The instantaneous frequency in hertz is the time rate of change in phase in radians divided by 2 *pi*

t = Pulse duration in seconds at half-amplitude

tr = Pulse rise time in seconds between 10% and 90% amplitude

K = An overall numerical factor which varies according to the emission and which depends upon the allowable signal distortion

Nc = Number of baseband channels in radio systems employing multi-channel multiplexing

fp = Continuity pilot sub-carrier frequency (Hz) (continuous signal utilized to verify performance of frequency-division multiplex systems).

Description of Emission	**Necessary Bandwidth**		**Designation of Emission**
	Formula	**Sample Calculation**	
I. NO MODULATING SIGNAL			
Continuous wave emission	-	-	**NONE**
II. AMPLITUDE MODULATION			
1. Signal with Quantized or Digital Information			
Continuous wave telegraphy, Morse code	$Bn = BK$ K = 5 for fading circuits K = 3 for nonfading circuits	25 words per minute; B = 20, K = 5 Bandwidth: 100 Hz	**100HA1AAN**
Telegraphy by on-off keying of a tone modulated carrier, Morse code	$Bn = BK + 2M$ K = 5 for fading circuits K = 3 for nonfading	25 words per minute; B = 20, M = 1 000, K = 5 Bandwidth: 2 100 Hz	**2K10A2AAN**

	circuits	= 2.1 kHz	
Selective calling signal using sequential single frequency code, single-sideband full carrier	*Bn* = *M*	Maximum code frequency is: 2 110 Hz *M* = 2 110 Bandwidth: 2 110 Hz = 2.11 kHz	**2K11H2BFN**
Direct-printing telegraphy using a frequency shifted modulating sub-carrier, with error-correction, single-sideband, suppressed carrier (single channel)	*Bn* = 2*M* + 2*DK* *M=B/2*	*B* = 50 *D* = 35 Hz (70 Hz shift) *K* = 1.2 Bandwidth: 134 Hz	**134HJ2BCN**
Telegraphy, multi-channel with voice frequency, error-correction, some channels are time-division multiplexed, singlesideband, reduced carrier	*Bn* = highest central frequency + *M* + *DK* *M=B/2*	15 channels; highest central frequency is: 2 805 Hz *B* = 100 *D* = 42.5 Hz (85 Hz shift) *K* = 0.7 Bandwidth: 2 885 Hz = 2.885 kHz	**2K89R7BCW**
2. Telephony (Commercial Quality)			
Telephony, double-sideband (single channel)	*Bn* = 2*M*	*M* = 3 000 Bandwidth: 6 000 Hz = 6 kHz	**6K00A3EJN**
Telephony, single-sideband, full carrier (single channel)	*Bn* = *M*	*M* = 3 000 Bandwidth: 3 000 Hz = 3 kHz	**3K00H3EJN**
Telephony, single-sideband, suppressed carrier (single channel)	*Bn* = *M* - lowest modulation frequency	*M* = 3 000 lowest modulation frequency is 300 Hz Bandwidth: 2 700 Hz = 2.7 kHz	**2K70J3EJN**
Telephony with separate frequency modulated signal to control the level of demodulated speech signal, single-sideband, reduced carrier (Lincompex) (single channel)	*Bn* = *M*	Maximum control frequency is 2 990 Hz *M* = 2 990 Bandwidth: 2 990 Hz = 2.99 kHz	**2K99R3ELN**

Telephony with privacy, single-sideband, suppressed carrier (two or more channels)	*Bn* = *Nc M* - lowest modulation frequency in the lowest channel	*Nc* = 2 *M* = 3 000 lowest modulation frequency is 250 Hz Bandwidth: 5 750 Hz = 5.75 kHz	**5K75J8EKF**
Telephony, independent sideband (two or more channels)	*Bn* = sum of *M* for each sideband	2 channels *M* = 3 000 Bandwidth: 6 000 Hz = 6 kHz	**6K00B8EJN**
Description of Emission	**Necessary Bandwidth**		**Designation of Emission**
	Formula	**Sample Calculation**	
3. Sound Broadcasting			
Sound broadcasting, double-sideband	*Bn* = 2*M* *M* may vary between 4 000 and 10 000 depending on the quality desired	Speech and music, *M* = 4 000 Bandwidth: 8 000 Hz = 8 kHz	**8K00A3EGN**
Sound broadcasting, single-sideband, reduced carrier (single channel)	*Bn* = *M* *M* may vary between 4 000 and 10 000 depending on the quality desired	Speech and music, *M* = 4 000 Bandwidth: 4 000 Hz = 4 kHz	**4K00R3EGN**
Sound broadcasting, single-sideband, suppressed carrier	*Bn* = *M* - lowest modulation frequency	Speech and music, *M* = 4 500 lowest modulation frequency = 50 Hz; Bandwidth: 4 450 Hz = 4.45 kHz	**4K45J3EGN**
4. Television			
Television, vision and sound	Refer to relevant ITU-R documents for the bandwidths of the commonly used television systems	Number of lines = 625; Nominal video bandwidth: 5 MHz Sound carrier relative to video carrier = 5.5 MHz; Total vision bandwidth: 6.25 MHz; FM sound bandwidth including guardbands: 750 kHz RF channel bandwidth: 7 MHz	**6M25C3F --** **750KF3EGN**
5. Facsimile			
		N = 1 100 corresponding to an index of cooperation of	

Analogue facsimile by sub-carrier frequency modulation of a single-sideband emission with reduced carrier, monochrome	*Bn* = *C* + *N/2* + *DK* *K* = 1.1 (typically)	352 and a cycler rotation speed of 60 rpm. Index of cooperation is the product of the drum diameter and number of lines per unit length. *C* = 1 900 *D* = 400 Hz Bandwidth: 2 890 Hz = 2.89 kHz	**2K89R3CMN**
Analogue facsimile; frequency modulation of an audio frequency sub-carrier which modulates the main carrier, single-sideband suppressed carrier	*Bn* = 2*M* + 2*DK* *M* =*N/2* *K* = 1.1 (typically)	*N* = 1 100 *D* = 400 Hz Bandwidth: 1 980 Hz = 1.98 kHz	**1K98J3C --**
6. Composite Emissions			
Double-sideband, television relay	*Bn* = 2*C* + 2*M* + 2*D*	Video limited to 5 MHz, audio on 6.5 MHz, frequency modulated sub-carrier, sub-carrier deviation = 50 kHz: *C* = 6.5 × 106 *D* = 50 × 103 Hz *M* = 15 000 Bandwidth: 13.13 × 106 Hz = 13.13 MHz	**13M1A8W --**
Double-sideband radio-relay system, frequency division multiplex	*Bn* = 2*M*	10 voice channels occupying baseband between 1 kHz and 164 kHz *M* = 164 000 Bandwidth: 328 000 Hz = 328 kHz	**328KA8E --**
Double-sideband emission of VOR with voice (VOR = VHF omnidirectional radio range)	*Bn* = 2*Cmax* + 2*M* + 2*DK* *K* = 1 (typically)	The main carrier is modulated by: - a 30 Hz sub-carrier - a carrier resulting from a 9 960 Hz tone frequency modulated by a 30 Hz tone - a telephone channel - a 1 020 Hz keyed tone for continual Morse identification *Cmax* = 9 960	**20K9A9WWF**

		M = 30 *D* = 480 Hz Bandwidth: 20 940 Hz = 20.94 kHz	
Independent sidebands; several telegraph channels with error-correction together with several telephone channels with privacy; frequency division multiplex	*Bn* = sum of *M* for each sideband	Normally composite systems are operated in accordance with standardized channel arrangements (e.g. CCIR Rec. 348-2). 3 telephone channels and 15 telegraphy channels require the bandwidth 12 000 Hz = 12 kHz	**12K0B9WWF**
Description of Emission	**Necessary Bandwidth**		**Designation of Emission**
	Formula	**Sample Calculation**	
III-A. FREQUENCY MODULATION			
1. Signal with Quantized or Digital Information			
Telegraphy without error-correction (single channel)	*Bn* = 2*M* + 2*DK* *M* = *B*/2 *K* = 1.2 (typically)	*B* = 100 *D* = 85 Hz (170 Hz shift) Bandwidth: 304 Hz	**304HF1BBN**
Telegraphy, narrow-band direct-printing with error-correction (single channel)	*Bn* = 2*M* + 2*DK* *M* = *B*/2 *K* = 1.2 (typically)	*B* = 100 *D* = 85 Hz (170 Hz shift) Bandwidth: 304 Hz	**304HF1BCN**
Selective calling signal	*Bn* = 2*M* + 2*DK* *M* = *B*/2 *K* = 1.2 (typically)	*B* = 100 *D* = 85 Hz (170 Hz shift) Bandwidth: 304 Hz	**304HF1BCN**
Four-frequency duplex telegraphy	*Bn* = 2*M* + 2*DK* *B* = Modulation rate in bauds of the faster channel. If the channels are synchronized: *M* = *B*/2	Spacing between adjacent frequencies = 400 Hz; Synchronized channels *B* = 100 *M* = 50 *D* = 600 Hz Bandwidth: 1 420 Hz	**1K42F7BDX**

	(otherwise $M = 2B$) $K = 1.1$ (typically)	= 1.42 kHz	
2. Telephony (Commercial Quality)			
Commercial telephony	$Bn = 2M + 2DK$ $K = 1$ (typically, but under certain conditions a higher value may be necessary)	For an average case of commercial telephony, $D = 5\ 000$ Hz $M = 3\ 000$ Bandwidth: 16 000 Hz = 16 kHz	**16K0F3EJN**
3. Sound Broadcasting			
Sound broadcasting	$Bn = 2M + 2DK$ $K = 1$ (typically)	Monaural $D = 75\ 000$ Hz $M = 15\ 000$ Bandwidth: 180 000 Hz = 180 kHz	**180KF3EGN**
4. Facsimile			
Facsimile by direct frequency modulation of the carrier; black and white	$Bn = 2M + 2DK$ $M = N/2$ $K = 1.1$ (typically)	$N = 1\ 100$ elements/sec; $D = 400$ Hz Bandwidth: 1 980 Hz = 1.98 kHz	**1K98F1C --**
Analogue facsimile	$Bn = 2M + 2DK$ $M = N/2$ $K = 1.1$ (typically)	$N = 1\ 100$ elements/sec; $D = 400$ Hz Bandwidth: 1 980 Hz = 1.98 kHz	**1K98F3C --**
5. Composite Emissions (see Table III-B)			
Radio-relay system, frequency division multiplex	$Bn = 2fp + 2DK$ $K = 1$ (typically)	60 telephone channels occupying baseband between 60 kHz and 300 kHz; rms per-channel deviation: 200 kHz; continuity pilot at 331 kHz produces 100 kHz rms deviation of main carrier. $D = 200 \times 103 \times 3.76 \times 2.02 = 1.52 \times 106$ Hz; $fp = 0.331 \times 106$ Hz; Bandwidth: 3.702×106 Hz = 3.702 MHz	**3M70F8EJF**

Radio-relay system, frequency division multiplex	$Bn = 2M + 2DK$ $K = 1$ (typically)	960 telephone channels occupying baseband between 60 kHz and 4 028 kHz; rms per-channel deviation: 200 kHz; continuity pilot at 4 715 kHz produces 140 kHz rms deviation of main carrier. $D = 200 \times 103 \times 3.76 \times 5.5 = 4.13 \times 106$ Hz; $M = 4.028 \times 106$; $fp = 4.715 \times 106$; $(2M + 2DK) > 2\ fp$ Bandwidth: 16.32 × 106 Hz = 16.32 MHz	**16M3F8EJF**
Radio-relay system, frequency division multiplex	$Bn = 2fp$	600 telephone channels occupying baseband between 60 kHz and 2 540 kHz; rms per-channel deviation: 200 kHz; continuity pilot at 8 500 kHz produces 140 kHz rms deviation of main carrier. $D = 200 \times 103 \times 3.76 \times 4.36 = 3.28 \times 106$ Hz; $M = 2.54 \times 106$; $K = 1$; $fp = 8.5 \times 106$; $(2M + 2DK) < 2\ fp$ Bandwidth: 17 × 106 Hz = 17 MHz	**17M0F8EJF**
Stereophonic sound broadcasting with multiplexed subsidiary telephony sub-carrier	$Bn = 2M + 2DK$ $K = 1$ (typically)	Pilot tone system; $M = 75\ 000$ $D = 75\ 000$ Hz Bandwidth: 300 000 Hz = 300 kHz	**300KF8EHF**

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

For FM/FDM systems the necessary bandwidth is:

$$Bn = 2M + 2DK$$

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

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

$$Bn = 2fp + 2DK$$

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

$$Bn = 2fp \text{ or } Bn = 2M + 2DK$$

whichever is greater.

Number of telephone channels Nc	Multiplying factor 1	
	(peak factor) × antilog	value in dB above modulation reference level / 20
$3 < Nc < 12$	4.47 × antilog	value in dB specified by the equipment manufacturer or station license, subject to administration approval / 20
$12 < Nc < 60$	3.76 × antilog	$\frac{2.6 + 2 \log Nc}{20}$

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

Number of telephone channels Nc	Multiplying factor 1	
	(peak factor) × antilog	value in dB above modulation reference level / 20
$60 < Nc < 240$	3.76 × antilog	$\frac{-1 + 4 \log Nc}{20}$

$Nc < 240$	3.76 × antilog	$\frac{-15 + 10 \log Nc}{20}$

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

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
IV. PULSE MODULATION			
1. Radar			
Unmodulated pulse emission	$Bn = 2K / t$ K depends upon the ratio of pulse duration to pulse rise time. Its value usually falls between 1and 10 and in many cases it does not need to exceed 6	Primary Radar Range resolution: 150 m K = 1.5 (triangular pulse where t tr, only components down to 27 dB from the strongest are considered) Then: Bandwidth: 3 × 106 Hz = 3 MHz	**3M00P0NAN**
2. Composite Emissions			
Radio-relay system	$Bn = 2K / t$ K = 1.6	Pulse position modulated by 36 voice channel baseband; pulse width at half amplitude = 0.4 *m*s Bandwidth: 8 × 106 Hz = 8 MHz (Bandwidth independent of the number of voice channels)	**8M00M7EJT**

RESOLUTION 646 (WRC-03)

Public protection and disaster relief

The World Radiocommunication Conference (Geneva, 2003),

considering

a) that the term “public protection radiocommunication” refers to radiocommunications used by responsible agencies and organizations dealing with maintenance of law and order, protection of life and property and emergency situations;

b) that the term “disaster relief radiocommunication” refers to radiocommunications used by agencies and organizations dealing with a serious disruption of the functioning of society, posing a significant widespread threat to human life, health, property or the environment, whether caused by accident, natural phenomena or human activity, and whether developing suddenly or as a result of complex, long-term processes;

c) the growing telecommunication and radiocommunication needs of public protection agencies and organizations, including those dealing with emergency situations and disaster relief, that are vital to the maintenance of law and order, protection of life and property, disaster relief and emergency response;

d) that many administrations wish to promote interoperability and interworking between systems used for public protection and disaster relief, both nationally and for cross-border operations in emergency situations and for disaster relief;

e) that current public protection and disaster relief applications are mostly narrow-band supporting voice and low data-rate applications, typically in channel bandwidths of 25 kHz or less;

f) that, although there will continue to be narrow-band requirements, many future applications will be wideband (indicative data rates in the order of 384-500 kbit/s) and/or broadband (indicative data rates in the order of 1-100 Mbit/s) with channel bandwidths dependent on the use of spectrally efficient technologies;

g) that new technologies for wideband and broadband public protection and disaster relief applications are being developed in various standards organizations[1];

h) that continuing development of new technologies such as IMT-2000 and systems beyond IMT-2000 and Intelligent Transportation Systems (ITS) may be able to support or supplement advanced public protection and disaster relief applications;

i) that some commercial terrestrial and satellite systems are complementing the dedicated systems in support of public protection and disaster relief, that the use of commercial solutions will

be in response to technology development and market demands and that this may affect the spectrum required for those applications and for commercial networks;

j) that Resolution 36 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference urges Member States to facilitate use of telecommunications for the safety and security of the personnel of humanitarian organizations;

k) that Recommendation ITU-R M.1637 offers guidance to facilitate the global circulation of radiocommunication equipment in emergency and disaster relief situations;

l) that some administrations may have different operational needs and spectrum requirements for public protection and disaster relief applications depending on the circumstances;

m) that the Tampere Convention on the Provision of Telecommunications Resources for Disaster Mitigation and Relief Operations (Tampere, 1998), an international treaty deposited with the United Nations Secretary-General and related United Nations General Assembly Resolutions and Reports are also relevant in this regard,

recognizing

a) the benefits of spectrum harmonization such as:

– increased potential for interoperability;

– a broader manufacturing base and increased volume of equipment resulting in economies of scale and expanded equipment availability;

– improved spectrum management and planning; and

– enhanced cross-border coordination and circulation of equipment;

b) that the organizational distinction between public protection activities and disaster relief activities are matters for administrations to determine at the national level;

c) that national spectrum planning for public protection and disaster relief needs to have regard to cooperation and bilateral consultation with other concerned administrations, which should be facilitated by greater levels of spectrum harmonization;

d) the benefits of cooperation between countries for the provision of effective and appropriate humanitarian assistance in case of disasters, particularly in view of the special operational requirements of such activities involving multinational response;

e) the needs of countries, particularly the developing countries[2], for low-cost communication equipment;

f) that the trend is to increase the use of technologies based on Internet Protocols;

g) that currently some bands or parts thereof have been designated for existing public protection and disaster relief operations, as documented in Report ITU-R M.2033 [3];

h) that for solving future bandwidth requirements, there are several emerging technology developments such as software-defined radio, advanced compression and networking techniques that may reduce the amount of new spectrum required to support some public protection and disaster

relief applications;

i) that in times of disasters, if most terrestrial-based networks are destroyed or impaired, **amateur**, satellite and other non-ground-based networks may be available to provide communication services to assist in public protection and disaster relief efforts;

j) that the amount of spectrum needed for public protection on a daily basis can differ significantly between countries, that certain amounts of spectrum are already in use in various countries for narrow-band applications, and that in response to a disaster, access to additional spectrum on a temporary basis may be required;

k) that in order to achieve spectrum harmonization, a solution based on regional frequency ranges[4] may enable administrations to benefit from harmonization while continuing to meet national planning requirements;

l) that not all frequencies within an identified common frequency range will be available within each country;

m) that the identification of a common frequency range within which equipment could operate may ease the interoperability and/or inter-working, with mutual cooperation and consultation, especially in national, regional and cross-border emergency situations and disaster relief activities;

n) that when a disaster occurs, the public protection and disaster relief agencies are usually the first on the scene using their day-to-day communication systems, but that in most cases other agencies and organizations may also be involved in disaster relief operations,

noting

a) that many administrations use frequency bands below 1 GHz for narrow-band public protection and disaster relief applications;

b) that applications requiring large coverage areas and providing good signal availability would generally be accommodated in lower frequency bands and that applications requiring wider bandwidths would generally be accommodated in progressively higher bands;

c) that public protection and disaster relief agencies and organizations have an initial set of requirements, including but not limited to interoperability, secure and reliable communications, sufficient capacity to respond to emergencies, priority access in the use of non-dedicated systems, fast response times, ability to handle multiple group calls and the ability to cover large areas as described in Report ITU-R M.2033;

d) that, while harmonization may be one method of realizing the desired benefits, in some countries, the use of multiple frequency bands can contribute to meeting the communication needs in disaster situations;

e) that many administrations have made significant investments in public protection and disaster relief systems;

f) that flexibility must be afforded to disaster relief agencies and organizations to use current and future radiocommunications, so as to facilitate their humanitarian operations,

emphasizing

a) that the frequency bands identified in this Resolution are allocated to a variety of services in accordance with the relevant provisions of the Radio Regulations and are currently used intensively by the fixed, mobile, mobile satellite and broadcasting services;

b) that flexibility must be afforded to administrations:

– to determine, at national level, how much spectrum to make available for public protection and disaster relief from the bands identified in this Resolution in order to meet their particular national requirements;

– to have the ability for bands identified in this Resolution to be used by all services having allocations within those bands according to the provisions of the Radio Regulations, taking into account the existing applications and their evolution;

– to determine the need and timing of availability as well as the conditions of usage of the bands identified in this Resolution for public protection and disaster relief in order to meet specific national situations,

resolves

1 to strongly recommend administrations to use regionally harmonized bands for public protection and disaster relief to the maximum extent possible, taking into account the national and regional requirements and also having regard to any needed consultation and cooperation with other concerned countries;

2 to encourage administrations, for the purposes of achieving regionally harmonized frequency bands/ranges for advanced public protection and disaster relief solutions, to consider the following identified frequency bands/ranges or parts thereof when undertaking their national planning:

– in Region 1: 380-470 MHz as the frequency range within which the band 380-385/390-395 MHz is a preferred core harmonized band for permanent public protection activities within certain countries of Region 1 which have given their agreement;

– in Region 2 [5]: 746-806 MHz, 806-869 MHz, 4 940-4 990 MHz;

– in Region 3 [6]: 406.1-430 MHz, 440-470 MHz, 806-824/851-869 MHz, 4 940-4 990 MHz and 5 850-5 925 MHz;

3 that the identification of the above frequency bands/ranges for public protection and disaster relief does not preclude the use of these bands/frequencies by any application within the services to which these bands/frequencies are allocated and does not preclude the use of nor establish priority over any other frequencies for public protection and disaster relief in accordance with the Radio Regulations;

4 to encourage administrations, in emergency and disaster relief situations, to satisfy temporary needs for frequencies in addition to what may be normally provided for in agreements with the concerned administrations;

5 that administrations encourage public protection and disaster relief agencies and organizations to utilize both existing and new technologies and solutions (satellite and terrestrial), to the extent practicable, to satisfy interoperability requirements and to further the goals of public protection and disaster relief;

6 that administrations may encourage agencies and organizations to use advanced wireless solutions taking into account *considering h)* and *i)* for providing complementary support to public protection and disaster relief;

7 to encourage administrations to facilitate cross-border circulation of radiocommunication equipment intended for use in emergency and disaster relief situations through mutual cooperation and consultation without hindering national legislation;

8 that administrations encourage public protection and disaster relief agencies and organizations to utilize relevant ITU-R Recommendations in planning spectrum use and implementing technology and systems supporting public protection and disaster relief;

9 to encourage administrations to continue to work closely with their public protection and disaster relief community to further refine the operational requirements for public protection and disaster relief activities;

10 that manufacturers should be encouraged to take this Resolution into account in future equipment designs, including the need for administrations to operate within different parts of the identified bands,

invites ITU-R

1 to continue its technical studies and to make recommendations concerning technical and operational implementation, as necessary, for advanced solutions to meet the needs of public protection and disaster relief radiocommunication applications, taking into account the capabilities, evolution and any resulting transition requirements of the existing systems, particularly those of many developing countries, for national and international operations;

2 to conduct further appropriate technical studies in support of possible additional identification of other frequency ranges to meet the particular needs of certain countries in Region 1 which have given their agreement, especially in order to meet the radiocommunication needs of public protection and disaster relief agencies.

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[1] For example, a joint standardization programme between the European Telecommunications Standards Institute (ETSI) and the Telecommunications Industry Association (TIA), known as Project MESA (Mobility for Emergency and Safety Applications) has commenced for broadband public protection and disaster relief. Also, the Working Group on Emergency Telecommunications (WGET), convened by the United Nations Office for Humanitarian Affairs (OCHA), is an open forum to facilitate the use of telecommunications in the service of humanitarian assistance comprising United Nations entities, major non-governmental organizations, the International Committee of the Red Cross (ICRC), ITU and experts from the private sector and academia. Another platform for coordination and to foster harmonized global Telecommunication for Disaster Relief (TDR) standards is the TDR Partnership Coordination Panel, which has just been established under the coordination of ITU with participation of international telecommunication service providers, related government departments, standards development organizations, and disaster relief organizations.

[2] Taking into account, for example, the ITU-D Handbook on disaster relief.

3-30, 68-88, 138-144, 148-174, 380-400 MHz (including CEPT designation of 380-385/390-395 MHz), 400-430, 440-470, 764-776, 794-806 and 806-869 MHz (including CITEL designation of 821-824/866-869 MHz).

[4] In the context of this Resolution, the term “frequency range” means a range of frequencies over which a radio equipment is envisaged to be capable of operating but limited to specific frequency band(s) according to national conditions and requirements.

[5] Venezuela has identified the band 380-400 MHz for public protection and disaster relief applications.

[6] Some countries in Region 3 have also identified the bands 380-400 MHz and 746-806 MHz for public protection and disaster relief applications.